

Marginalized Cultures and Sustainable Futures in the Global South

Nantchouang Djibie Dany Forming, Upama Saikia, Yun-Hao Chuang, Prachi V. Golhar, Deepjyoti Bora
Editors

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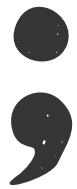
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Preface

This edited volume, *Marginalized Cultures and Sustainable Futures in the Global South*, brings together a diverse set of scholarly contributions that critically examine the intersections of marginality, identity, and sustainability across different socio-cultural and geopolitical contexts. In an era marked by rapid globalization, environmental crises, and persistent inequalities, the voices and lived experiences of marginalized communities remain central to understanding pathways toward more inclusive and sustainable futures.

The Global South, often characterized by historical legacies of colonialism, uneven development, and socio-political exclusion, presents a complex landscape where questions of identity, belonging, and justice are deeply intertwined with issues of sustainability. This book seeks to foreground these complexities by engaging with themes such as migration, displacement, cultural resilience, environmental governance, social exclusion, and grassroots resistance. Through interdisciplinary perspectives, the chapters collectively highlight how marginalized groups negotiate their identities and assert agency within structures that often seek to silence or exclude them.

One of the key aims of this volume is to move beyond dominant narratives that portray marginalized communities merely as passive victims. Instead, the contributions emphasize their resilience, adaptive strategies, and capacity for innovation in the face of structural challenges. Whether through cultural preservation, everyday forms of resistance, or engagement with policy and governance frameworks, these communities actively shape their own futures while contributing to broader discourses on sustainability and social justice.

The chapters included in this book reflect a wide geographical and thematic range, addressing issues such as repatriation and identity reconstruction, caste and subaltern resistance, migration and labor dynamics, environmental sustainability, and the politics of inclusion and exclusion. Together, they offer nuanced insights into how historical processes and contemporary realities intersect to influence both marginalization and opportunities for transformation.

This volume also aims to contribute to academic and policy debates by emphasizing that sustainable development cannot be achieved without addressing social inequalities and recognizing cultural diversity. The pursuit of sustainability must therefore be grounded in principles of equity, participation, and respect for local knowledge systems. By centering marginalized perspectives, this book advocates for more inclusive approaches to development that acknowledge the importance of social and cultural dimensions alongside economic and environmental considerations.

As editors, we are deeply grateful to all the contributors for their valuable research and commitment to advancing knowledge in this field. We also extend our appreciation to the reviewers and the publishing team for their support in bringing this volume to fruition. It is our hope that this book will serve as a meaningful resource for scholars, practitioners, and policymakers, and inspire further research and dialogue on marginalized cultures and sustainable futures in the Global South.

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Chapter 1: Identity, Belonging, and Integration: A Study of Repatriated Tamils in Tamil Nadu

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Abstract

During the British colonial period, large numbers of Indian Tamils were transported from Tamil Nadu to Ceylon (present-day Sri Lanka) to work on coffee and later tea plantations. By the time of independence, Indian Tamils constituted nearly twelve percent of Sri Lanka's population but were subjected to political exclusion, as nationalist policies portrayed them as a demographic and political threat. The Sirima–Shastri Pact of 1964 formalized the repatriation of 525,000 Indian Tamils to India while granting Sri Lankan citizenship to 300,000 others. Between 1964 and 1984, thousands were resettled in different regions of Tamil Nadu.This chapter examines the identity, belonging, and integration of repatriated Tamils, focusing on pre-repatriation experiences in Sri Lanka and post-repatriation realities in Tamil Nadu. Using a qualitative methodology, data were collected from 43 repatriated Tamils in Madurai, the Nilgiris, and Pudukkottai, supplemented by policy documents and scholarly literature. The analysis focuses on identity reconstruction, community relations, access to welfare provisions, employment opportunities, and participation in local social institutions.The findings reveal persistent marginalization in both contexts where repatriated Tamils were labeled as "Ceylonkaran" or "Kandykaran" in Tamil Nadu resulting in enduring social exclusion. The study argues that sustainable integration requires not only rehabilitation measures but also inclusive governance, social recognition, and participatory development that acknowledge the historical experiences of repatriated communities. By foregrounding identity and belonging, the paper contributes to broader debates on migration, ethnic marginalization, and social justice in contemporary India.

Keywords: Identity; Belonging; Repatriated Tamils; Sirima–Shastri Pact; Tamil Nadu

1. Introduction

1.1 Background of the Study

The migration of Indian Tamil labourers to Ceylon (present-day Sri Lanka) began in 1823 under British colonial administration, driven primarily by the labour demands of expanding plantation agriculture [1]. In its initial phase, this movement was largely seasonal and male-dominated, with workers travelling from Tamil Nadu to Ceylon for forest clearing, cultivation, and harvesting before returning to India [2]. This pattern changed significantly in the latter half of the nineteenth century following the collapse of the coffee industry in the 1860s due to the outbreak of coffee leaf rust [2]. The subsequent transition to tea cultivation, an industry requiring a permanent and stable workforce, led plantation owners to recruit Indian Tamil labourers as family units. This shift resulted in the establishment of long-term settlements in the central highlands of Ceylon [1].

Over time, the Indian Tamil population grew into a substantial demographic presence. Census records indicate that by 1921, Indian Tamils constituted approximately 13.5 percent of the island's population, numbering around 602,700 individuals [3]. At the time of Sri Lanka's independence in 1948, their population had increased to 757,264, accounting for nearly 12 percent of the total population, and by 1963 this figure had risen further to approximately 1,123,000 [3]. Despite their long-standing residence and vital contribution to the plantation economy, the majority of Indian Tamils remained without formal citizenship status [4].

The post-independence period was marked by the rise of Sinhalese nationalism, which increasingly framed Indian Tamils as political and demographic outsiders. The enactment of the Ceylon Citizenship Act of 1948 resulted in citizenship being granted to only a small fraction approximately 5,000 of Indian Tamils. Consequently, over 700,000 individuals, constituting nearly 11 percent of the population, were rendered stateless or classified as non-citizens [4]. Subsequent bilateral efforts, including the Nehru–Kotelawala Pact of 1954, failed to provide a durable solution to this issue [2]. By 1962, the Government of Ceylon identified approximately 975,000 people as "Indian nationals," while the Government of India classified them as "stateless." Although India did not accept formal legal responsibility for this population, it acknowledged a moral and emotional obligation towards their welfare [2]. This prolonged impasse ultimately led both governments to seek a more definitive bilateral settlement. A major turning point occurred with the signing of the Sirima–Shastri Pact on 30 October 1964. The agreement sought to determine the legal status of persons of Indian origin in Ceylon (APIOC). Under its provisions, 300,000 individuals were to be granted Sri Lankan citizenship, 525,000 were to be repatriated to India, and the status of the remaining 150,000 was left for future negotiation [5].

Between 1964 and 1984, an estimated 461,999 Indian-origin Tamils were repatriated [6] to South India. Many undertook the journey via the Uppāri train from the hill country to Talaimannar, followed by ferry transport to Rameswaram in Tamil Nadu. This repatriation process came to a halt in 1984 with the suspension of ferry services due to the escalation of the Sri Lankan civil war [2].

For over six decades, neither the Government of India nor the Government of Sri Lanka has systematically monitored the long-term socio-economic conditions, integration processes, or welfare outcomes of the repatriated population. Today, these communities are dispersed across several Indian states, including Tamil Nadu, Andhra Pradesh, Kerala, and the Andaman and Nicobar Islands, with smaller populations in Karnataka, Puducherry, and Gujarat.

This study focuses on repatriated Tamil families residing in Tamil Nadu, with particular attention to the districts of Pudukkottai, the Nilgiris, and Madurai. By foregrounding their narratives and lived experiences, the study seeks to examine the identity-related challenges faced by a population that has remained marginalized and largely absent from mainstream historical scholarship and policy discourse.

1.2 Statement of the Problem

Despite the large-scale repatriation of Indian Tamils from Sri Lanka to Tamil Nadu between 1964 and 1984, their long-term experiences of identity, belonging, and social integration remain under-researched. Existing studies and policies have primarily focused on administrative and material rehabilitation, neglecting the social and symbolic dimensions of integration. As a result, repatriated Tamils continue to experience marginalization, exclusion, and limited access to opportunities. The lack of systematic research has created a gap in understanding how historical displacement, state policies, and social attitudes shape their integration, underscoring the need for inclusive and socially just policy interventions.

1.3 Objectives and Research Questions

The primary objective of this study is to examine the processes of identity formation, belonging, and integration among repatriated Tamils in Tamil Nadu. The study seeks to understand how historical displacement, social perception, and institutional frameworks shape the lived experiences of these communities. Specifically, the study aims to:

1) Explore the pre-repatriation experiences of Indian Tamils in Sri Lanka and how these shape their post-repatriation identities in Tamil Nadu.
2) Examine the social, economic, and institutional dimensions of integration, including access to employment, welfare provisions, and community participation.

3) Investigate the strategies adopted by repatriated Tamils to negotiate inclusion, belonging, and social recognition within the host society.

Guided by these objectives, the study addresses the following research questions:

1. How do repatriated Tamils reconstruct and negotiate their identities after resettlement in Tamil Nadu?
2. What factors facilitate or hinder their sense of belonging within local communities?
3. How effective are government rehabilitation and welfare measures in enabling meaningful integration?

1.4 Significance of the Study

This study is significant as it centers the lived experiences of repatriated Tamils, a historically marginalised group, and expands the understanding of repatriation beyond administrative processes to include social, cultural, and psychological dimensions. It contributes to broader debates on migration, ethnic marginalisation, and social justice by highlighting the complexities of inclusion and exclusion despite shared ethnicity or language. Additionally, the study offers policy-relevant insights to support the development of more inclusive and culturally sensitive rehabilitation and welfare initiatives.

2. Background and Context

2.1 History of Repatriation

The repatriation of Indian Tamils from Sri Lanka to India represents a complex and historically significant migration process. During the British colonial period, Indian Tamils were initially brought to Ceylon to meet the labour demands of coffee and tea plantations [7]. By the mid-twentieth century, they had become a substantial demographic group, yet most remained without formal citizenship in Sri Lanka [7]. The post-independence period saw the enactment of the Ceylon Citizenship Act of 1948, which excluded the majority of Indian Tamils from citizenship, leaving them stateless or classified as non-citizens [8]. Bilateral attempts to resolve this issue, such as the Nehru–Kotelawala Pact of 1954, provided limited relief and failed to offer a durable solution [2].The Sirima–Shastri Pact of 1964 marked a turning point by formalizing the repatriation of 525,000 Indian Tamils to India while granting citizenship to 300,000 individuals in Sri Lanka. Between 1964 and 1984, an estimated 461,999 people were repatriated, primarily to Tamil Nadu [6], via train and ferry routes. Although framed as a “return” to the homeland, many repatriates faced a society culturally and socially unfamiliar to them, as generations born in Sri Lanka had limited direct ties to India. The cessation of repatriation in 1984 due to the escalation of the Sri Lankan civil war further limited migration options, leaving many families to navigate integration challenges in Tamil Nadu on their own.

2.2 Policy and Legal Framework

The repatriation of Indian Tamils was shaped by bilateral agreements between India and Sri Lanka that provided for rehabilitation and welfare measures, including land allocation, housing assistance, loans, and employment opportunities. Repatriates were offered work in the agricultural sector particularly tea plantations along with employment through initiatives such as the TANTEA tea factories, cotton mills, and jobs as bus drivers and conductors. However, implementation of these measures was uneven, and legal recognition was hindered by gaps in documentation, monitoring, and long-term welfare provision. Bureaucratic barriers and the absence of a comprehensive policy for social integration beyond material support limited meaningful inclusion, resulting in continued social marginalization despite formal citizenship and settlement assistance.

2.3 Socio-Economic Setting in Tamil Nadu

Upon arrival in Tamil Nadu, repatriated Tamils were initially accommodated in the Mandapam camp, where processes of marginalisation began. They were subsequently resettled primarily in districts such as Madurai, the Nilgiris, and Pudukkottai, with smaller populations dispersed across other regions. Most families were allocated agricultural land or absorbed into plantation-based employment; however, they faced challenging conditions marked by limited resources, inadequate water availability, lack of agricultural knowledge, poor infrastructure, and competition for employment opportunities.

Over time, some repatriates diversified their livelihoods by engaging in informal trade, small-scale businesses, and daily wage labour in local markets. Despite these efforts, economic mobility remained limited for many households. Social integration was similarly uneven. Although shared language facilitated basic communication, repatriated Tamils were frequently perceived as outsiders and labeled locally as “Ceylonkaran” or “Kandykaran,” reinforcing social boundaries and restricting access to community networks and social capital.

The cumulative impact of historical displacement, policy implementation, and socio-economic conditions has resulted in a situation where repatriated Tamils, despite being legally recognised as citizens, continue to negotiate identity, belonging, and integration within contexts shaped by structural and social exclusion. Understanding these dynamics provides essential context for examining the lived experiences, challenges, and adaptive strategies of repatriated communities in contemporary Tamil Nadu.

3. Literature Review

3.1 Identity and Belonging Theories

Identity and belonging are central to understanding the experiences of repatriated communities. Identity, in social science discourse, is often conceptualized as a dynamic

process through which individuals and groups negotiate self-understanding in relation to social structures and cultural norms [9,10]. Social identity theory highlights that group membership ethnic, linguistic, or national shapes both self-perception and social interactions, influencing how individuals are accepted or excluded within broader communities. Belonging, on the other hand, emphasizes the emotional, relational, and symbolic dimensions of integration [11]. It is not solely determined by legal recognition or residence status; instead, it emerges through social acceptance, cultural recognition, and participation in shared practices. For repatriated populations, navigating identity and belonging entails reconciling memories, cultural practices, and social expectations from both the place of origin and the host society. This dual process can generate tension, especially when communities face stigma or persistent marginalization despite shared ethnicity or language with the host population.

3.2 Return Migration and Repatriation Studies

Return migration has received considerable attention in migration studies, with scholars emphasizing its complex socio-economic, political, and psychological dimensions. Return is often idealized as a reintegration into a "homeland," yet empirical evidence indicates that return migrants frequently encounter exclusion, identity negotiation, and structural barriers to integration [12,13]. Repatriation, in particular, involves state-sponsored processes designed to facilitate the resettlement of displaced populations. Studies on repatriation highlight that material support, such as housing, employment, and legal recognition, is necessary but insufficient for ensuring meaningful integration [14,15]. Social and symbolic inclusion—acceptance within local communities, recognition of cultural practices, and the ability to participate in civic life remains crucial for long-term integration outcomes. Research on repatriated communities in postcolonial contexts demonstrates that historical displacement, bureaucratic inefficiencies, and social stigma often hinder the successful negotiation of identity and belonging, leaving populations in a persistent state of liminality between "home" and "host" [16,17].

3.3 Tamil Diaspora and Returnees

The Tamil diaspora provides a relevant lens for examining the experiences of repatriated Tamils. Studies on the Tamil diaspora emphasize the importance of transnational networks, cultural retention, and the role of historical memory in shaping identity [18,19]. Indian Tamils in Sri Lanka occupied a unique socio-political position as migrant labourers who, despite decades of residence, were systematically excluded from citizenship and political participation [7]. This experience of marginality had profound implications for identity formation, both in Sri Lanka and upon return to India. Research on returnees highlights the challenges of negotiating dual identities, as repatriated individuals may retain cultural practices and social norms from their country of origin

while adapting to the institutional, social, and linguistic realities of the host state [20]. Specifically, repatriated Tamils in Tamil Nadu were often socially labeled as "Ceylonkaran" or "Kandykaran," signaling a persistent boundary between local populations and returnees. Such labeling has implications for access to employment, social networks, and civic participation, illustrating that shared ethnicity does not automatically ensure belonging.

3.4 Research Gap

Despite extensive literature on migration, return migration, and diasporic communities, significant gaps remain regarding the long-term experiences of repatriated Tamils in Tamil Nadu. Existing studies tend to focus on administrative, economic, or historical dimensions, such as the scale of repatriation, housing allocations, or political negotiations [2,4]. While these contributions are valuable, they often overlook the social, cultural, and psychological dimensions of integration, particularly the processes through which identity, belonging, and social recognition are negotiated in post-repatriation contexts. There is limited empirical research documenting the lived experiences of repatriated individuals and families, their strategies for coping with exclusion, and the ways in which historical displacement continues to shape intergenerational identity formation.

Furthermore, studies on the Tamil diaspora largely examine transnational communities abroad, with less attention paid to intra-national returnees, especially in postcolonial India. The intersection of ethnicity, historical displacement, and socio-economic marginality in shaping long-term integration outcomes remains underexplored. Addressing this gap is crucial for both theoretical and policy-oriented scholarship. By focusing on identity reconstruction, community relations, and socio-economic integration of repatriated Tamils in Tamil Nadu, the present study contributes to a nuanced understanding of return migration that integrates historical, social, and cultural perspectives.

4. Conceptual / Theoretical Framework

Understanding the experiences of repatriated Tamils in Tamil Nadu requires a conceptual framework that integrates the interrelated notions of identity, belonging, and integration. These concepts provide the lens through which the study examines the social, cultural, and institutional dimensions of return migration.

Identity is understood as a dynamic and context-dependent construct shaped by social interactions, historical experiences, and cultural affiliations [10,9]. For repatriated Tamils, identity encompasses both individual and collective dimensions, reflecting their self-perception as members of a Tamil ethnic group, as former Sri Lankan residents, and as part of the host communities in Tamil Nadu. Identity formation in this context is

influenced by factors such as historical displacement, social labeling, and intergenerational transmission of cultural norms. The study draws on social identity theory to explore how repatriates negotiate these multiple affiliations and reconcile perceived differences between themselves and the host population.

Belonging refers to the sense of emotional attachment, social acceptance, and participation within a community [11]. Unlike legal citizenship, belonging is socially constructed and contingent on recognition by others, shared practices, and inclusion in social networks. For repatriated populations, belonging is closely linked to experiences of acceptance, marginalization, or exclusion, which shape their ability to participate fully in local social, cultural, and economic life. Investigating belonging allows the study to highlight the symbolic and relational aspects of integration that extend beyond material rehabilitation.

Integration is conceptualized as the multidimensional process through which repatriated individuals and communities establish social, economic, and political connections within the host society [21]. Integration encompasses access to resources, participation in civic and economic activities, and the recognition of cultural and social identities. In this study, integration is examined not only in terms of structural indicators such as employment, education, and welfare access but also in terms of relational outcomes, social acceptance, intergroup interactions, and community participation.

The analytical framework of this study positions identity, belonging, and integration as interdependent constructs that collectively shape the post-repatriation experiences of Tamil communities. Drawing on qualitative methodologies, the study investigates how repatriated Tamils reconstruct identity, navigate social boundaries, and develop a sense of belonging in contexts of historical displacement and structural marginalization. The framework emphasizes three dimensions:

Historical dimension: examining pre-repatriation experiences, displacement narratives, and social labeling in Sri Lanka;
Socio-cultural dimension: analyzing community relations, local perceptions, and cultural continuity in Tamil Nadu;
Institutional dimension: evaluating access to welfare, employment, education, and participation in local governance and civic life.

By situating these dimensions within the theoretical constructs of identity, belonging, and integration, the study provides a comprehensive approach for understanding the challenges and strategies of repatriated Tamils. This framework informs both the design of the research instruments and the interpretation of findings, allowing for a nuanced analysis that captures the complex interplay between individual agency, social recognition, and institutional support.

5. Methodology

This study adopts a qualitative, phenomenological approach to examine the lived experiences of Tamils repatriated from Sri Lanka to Tamil Nadu under the 1964 Sirima–Shastri Pact. Phenomenology allows for an in-depth exploration of the meanings participants assign to displacement, identity, and belonging, emphasizing both individual perception and collective memory. This approach aligns with the study's objectives of understanding how repatriated individuals interpret their socio-cultural realities in postcolonial South India.

5.1 Research Sites and Participants

Fieldwork was conducted in the Tamil Nadu districts of Pudukottai, Nilgiris, and Madurai, chosen for their substantial populations of repatriated Tamil families. These sites provided insight into regional variations in adaptation, livelihood opportunities, and social integration. A purposive sampling strategy recruited participants who either directly experienced repatriation or inherited its legacy. The total sample included 43 participants, comprising first-generation repatriates and their descendants, with attention to gender balance. Inclusion criteria required participants to have been repatriated under the Sirima–Shastri Pact or be immediate descendants, currently residing in relevant South Indian communities, and willing to share personal or family narratives.

5.2 Data Collection

Semi-structured interviews were the primary data source, conducted in Tamil to allow participants to narrate their experiences in their native language. Interviews, lasting 60–90 minutes, focused on migration, settlement, identity, and belonging. Oral histories preserved personal and collective memories, while case studies examined household-level experiences, family dynamics, and intergenerational narratives. Field observations complemented these methods by documenting everyday life, social interactions, and community engagement. Reflexive notes captured non-verbal cues and contextual details, helping to situate the analysis within its socio-cultural context.

5.3 Data Analysis

Data were analyzed using thematic analysis, identifying, coding, and interpreting patterns across interviews, oral histories, and case studies. Transcripts were prepared verbatim and translated into English where necessary. Initial coding was conducted manually and cross-verified using NVivo. Themes were developed around key dimensions such as displacement and loss, identity and belonging, citizenship and exclusion, labor and livelihood, and memory and resilience. These themes were then interpreted in relation to historical, political, and theoretical frameworks, enabling a nuanced understanding of both individual and collective experiences.

5.3.Ethical Considerations

The study adhered to strict ethical standards. Informed consent was obtained, confidentiality was maintained through pseudonyms, and sensitive information was handled with discretion. Given the emotionally charged nature of the topic, interviews were conducted with empathy, prioritizing participant comfort and well-being. Culturally appropriate research practices were followed throughout.

5.5 Limitations

The study acknowledges certain limitations. Trust-building required significant time due to participants' historical marginalization. Linguistic diversity across Tamil dialects sometimes necessitated interpretation and cross-verification. Emotional distress could arise when recalling traumatic experiences, and recall bias may have affected the accuracy of long-term recollections. Additionally, the findings are context-specific and may not be fully generalizable to all repatriated Tamil communities across South India.

6. Findings and Analysis

This section presents the findings from interviews, oral histories, and case studies with 43 participants, highlighting the lived experiences of repatriated Tamils in Tamil Nadu. The analysis is structured around three interrelated themes: Identity, Belonging, and Integration, reflecting both the theoretical framework and participants' narratives.

6.1 Identity

Living in Sri Lanka, their identity was closely tied to ethnicity and shaped by long-standing discrimination. Despite working on plantations for over 150 years, they were frequently labeled as "Indian Tamils" or "estate Tamils," designations that marked them as outsiders and reinforced social exclusion. As one participant explained, "We left because of fear… we witnessed burnings, mob attacks, harassment on buses"[22]. Ethnic violence emerged as the most significant factor influencing decisions to leave, including experiences of racial slurs such as "Kallathoni". Statelessness and denial of civil rights further heightened their vulnerability. Many plantation Tamils lacked formal citizenship documentation, leaving them politically marginalised and exposed to abuse. Participants frequently described a lifelong sense of exclusion, noting that they had never truly belonged under either colonial or post-independence governments. One participant poignantly remarked, "We were under English people, then Sinhala people never free" (23).Among repatriated Tamils, identity emerged as complex, fluid, and context-dependent. Participants described navigating multiple affiliations, including Sri Lankan Tamil, Indian Tamil, Ceylonkaran, Malayaga Tamil, or simply Tamil. Expressions of identity varied according to context, official, familial, or social, reflecting both cultural continuity and the pressures of integration.

Older generations tended to emphasize their Sri Lankan heritage, recalling life on plantations, social networks in Sri Lanka, and memories of displacement. As one participant noted, “I was born in Sri Lanka, so I am a Sri Lankan Tamil. We are living in India, so I would like to say we are Indian Tamils” (24). In contrast, younger generations often identify as Indian to facilitate social acceptance and avoid stigma: “My children feel ashamed to say they are repatriates; they just say they are Indian” (25).

Cultural practices, including the Tamil language, estate-based rituals, and traditional festivals, functioned as markers of identity and continuity, particularly in the Nilgiris. At the same time, participants described negotiating these identities in response to local perceptions. Labels such as “Ceylonkaran” or “Kandikaran” reinforced outsider status, prompting strategic adaptations of identity to navigate social interactions and access resources.

6.2 Belonging

Belonging was closely intertwined with social recognition, community acceptance, and participation in local networks. Despite formal citizenship, many repatriates reported experiences of social exclusion. Derogatory labels, verbal hostility, and social distancing were common, reflecting persistent prejudice from local communities. One participant recounted, “Even today neighbours say, ‘Who are you, refugee?’” (26). Exclusion extended to access to community resources, participation in local events, and relationships such as marriage alliances. Families often perceived repatriates as economic or social threats, leading to restrictions on intermarriage: “Nobody allowed to marry their daughters to Kandikaran. Relatives said we are coming to take lands” (27).Discrimination is intersected with class and caste dynamics, shaping access to employment, education, and social networks. Children experienced teasing in schools, while adults were sometimes excluded from community gatherings or ration distributions. Over time, partial integration occurred, particularly among younger generations, yet social acceptance remained uneven and contingent upon local perceptions and intergenerational negotiation.

6.3 Integration was examined across legal, economic, and social dimensions.

6.3.1 Legal and Citizenship Status:

All participants ultimately obtained Indian citizenship and essential legal documentation, such as Aadhaar and ration cards. While some participants received documents promptly, others encountered bureaucratic delays. One participant described visiting multiple offices over six months to obtain a ration card (28). The availability of formal citizenship enabled access to government services, but challenges persisted in banking, employment, and welfare programs, highlighting the uneven facilitation of formal integration.

6.3.2 Economic and Employment Integration:

Employment opportunities were frequently constrained by social prejudice and structural barriers. Participants reported being denied work explicitly due to repatriate status, while government jobs often required bribes, and quotas for repatriates were inconsistently implemented. The intersection of social stigma and economic marginality limited upward mobility, reinforcing perceptions of repatriates as outsiders within both labor and community networks.

6.3.3 Social Integration and Identity Negotiation:

Integration also involved negotiating social acceptance and identity. Many participants described strategic adjustments of identity, using the label "Indian Tamil" in public while retaining "Sri Lankan Tamil" within family and cultural contexts. Generational differences were notable, with younger members adopting Indian identities to facilitate school, work, and social interactions. Participants emphasized the persistence of both overt and subtle forms of exclusion, indicating that integration extends beyond legal recognition to encompass relational and symbolic inclusion.

6.3.4 Memory, Resilience, and Intergenerational Continuity:

Repatriated communities exhibited resilience through the preservation of selected cultural practices, oral histories, and estate-based memories. Participants emphasized the importance of intergenerational transmission, ensuring that younger members understood their heritage while adapting to the social realities of Tamil Nadu. However, some participants noted that the younger generation did not view the preservation of all cultural practices as necessary. These narratives illustrate how identity, belonging, and integration are negotiated dynamically over time, shaped by both historical displacement and contemporary social contexts.

6.4 Synthesis

The findings reveal a multi-layered experience of repatriation. Despite formal citizenship and legal recognition, repatriates continue to navigate structural barriers, social stigma, and identity tensions. Integration is uneven, contingent upon social perception, generational shifts, and local context. Cultural continuity and resilience help maintain a sense of identity and belonging, yet participants highlight that full social acceptance remains a challenge.The interplay of legal status, social recognition, and cultural identity underscores that integration cannot be measured solely by material rehabilitation. Rather, it requires attention to symbolic inclusion, relational networks, and participatory social engagement. These findings support theoretical perspectives on identity and belonging, demonstrating how historical displacement shapes contemporary social experiences, even within communities sharing ethnicity and language with the host population.

7. Discussion and Implications

The findings of this study highlight the complex and multidimensional experiences of repatriated Tamils in Tamil Nadu, illustrating the interplay between identity, belonging, and integration. Despite formal citizenship and legal recognition, repatriates continue to navigate social, economic, and cultural barriers, revealing that integration is not merely a matter of material rehabilitation but also of social and symbolic inclusion.

7.1 Identity Reconstruction and Negotiation

The study underscores that identity among repatriated Tamils is dynamic, fluid, and context-dependent. Participants' negotiation between Sri Lankan and Indian Tamil identities reflects both historical displacement and contemporary pressures to integrate into host communities. Older generations maintained a strong connection to Sri Lankan heritage, emphasizing plantation culture, language, and social norms, while younger generations often identify primarily as Indian to facilitate social acceptance and mitigate stigma. This generational shift illustrates the influence of social context, external labeling, and intergenerational adaptation on identity formation, echoing social identity theory [9] and the concept of belonging as relational and context dependent [11].The persistence of derogatory labels such as "Ceylonkaran" or "Kandikaran" demonstrates the enduring social markers of difference, even when formal citizenship is granted. These findings reinforce the idea that legal recognition alone is insufficient for full social inclusion; identity reconstruction is intimately tied to community acceptance, social networks, and symbolic recognition.

7.2 Belonging and Social Inclusion

Belonging emerged as a central theme, illustrating that social acceptance and participation are critical components of integration. Participants reported ongoing exclusion from community activities, social gatherings, and local networks, as well as restrictions on marriage alliances. These experiences highlight the intersections of repatriate status, caste, and local hierarchies, showing that integration is mediated not only by ethnicity but also by social stratification.Over time, partial integration was observed, particularly among younger generations who navigated both local norms and cultural continuity. However, subtle forms of prejudice persist, indicating that long-term social inclusion requires sustained attention to community attitudes and relational dynamics. This finding aligns with literature on return migration and repatriation [12, 13], emphasizing that reintegration is a gradual and negotiated process rather than an automatic outcome of formal resettlement.

7.3 Integration and Access to Resources

Legal and economic integration presented a mixed picture. While all participants ultimately acquired Indian citizenship and essential documents, bureaucratic delays and

uneven implementation of welfare provisions highlighted structural barriers. Employment opportunities were constrained by social prejudice and inconsistent application of quotas for repatriates, reinforcing marginalization in both labor markets and civic participation.The study demonstrates that integration is multidimensional, encompassing legal recognition, access to economic resources, and social participation. Structural support, such as welfare schemes and employment quotas, must be complemented by initiatives that promote social inclusion, reduce stigma, and foster participatory community engagement. These findings support the analytical framework proposed in this study, showing that identity, belonging, and integration are interdependent and mutually reinforcing.

7.4 Intergenerational Continuity and Cultural Resilience

A notable finding is the role of intergenerational transmission in shaping identity and belonging. Cultural practices, oral histories, and estate-based memories serve as tools for preserving heritage while facilitating adaptation to local contexts. Younger generations exhibit flexibility in identity expression, adopting Indian Tamil identities in public spaces while maintaining Sri Lankan heritage privately. This resilience underscores the importance of cultural continuity in promoting psychological well-being, community cohesion, and adaptive strategies among repatriated populations.

7.5 Policy and Social Implications

The findings have several policy and social implications. First, rehabilitation programs must go beyond material support to address symbolic and relational aspects of integration, including community sensitization, anti-discrimination measures, and participatory decision-making. Second, legal recognition must be paired with efficient and equitable access to welfare services, employment, and education, particularly for historically marginalized groups. Third, initiatives to preserve cultural heritage and intergenerational knowledge can strengthen both identity and social cohesion, supporting sustainable integration.

The study also contributes to broader migration and repatriation scholarship, emphasizing that shared ethnicity or language does not automatically guarantee inclusion. Historical displacement, social stigma, and local hierarchies continue to shape the lived experiences of repatriated communities, highlighting the need for inclusive governance and socially responsive policies.

7.6 Contribution to Theory

This study extends theoretical understanding of identity, belonging, and integration in postcolonial return migration contexts. It demonstrates that identity negotiation is not static but evolves across generations and social contexts. Belonging emerges as relational, contingent on community recognition, and integration is multidimensional, encompassing

legal, economic, and social domains. By situating repatriated Tamils within these frameworks, the study provides empirical evidence linking historical displacement to contemporary social inclusion and exclusion, offering insights relevant to other repatriated and returnee populations globally.

8. Conclusion and Recommendations

This study examined the lived experiences of repatriated Tamils in Tamil Nadu, focusing on the intertwined themes of identity, belonging, and integration. Drawing on interviews, oral histories, and case studies, the research highlighted the complex challenges faced by communities repatriated under the Sirima–Shastri Pact, as well as their resilience and adaptive strategies over generations.

8.1 Conclusion

Findings indicate that repatriated Tamils navigate fluid and context-dependent identities, balancing Sri Lankan heritage with Indian citizenship. Older generations often emphasize their Sri Lankan roots, while younger generations adopt Indian Tamil identities to facilitate social acceptance. Identity negotiation is shaped by both historical displacement and contemporary social pressures, illustrating the dynamic nature of belonging in postcolonial contexts.Despite formal citizenship and access to legal documentation, participants reported persistent social exclusion and discrimination. Derogatory labels, employment barriers, and caste-based prejudice limited both social participation and economic opportunities. These findings underscore that legal recognition alone is insufficient for meaningful integration; social acceptance, cultural continuity, and community participation are equally critical.

Integration emerged as a multidimensional process, encompassing legal status, economic opportunity, social networks, and symbolic inclusion. Repatriated communities demonstrated resilience through cultural preservation, intergenerational knowledge transfer, and adaptive strategies, highlighting the importance of cultural continuity and memory in fostering a sense of belonging and community cohesion.

The study contributes to theory by illustrating how identity, belonging, and integration are mutually reinforcing in the context of postcolonial return migration. It provides empirical evidence that historical displacement has enduring social and cultural consequences, even when populations share ethnicity and language with host communities.

8.2 Recommendations

The study recommends comprehensive integration strategies for repatriated communities, including holistic social and cultural support, streamlined access to legal

and welfare services, preservation of cultural heritage, equitable employment opportunities, and participatory governance to ensure inclusion and representation.

8.3 Closing Remarks

The experiences of repatriated Tamils in Tamil Nadu show that integration is complex, shaped by legal, social, and cultural factors. While these communities display resilience and adaptability, ongoing challenges underscore the need for inclusive policies. The study highlights identity and belonging, contributing insights to migration and return-migration research with relevance for other displaced populations.

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Chapter 2: Small Lives, Large Silences: Caste, Ethnic Marginality, and Resistance in *The God of Small Things*

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Abstract

This chapter examines *The God of Small Things* by Arundhati Roy through the lens of caste, ethnic marginality, and subaltern resistance, focusing on lives that remain socially invisible yet structurally crucial. Drawing upon Subaltern Studies, postcolonial theory, and anti-caste thought, the study foregrounds how Roy represents marginalized subjects particularly Velutha as figures silenced by caste ideology, state power, and social morality. The chapter situates the novel within broader debates on subaltern agency as articulated by Gayatri Chakravorty Spivak and Ranajit Guha, while also engaging with Homi K. Bhabha's ideas of marginality and ambivalence. Ambedkar's critique of caste provides a socio-political framework to understand the violence inflicted on bodies marked as "untouchable." Rather than portraying resistance as overt rebellion, Roy presents it through everyday gestures, forbidden love, and affective ties that challenge entrenched hierarchies. The chapter argues that the novel constructs a counter-narrative to dominant histories by centering "small lives" whose suffering and defiance expose the moral failures of caste society. Through close textual analysis and theoretical engagement, this study demonstrates how silence itself becomes a site of resistance in the novel.

Keywords: Caste, Subalternity, Marginality, Silence, Resistance, Untouchability, Social Exclusion, Postcolonial Indian Fiction, Arundhati Roy

Introduction

The God of Small Things is often described as a family novel shaped by memory and loss, yet its sustained engagement with caste places it firmly within debates about internal marginalization in India. Set in Kerala, a region frequently associated with political

awareness and social reform, the novel exposes how caste continues to organize everyday life beneath claims of progress. Roy shows that caste does not operate only through explicit discrimination but through subtle controls over labor, intimacy, memory, and social legitimacy. The character of Velutha occupies the center of this critique. Introduced as "a Paravan. A carpenter. He was also an excellent swimmer" (Roy 74), Velutha is defined simultaneously by skill and prohibition. His abilities are visible and useful, yet they do not translate into belonging. Despite being educated, politically aware, and technically skilled, he remains expendable within a social order that assigns value by birth rather than action. His fate exposes what B. R. Ambedkar identifies as caste's central logic: a system of "graded inequality" that fragments society and forecloses ethical social relations (Ambedkar 108–11). This paper reads the novel alongside anti-caste thought and subaltern studies to examine how caste functions as a form of internal ethnic marginality. Rather than attempting to restore a lost or silenced voice, the analysis focuses on how Roy's narrative reveals the conditions that make speech impossible. Through caste transgression, institutional punishment, and narrative silence, the novel represents resistance not as rebellion but as fragile, intimate moments that refuse complete erasure.

Objectives

1. To study how the novel presents caste as a social system that controls people's lives, relationships, and social status.
2. To understand how marginalized characters, especially Velutha, are shown as silenced and excluded because of caste.
3. To examine the idea of silence in the novel and how it is created by caste rules, social pressure, and state power.
4. To explore different forms of resistance in the novel, focusing on small, everyday acts rather than open political protest.
5. To use ideas from Subaltern Studies, postcolonial theory, and anti-caste thought to explain the experiences of marginal characters in the novel.
6. To show how the novel challenges dominant social and historical narratives by giving importance to ignored and suppressed lives.

Methodology

This chapter follows a qualitative and text-based research methodology, focusing on close reading and critical interpretation of the novel. The analysis is entirely based on the primary text of the novel and secondary theoretical and critical materials that have been provided, such as works from Subaltern Studies, postcolonial theory, and anti-caste writings. No external or unverified sources are used, and no data is created independently.

Caste as Social Law: Regulating "Small Lives" through Visible and Invisible Power

The caste in the novel operates as a social system that quietly governs daily life, relationships, and belonging. Roy shows that caste is not only enforced through open discrimination but also through ordinary rules that appear "natural" inside the family and community. Even the novel's early descriptions of Ayemenem suggest that order depends on strict classification what can be named, what can be separated, and what must remain in its "proper" category (Roy 40). This emphasis on classification becomes a way to understand how caste works: it fixes identity, controls intimacy, and punishes transgression (Roy 40).

Roy directly connects this system of classification to what she calls the "laws" of love and family. These rules are not written in legal books, yet they behave like law because they decide what is allowed and what is forbidden. When Roy describes the "laws that lay down who should be loved and how. And how much," she makes caste and kinship rules appear as part of a wider structure that controls meaning itself who counts as family, who counts as pure, and who counts as untouchable (Roy 40). Roy writes:

> "Looking back now, to Rahel it seemed as though this difficulty that their family had with classification ran much deeper than the jam-jelly question.
> Perhaps Ammu, Estha and she were the worst transgressors. But it wasn't just them. It was the others too. They all broke the rules. They all crossed into forbidden territory. They all tampered with the laws that lay down who should be loved and how. And how much. The laws that make grandmothers grandmothers, uncles uncles, mothers mothers, cousins cousins, jam jam, and jelly jelly". (Roy 40)

This passage is central because Roy places caste-like regulation inside the language of everyday "sense." By listing relationships and objects together "grandmothers," "uncles," "jam," and "jelly" Roy suggests that the community treats human bonds as something that must remain correctly labeled and separated (Roy 40). When Ammu and Velutha cross caste boundaries, the act is framed not as a personal choice but as a violation of social law. The narrative shows that such transgression produces fear and collective anger because it threatens the structure that maintains hierarchy (Roy 40). This logic mirrors Ambedkar's explanation of caste as a system that survives because inequality is not random; it is arranged in levels where even those who are oppressed may gain small privileges above others, making the whole structure difficult to break. In the provided material, this idea is explained through Ambedkar's concept of "graded inequality," where

social groups are ranked in steps, and each group has an interest in maintaining the hierarchy. The text states:

> It has created what Ambedkar describes as a system of "graded inequality" in which
> "there is no such class as a completely unprivileged class except the one which is at the base of the social pyramid. The privileges of the rest are graded. Even the low is privileged as compared with lower. Each class being privileged, every class is interested in maintaining the system." (Ambedkar 27)

This helps explain why Roy's Ayemenem community responds to Velutha's relationship with Ammu not simply with disapproval but with harsh punishment. Velutha's caste position makes him vulnerable because his life is socially treated as disposable, even when he is competent and valuable to the family's daily functioning (Roy 40). Roy shows that the police find Velutha and arrest him even before the funeral is over, and the description of handcuffs and bodily detail makes clear that violence is not accidental it is built into the system that disciplines the "Untouchable" body (Roy 40). The narrative's movement from "laws" of love to police capture suggests that informal social rules and formal state power work together (Roy 40). Caste, then, is shown as a structure that controls not only labor and public life but also the most intimate spaces of emotion and desire. Roy presents the "small lives" of Ammu and Velutha as trapped inside a social order where crossing boundaries becomes unthinkable, and yet the crossing occurs revealing the real nature of the "laws" that govern society (Roy 40). In this way, the novel prepares the ground for understanding silence: when law and society decide in advance who can be legitimate, those placed outside legitimacy are also pushed outside speech and justice (Roy 40; Ambedkar 27).

Silence, Subalternity, and the Denial of Speech

The silence in the novel functions as a social condition imposed on marginalized subjects rather than a personal choice. Roy repeatedly shows that silence is produced by caste hierarchy, family authority, and state power. Characters like Velutha are not silent because they lack thought or emotion, but because the social structure refuses to recognize their voice as meaningful. This enforced silence reflects the broader condition of subalternity, where speech exists but is rendered ineffective or illegible within dominant systems (Roy 308). Velutha's position in the novel closely aligns with what Subaltern Studies defines as the subaltern subject someone excluded from institutional power and denied representation in official narratives. Although Velutha is politically conscious and associated with the Communist Party, his political identity does not protect him. Roy shows that ideology cannot override caste identity. When Velutha is accused of kidnapping and rape, his version of events is never recorded or considered. Instead, the

police narrative becomes the only "truth" that survives (Roy 308). This confirms Ranajit Guha's argument that subaltern history is often accessible only through elite or state records, which distort or erase subaltern experience (Guha xv). Gayatri Chakravorty Spivak's question *"Can the subaltern speak?"* is especially relevant to Velutha's fate. Spivak argues that the subaltern's speech does not disappear but is structurally prevented from being heard or acknowledged within dominant discourse (Spivak 308). She writes: "The subaltern cannot speak. There is no virtue in global laundry lists with "woman" as a pious item. Representation has not withered away. The female intellectual has a circumscribed task which she must not disown with a flourish". (Spivak 308)

Spivak's argument helps explain why Velutha's silence in the novel is not a narrative gap but a political reality. Velutha does not testify, confess, or narrate his own suffering. His body becomes the site where meaning is produced through beating, injury, and death while his voice is excluded. Roy describes the police violence inflicted on Velutha in graphic detail, emphasizing how his body absorbs punishment meant to restore social order (Roy 310). The brutality of this scene shows that silence is enforced not only through neglect but through physical annihilation. The role of the state is crucial in this process. Roy portrays the police not as neutral agents of law but as active participants in caste enforcement. The speed with which Velutha is arrested and beaten demonstrates how state institutions support dominant social norms rather than challenge them. Guha claims that this reflects Subaltern Studies' claim that postcolonial institutions often reproduce colonial structures of domination instead of dismantling them.

Silence in the novel is not limited to Velutha alone. Ammu also experiences enforced silence as a woman who violates social expectations. After Velutha's death, Ammu is denied the right to mourn publicly, speak openly, or remain within the family space. Her suffering is minimized, and her voice is treated as disruptive rather than legitimate. Roy shows that while Ammu belongs to a higher caste, her gender places her in a vulnerable position, creating overlapping forms of marginalization.

At the narrative level, Roy uses silence as a deliberate strategy. The fragmented structure of the novel, its repetition, and its gaps reflect the difficulty of representing subaltern suffering within language itself. By refusing a linear or complete account of Velutha's death, Roy exposes the violence involved in official storytelling. These narrative silences force readers to confront what cannot be fully recovered or spoken within oppressive systems. Thus, silence in the novel operates as both evidence of oppression and a critique of dominant narratives. It reveals how caste and power work together to erase certain lives from history, while also reminding readers of the ethical limits of representation.

Resistance, Transgression, and the Politics of the "Small"

The resistance does not appear as organized rebellion or heroic political action. Instead, Arundhati Roy presents resistance through intimate, fragile, and everyday acts that challenge caste and social authority. These acts are "small" in scale but deeply threatening to the social order because they question the naturalness of hierarchy. The relationship between Ammu and Velutha is the most significant example of such resistance. Their love directly violates caste boundaries and exposes the cruelty underlying social rules that claim moral legitimacy (Roy 334). Roy presents this relationship not as a romantic ideal but as a dangerous crossing that carries inevitable consequences. The novel repeatedly emphasizes that Ammu and Velutha are aware of the risks involved. Their resistance is not based on ignorance but on conscious transgression. Roy describes their meetings as moments suspended outside social time, suggesting that love briefly creates a space where caste loses its authority (Roy 334). This is evident in the following passage:

> *"They lay there listening to the river.*
> *The dark water flowed past them, carrying with it floating swathes*
> *of garbage, lit by the broken yellow moon.*
> *The river was full of shit and pesticides bought with World Bank loans.*
> *But even its slow, sludging silence contained a whisper of revolution.*
> *There was a sense of something quietly, deeply, unspeakably wrong*
> *in the way the world worked.*
> *And it was this quiet wrongness that Ammu and Velutha held close." (Roy 334)*

This passage is important because Roy links personal intimacy with political awareness. The "whisper of revolution" does not emerge from slogans or speeches but from shared recognition of injustice. Velutha's resistance is further complicated by his association with the Communist movement, but his political identity fails to protect him, revealing the limits in a society structured by caste**.** This reflects Ambedkar's argument that caste cannot be dismantled through economic reform alone because it is rooted in social and religious practice rather than class relations.

Velutha's love is redefined as criminal behavior, and his silence is used as proof of guilt rather than injustice (Roy 310). Roy presents the destruction of Velutha's body as the final method through which resistance is silenced. His death is described with careful attention to physical detail, emphasizing the disproportionate violence used against him:

> *"They hit him with the boots.*
> *On his back. His neck. His head.*
> *Till the skin on his ribs split and the blood came out.*
> *Till the sounds inside him stopped.*

Till the world became quiet again. (Roy 310)"

This scene demonstrates how caste society restores "order" through physical annihilation. The repetition of short sentences mirrors the mechanical nature of violence, suggesting that such punishment is routine rather than exceptional (Roy 310). Resistance is not debated or negotiated it is crushed. Ammu's resistance is also punished, though in less visibly violent ways. After Velutha's death, she is expelled from the family space and denied dignity even in death. Her body is cremated quickly, without ceremony, reinforcing how women who transgress social norms are erased rather than remembered (Roy 161). Roy shows that resistance by women is treated as moral failure rather than political defiance (Roy 161). Despite this, Roy does not portray resistance as meaningless. The novel itself becomes an act of resistance by refusing to forget Velutha and Ammu. By centering their story, Roy challenges dominant histories that erase subaltern suffering. Homi K. Bhabha's idea that marginal narratives disrupt the authority of dominant discourse is relevant here, as the novel creates meaning from what is socially excluded (Bhabha 199). Ultimately, the novel suggests that even failed resistance matters. Small acts of love, memory, and refusal expose the injustice of caste society, even when they do not dismantle it. These acts leave traces emotional, ethical, and narrative that challenge silence and demand recognition.

This chapter has examined the novel as a narrative that exposes how caste, marginality, and silence shape and destroy "small lives" in postcolonial Indian society. Roy emphasizes that the othering is not done through open discrimination but through everyday practices that normalize exclusion. The silence in the novel is not chosen by the marginalized but imposed at them through daily practices. Resistance does not appear as organized political revolt but as intimate acts of love, memory, and transgression. The relationship between Ammu and Velutha challenges caste and represents resistance but this resistance is crushed through violence. By blending together the "small lives" and the "large silences" the chapter exposes the moral failure of a society that claims progress while continuing to practice caste violence. The novel forces the readers to rethink history, justice, and **re**sistance from the perspective of the marginalised.

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Chapter 3: Intersecting Inequalities in a Warming World: Gender, Climate Vulnerability and Rights-Based Development

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Abstract

Climate change isn't just an environmental issue; it's a complex social challenge that hits marginalized groups the hardest, especially women. This chapter takes a deep dive into the complex connections between gender, climate vulnerability, and rights-based development. It brings together key ideas like intersectionality, feminist political ecology, the capabilities approach, climate justice, and gender-sensitive disaster risk reduction. By examining evidence from various parts of the world particularly Sub-Saharan Africa, South Asia, and Latin America it highlights how social factors such as gender, age, race, class, caste, and ethnicity shape these vulnerabilities. Through in-depth case studies, such as those involving smallholder women farmers, the impact of urban heat in informal settlements, and climate-driven migration, the chapter showcases how rights-based, participatory, and intersectional strategies can boost adaptive capacity and resilience. It also examines policy frameworks like the UNFCCC Gender Action Plan, National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs), SDG 5, SDG 13, and CEDAW, highlighting their importance in making gender-responsive climate action a reality. The chapter concludes by pinpointing the obstacles to putting ideas into action, suggesting innovative policy approaches, and offering insights on how to integrate gender, social justice, and human rights into climate governance at both the global and national scales. By situating climate vulnerability within the broader framework of social, economic, and political systems, this chapter provides a comprehensive blueprint for equitable, effective, and justice-oriented climate adaptation and development.

Keywords: Gender and climate change, Intersectionality, Climate vulnerability, Rights-based development, Feminist political ecology, Capabilities approach, Climate justice, Disaster risk reduction, Adaptation policy, Gender-responsive governance

1. Introduction

Climate change is turning into more than just an environmental issue these days. It is a big social and political problem that affects how development happens, human security, and even social justice all over the world. The physical parts like higher temperatures, stronger storms, longer dry spells, and rising seas are pretty well known. But the way these impacts hit different people is not even at all. It is tied to inequalities in gender, class, race, caste, ethnicity, age, and where people live. The IPCC report from 2022 talks about this. So climate change makes existing problems worse, and it shows how development models often ignore these differences.

Gender plays a huge role in who gets hit hardest by climate stuff and who can bounce back. Women and gender diverse folks, especially in the Global South, deal with more because of how labor is divided by gender, not enough access to resources, less freedom to move around, and not being included in decisions. Sources like Agarwal from 2010 and UN Women in 2021 point this out. But gender is not the only thing. A womans risk depends on her class, caste or race, age, if she has disabilities, and where she fits in the global economy. This means we need an intersectional way to look at it, to get the full picture of real lives in a hotter world.

Thinking development through a rights-based lens that incorporates intersectionality and climate justice can significantly address gender vulnerabilities, making progress fairer and more sustainable. Instead of lumping all women into one vulnerable category, we need to recognize how power dynamics and inequalities create distinct risks and adaptation strategies. By integrating feminist political ecology, the capabilities approach, and human rights principles, we can bridge the gap between theory and practical policies for improved climate governance. This perspective examines how gendered climate vulnerability aligns with global frameworks like the UNFCCC, SDGs, CEDAW, and national initiatives such as NDCs, NAPs, and DRR strategies. While there's a growing recognition of gender issues, substantial gaps remain in translating this awareness into real change rather than mere rhetoric. We can look at case studies from Africa, Asia, and Latin America, along with some policy recommendations to address key questions. For instance, how do social identities intersect to shape gendered vulnerability to climate change? What does a rights-based, intersectional approach contribute to fostering climate-resilient development, and how can global and national policies better incorporate gender justice in climate action? It's important to understand that climate risks aren't just natural phenomena; they stem from social structures and unequal access to resources, institutions, and power.

Disasters like floods, heatwaves, and droughts affect regions differently, but social frameworks determine who is most exposed, who suffers the most, and who has the capacity to adapt. Blaikie and others highlighted this in 2014, challenging the tech-centric

adaptation strategies that focus solely on infrastructure or financial resources while neglecting justice.

Women often find themselves in roles that heighten their vulnerability to climate impacts, such as farming, fetching water, and engaging in informal work. In many low-income countries, women are responsible for subsistence farming and household water needs, making them particularly susceptible to climate-induced scarcity. The FAO's 2018 data supports this. Additionally, patriarchal systems often prevent women from formally owning land, which limits their access to credit, services, and climate-related technology. To truly understand gendered vulnerability, embracing intersectionality is essential. Take Indigenous women in Latin America, they face extra risks from losing land, environment damage, being pushed out politically. Or poor urban women in African and Asian cities, more heat stress because bad housing, no cooling, shaky jobs. Satterthwaite and team in 2020 cover this. It shows vulnerability is not built in, it comes from overlapping oppressions. Some people might see it differently, but it seems like that is the main point.

1.1 Why Gender Matters in Climate Vulnerability

When we talk about climate vulnerability, gender plays a crucial role—not because women are inherently weaker or less capable, but because the dynamics of power related to gender influence how resources, knowledge, and decision-making are accessed. Feminist scholars warn against narratives that paint women solely as victims of climate change. Instead, they highlight women as active participants in adaptation, as holders of vital knowledge, and as leaders within their communities (Resurrección, 2013). However, the reality is that structural inequalities still exist. Women are often underrepresented in climate governance at local, national, and global levels, which limits their ability to influence strategies for adaptation and mitigation (Alston, 2014). Climate policies that ignore gender can inadvertently reinforce existing inequalities by overlooking unpaid care work, informal economies, and the different mobility challenges faced by various groups. Therefore, taking gender into account in climate action isn't just a moral obligation; it's essential for creating effective and inclusive adaptation strategies.

2. Conceptual Framework – Intersectionality and Climate

2.1 Intersectionality Theory and Climate Vulnerability

Concept introduced by Kimberlé Crenshaw (1989), offers a vital perspective for understanding how various aspects of identity like gender, race, class, caste, ethnicity, age, and disability interact to create unique experiences of both oppression and privilege. When applied to climate change, intersectionality reveals that vulnerability isn't the same across different social groups; it's shaped by overlapping systems of inequality (Kaijser & Kronsell, 2014). For example, while women in rural Sub-Saharan Africa may be at risk from agricultural disruptions caused by drought, Indigenous women in the Amazon are

facing their own set of challenges, including deforestation, loss of traditional lands, and limited political representation. This results in a unique and compounded vulnerability (Pulido, 2017).

In South Asia, women living in urban poverty are grappling with a harsh reality filled with heat stress, water shortages, and inadequate housing. These challenges are deeply connected to caste systems and job instability (Sultana, 2014). The idea of intersectionality helps us see vulnerability in a more complex light, moving beyond a simple statement like "women are vulnerable" to a richer analysis that reveals how power dynamics influence various climate impacts. This perspective is essential for crafting equitable adaptation policies, as it identifies who is most at risk and the underlying reasons, ensuring that our efforts don't inadvertently reinforce existing inequalities.

2.2 Feminist Political Ecology

Feminist political ecology (FPE) takes this intersectional lens and applies it to the ecological and political aspects of environmental change (Rocheleau, Thomas-Slayter, & Wangari, 1996). FPE looks at how gendered power dynamics influence access to natural resources, control over productive work, and resilience when facing environmental challenges. For instance, in many areas, women's agricultural work is essential for food security, yet it often goes unrecognized, underpaid, and excluded from formal policies. In water-scarce regions of South Asia, women are primarily responsible for securing water for their households, a task that's becoming increasingly difficult due to shifting rainfall patterns and dwindling aquifers (Agarwal, 2010). Feminist political ecology not only sheds light on these disparities but also emphasizes women's knowledge and agency, recognizing them as vital players in sustainable resource management and climate adaptation efforts. By weaving FPE into climate vulnerability assessments, policymakers and practitioners can better understand the political aspects of resource distribution, ensuring that adaptation strategies empower marginalized communities instead of reinforcing existing power structures (Elmhirst, 2011).

2.3 The Capabilities Approach

The capabilities approach, introduced by Amartya Sen in 1999 and further developed by Martha Nussbaum in 2000, provides a unique lens for examining climate vulnerability and development. Unlike the traditional welfare models that focus solely on income or resource distribution, this approach emphasizes what individuals can actually achieve and become their real opportunities to lead fulfilling lives. When we think about climate change, these capabilities might include securing food and water, having access to safe housing, participating in governance, and maintaining good health. Sadly, climate change often impacts marginalized communities the most, threatening these vital capabilities. For example, during heatwaves in urban slums, women frequently struggle to juggle productive work and caregiving, while flooding in low-income rural areas can drastically

hinder children's educational prospects (Sen, 1999). By combining the capabilities approach with intersectionality, we lay a strong groundwork for rights-based development that connects social justice, human rights, and climate adaptation. This blend enables us to assess not just vulnerability but also how effective resilience-building efforts are, ensuring they truly enhance people's freedoms rather than imposing top-down solutions.

2.4 Rights-Based Development Frameworks

A rights-based approach (RBA) to development focuses on the legal and moral rights of individuals, emphasizing participation, accountability, non-discrimination and empowerment (United Nations, 2003). Within the climate context, RBA dovetails with gender-responsive adaptation by affirming women's rights to resources, decision-making, and protection from the harms caused by climate change.

The idea of weaving intersectionality into rights-based development highlights the need for legal and policy protections to tackle structural inequalities. Take CEDAW, for instance it calls for equality between women and men across all areas, like access to land, credit, and public participation. However, intersectional barriers, such as those related to caste or ethnicity, often stand in the way of these rights being fully realized in practice (UN Women, 2018). By merging intersectionality with feminist political ecology and the capabilities approach, a rights-based development framework offers a powerful conceptual toolkit for examining climate vulnerability and crafting policies that are both fair and effective.

2.5 Climate Justice Theory

Climate justice theory places climate change within the context of wider social, economic, and historical inequalities, focusing on responsibility, equity, and human rights (Schlosberg & Collins, 2014). It pushes back against the traditional view of climate action as merely a technical issue, instead acknowledging that historical emissions, global power dynamics, and socioeconomic gaps play a significant role in shaping vulnerability. From a gender perspective, climate justice advocates for policies that redistribute resources, recognize unpaid labor, and empower marginalized communities. This approach aligns with international policy frameworks like the UNFCCC Gender Action Plan, SDG 5 (gender equality), and SDG 13 (climate action), all of which aim to integrate gender equity into climate governance.

2.6 Gender and Disaster Risk Reduction (DRR)

When it comes to disaster risk reduction, there's a growing recognition of how crucial it is to incorporate gender-responsive strategies. Effective DRR acknowledges that women, men, and individuals of diverse gender identities face hazards in unique ways, shaped by their social roles, mobility, and access to information (Shaw, 2012).

For instance:

• Early warning systems need to consider who can access communication tools.

• Evacuation plans should consider responsibilities like childcare and caring for the elderly.

• Post-disaster relief efforts must ensure that resources are distributed fairly to marginalized households.

By weaving together DRR with intersectional and rights-based approaches, can make climate adaptation and disaster management not only more effective but also more inclusive, boosting resilience while fostering justice.

3. Climate Change Impacts and Gendered Vulnerability

3.1. Heat, Drought, Floods, and Storms:

Differential Impacts Climate change shows up in various forms—like extreme heat, long-lasting droughts, fierce storms, and rising sea levels—each bringing about different social consequences. These effects aren't the same for everyone; social roles, access to resources, and limitations on mobility all play a part in how people experience and cope with these challenges.

3.1.1 Heat and Urban Vulnerability

In urban areas, heatwaves hit women in low-income communities particularly hard, especially in the Global South. This is largely due to cramped living conditions, a lack of cooling facilities, and caregiving duties that restrict their ability to move around (Satterthwaite et al., 2020). Older women, pregnant women, and those with existing health issues are at an even greater risk of suffering from heat-related illnesses and fatalities. Additionally, factors like caste or socioeconomic status can make things worse; for example, low-caste women living in Indian slums often find themselves in poorly ventilated homes with limited access to clean drinking water.

3.1.2 Drought and Agricultural Livelihoods

Drought takes a heavy toll on rural communities that rely on rain-fed agriculture. Women, who often handle subsistence farming and oversee the household's food and water security, face the toughest challenges as labor demands increase in water-scarce situations (Agarwal, 2010). In regions like Africa and South Asia, women might find themselves trekking longer distances to fetch water, cutting back on their own food intake to ensure their families are fed, or even giving up paid work to focus on household needs. At the same time, as men migrate in search of employment, women are left to navigate the uncertainties of agricultural production, underscoring the unequal burden of climate change on different genders.

3.1.3 Floods and Coastal Hazards

Flooding and rising sea levels pose serious threats to coastal communities across Asia, Africa, and Latin America. Women and children often face higher mortality rates during floods, partly because of mobility restrictions and limited access to emergency information (Neumayer & Plümper, 2007). Social norms frequently limit women's ability to swim or travel alone, putting them at greater risk during disasters. The aftermath of floods also has a gendered aspect: women may lose their livelihoods, take on more domestic responsibilities, or become targets of gender-based violence in displacement camps (Bradshaw, 2013).

3.1.4 Storms and Cyclones

Cyclones and hurricanes exacerbate existing inequalities. For instance, during Cyclone Sidr in Bangladesh (2007), a significantly higher number of women than men lost their lives, highlighting the gender-specific barriers to mobility, caregiving roles at home, and the lack of disaster preparedness that addresses women's needs (Denton, 2002). An intersectional perspective shows that the most vulnerable women, often with limited education and access to early warning systems, are hit the hardest.

3.2. Gendered Exposure, Sensitivity and Adaptive Capacity

When we discuss climate vulnerability, we're really diving into how exposure, sensitivity, and adaptive capacity intertwine (IPCC, 2022). Gender is a key player in each of these aspects:

1. Exposure: This focuses on how individuals encounter hazards. Social roles—like women fetching water, cooking over open flames, or tending to the fields—often determine who faces these risks head-on. In urban areas, for example, low-income women are more likely to find themselves in heat islands or flood-prone informal settlements.

2. Sensitivity: Sensitivity refers to how much a person or system is affected by climate stress. Women often experience this more intensely due to existing socioeconomic disparities, health challenges, and limited access to information and resources. Consider droughts; they can lead to crop failures that disproportionately impact female-headed households, especially when these households lack land rights or access to credit (FAO, 2018).

3. Adaptive Capacity: This is all about the ability to adjust to hazards, reduce harm, or seize opportunities. Women's capacity to adapt is shaped by their access to education, financial resources, social networks, and political engagement. However, other factors like ethnicity or class can further limit this capacity. For instance, Indigenous women in Latin America may possess valuable ecological knowledge but often face challenges with legal recognition of their land rights, which can hinder their ability to adapt effectively.

3.3. Empirical Examples Across Regions

3.3.1 Africa: Women in Agroecological Livelihoods

In Sub-Saharan Africa, women make up the majority of smallholder farmers, yet they often struggle to access essential resources like extension services, credit, and climate-resilient seeds (World Bank, 2019). Droughts only add to their challenges, increasing labor demands, lowering crop yields, and worsening food insecurity. However, programs that encourage women's involvement in agroforestry and water management have shown great promise in boosting their ability to adapt, underscoring the need for gender-sensitive adaptation strategies.

3.3.2. Asia: Urban Heat and Informal Settlements

The rapid growth of cities in South and Southeast Asia has led to the rise of sprawling informal settlements, where marginalized women are particularly vulnerable to extreme heat and flooding. Many of these women lack access to cooling systems, sanitation, and healthcare, all while juggling unpaid domestic responsibilities. Climate initiatives that ignore the unique spatial vulnerabilities faced by women risk deepening existing inequalities (Sultana, 2014).

3.3.3 Latin America: Indigenous Women and Climate-Induced Migration

Indigenous communities in Latin America are grappling with multiple vulnerabilities due to deforestation, biodiversity loss, and climate variability. Indigenous women, in particular, face the dual challenges of displacement and cultural marginalization. When it comes to migration as a way to adapt, the experience is often gendered: women typically take on the roles of maintaining household stability, sending remittances, and preserving cultural knowledge. Yet, they often encounter barriers to mobility and limited access to social services in urban areas where they resettle (Bottazzi & Battistella, 2020).

3.4. Synthesis: Intersectional Vulnerability in Practice

In various contexts, a clear pattern emerges: gendered vulnerability isn't just a straightforward issue; it's intersectional, influenced by social factors, and changes depending on the circumstances. Not all women experience the same vulnerabilities; their journeys are shaped by elements like age, socioeconomic status, ethnicity, their location, and the political climate. It's essential for policies and programs to acknowledge these different layers of identity instead of treating gender as a one-size-fits-all category or assuming that all women have the same experiences. Examining intersectional vulnerability also underscores the significance of rights-based adaptation strategies. These approaches view women as active participants and agents of change, rather than mere victims, linking climate action to broader social justice and human rights goals. Therefore,

effective adaptation must be socially inclusive and technically sound, merging climate risk reduction with empowerment, participation, and equitable access to resources.

4. Rights-Based Development Approaches

4.1. Rights vs. Needs-Based Development

Traditional development strategies have often centered on addressing needs, focusing on immediate issues like food shortages, poverty, or inadequate infrastructure. While these needs-based approaches are essential for providing support, they can unintentionally create cycles of dependency and marginalization by not tackling the deeper inequalities in power and agency (Haq, 1999). On the other hand, rights-based development (RBD) puts the spotlight on entitlements and empowerment. It's rooted in international human rights law and revolves around key principles like participation, accountability, non-discrimination, and empowerment (United Nations, 2003). In the context of climate change, RBD goes beyond just offering disaster relief or adaptation technologies. It ensures that everyone, especially marginalized women and gender-diverse individuals, can assert their rights to resources, protection, and a voice in climate-related decisions. For instance, while a needs-based approach might supply drought-resistant seeds to rural women farmers, a rights-based approach would go further. It would guarantee that these women have secure land rights, access to credit, a seat at the table in agricultural decision-making, and legal safeguards against discrimination, effectively tackling the structural barriers that keep them vulnerable (Agarwal, 2010).

4.2. Human Rights Instruments Relevant to Climate and Gender

There are several key international frameworks that support a rights-based approach to development in the realms of climate and gender:

a. CEDAW (Convention on the Elimination of All Forms of Discrimination Against Women) CEDAW requires that countries promote gender equality in areas like political participation, access to resources, education, employment, and decision-making. When it comes to climate change, this means that women should be actively involved in adaptation planning, disaster management, and the allocation of climate finance (UN Women, 2018). It's crucial that the implementation of these rights is intersectional, ensuring that women from marginalized castes, ethnicities, or indigenous backgrounds are not left out.

b. UNDRIP (United Nations Declaration on the Rights of Indigenous Peoples) UNDRIP highlights the importance of self-determination, land rights, and the preservation of culture. Climate change policies need to honor Indigenous women's rights to their traditional lands, their ecological knowledge, and their involvement in environmental governance (Corntassel, 2008).

c. SDGs (Sustainable Development Goals)

• SDG 5: Achieve gender equality and empower all women and girls

• SDG 13: Take urgent action to combat climate change and its impacts

By integrating these goals, governments are encouraged to weave gender considerations into climate policies, creating a connection between human rights and sustainable development.

d. UNFCCC and Gender Action Plan the UNFCCC's Gender Action Plan (GAP) puts gender equality into action within climate initiatives, focusing on capacity building, participation, knowledge sharing, and gender-responsive planning. The GAP urges countries to include gender analyses in their National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs), ensuring that climate policies are fair and grounded in rights (UNFCCC, 2019).

4.3. Gender Equality as a Development Right

Gender equality isn't just a nice idea; it's a basic human right and essential for building a climate-resilient future. Research shows that when women have equal access to resources, leadership opportunities, and information, communities can adapt better, enjoy greater food security, and manage their environments more sustainably (World Bank, 2019). Key aspects of gender equality in climate adaptation include:

1. Resource Access: Land, water, credit, seeds and technology

2. Decision-Making Participation: Inclusion in local governance, disaster risk reduction committees, and climate planning

3. Capacity Building: Education, climate knowledge, and skills development

4. Protection from Discrimination and Violence: Tackling social norms and legal barriers A rights-based approach brings these aspects to life, making sure that adaptation efforts are inclusive, participatory, and focused on justice.

By viewing climate resilience as a way to enhance capabilities and protect rights, this approach shifts the narrative from being passively vulnerable to actively empowered.

4.4. Operationalizing Rights-Based Approaches in Climate Policy

Putting a rights-based framework into action involves:

• Intersectional Vulnerability Assessments: Identifying who is most at risk based on gender, age, ethnicity, class, and other factors.

• Participatory Planning: Engaging marginalized women in local, regional, and national climate decision-making processes.

• Legal and Institutional Safeguards: Ensuring land tenure security, enforcing anti-discrimination laws, and bolstering social protection systems.

• Monitoring and Accountability: Creating gender-sensitive indicators for adaptation outcomes and holding institutions accountable for any rights violations.

• Integration with Climate Finance: Designating funds specifically for gender-responsive adaptation and disaster risk reduction initiatives.

For example, Bangladesh's Gender-Responsive Climate Change Action Plan (2018) integrates CEDAW principles and local participation, ensuring that women receive training in climate-resilient agriculture, access to microcredit, and priority in disaster preparedness programs. This demonstrates the transformative potential of rights-based approaches when coupled with intersectional analysis.

4.5. Linking rights-based approaches to climate justice

It's all about addressing those deep-seated inequalities and ensuring that the risks and rewards of climate change are distributed fairly. Intersectional rights-based development (RBD) emphasizes that women and marginalized communities aren't just passive recipients; they're vital contributors to driving change. This approach allows us to develop climate policies that are inclusive, effective, and rooted in ethical principles (Schlosberg & Collins, 2014). By integrating human rights frameworks, gender equality, and climate justice, governments and development organizations can create policies that not only lessen vulnerability but also enhance resilience and uphold human dignity.

5. Policy Frameworks Linking Gender, Rights, and Climate

5.1. UNFCCC Gender Action Plan

The United Nations Framework Convention on Climate Change (UNFCCC) has increasingly acknowledged how vital gender equality is for effective climate action. The Gender Action Plan (GAP), which was adopted in 2015, lays out a clear strategy for integrating gender considerations into areas like mitigation, adaptation, capacity-building, technology transfer, and climate finance (UNFCCC, 2019).

The GAP focuses on five main priorities: 1. Building capacity, managing knowledge, and enhancing communication - empowering gender-responsive skills and sharing successful practices. 2. Participation and leadership – ensuring women have a voice in decision-making at all levels. 3. Gender-responsive climate policy planning - integrating gender considerations into National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs), and other national policies. 4. Gender-responsive implementation and financing - making sure climate finance addresses the specific vulnerabilities faced by different genders. 5. Monitoring and reporting – tracking progress with gender-sensitive indicators. The GAP highlights that gender equality isn't just a bonus; it's crucial

for effective climate action. Countries are encouraged to conduct gender analyses and incorporate those insights into their national strategies, ensuring that women and marginalized groups are involved in both policy development and implementation.

5.2. Sustainable Development Goals (SDG 5 & SDG 13 Intersections)

The Sustainable Development Goals (SDGs) offer a global framework for aligning gender and climate objectives:

SDG 5: Gender Equality aims to eliminate all forms of discrimination and empower women and girls.

SDG 13: Climate Action calls for urgent measures to tackle climate change and its effects.

These goals intersect in several important ways:

- Empowering women enhances adaptive capacity, especially in areas like agriculture, water management, and disaster preparedness.
- Gender-sensitive policies in climate adaptation lead to better social outcomes, including improvements in health, education, and food security.

1) Inclusive governance and representation support both gender equality and climate resilience (UN Women, 2021).

Policy coherence between SDG 5 and SDG 13 ensures that climate interventions are both environmentally and socially sustainable**,** bridging the gap between human rights and environmental imperatives**.**

5.3. National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs) a. National Adaptation Plans (NAPs) National Adaptation Plans, or NAPs, are crafted to pinpoint the climate adaptation needs that span both the medium and long term, weaving them into the fabric of national development strategies. When it comes to gender mainstreaming in NAPs, here's what's involved:

• Carrying out vulnerability assessments that take gender differences into account.

• Involving women's organizations and marginalized communities in shaping policies.

• Focusing on climate adaptation initiatives that bolster women's livelihoods and tackle inequality head-on.

Take Vietnam, for instance: during its NAP process, the active participation of women in community-based adaptation efforts has led to better disaster preparedness, improved water management, and more resilient agricultural practices (UNDP, 2018).

b. Nationally Determined Contributions (NDCs) NDCs are the commitments made by countries under the Paris Agreement to cut emissions and boost adaptation efforts. By integrating gender into NDCs, we ensure that both mitigation and adaptation strategies:

• Recognize women as key players in climate action.

• Address specific vulnerabilities across sectors like agriculture, energy, and water.

• Guarantee fair access to climate finance, technology, and capacity-building opportunities. Countries such as Chile, Mexico, and Rwanda have made a point to include gender considerations in their NDCs, connecting their mitigation and adaptation strategies to the empowerment of women and social inclusion (UNFCCC, 2020).

5.4. Disaster Risk Reduction (DRR) Integration

When it comes to crafting effective climate policies, it's essential to weave in gender-responsive disaster risk reduction (DRR). The Sendai Framework for Disaster Risk Reduction (2015–2030) emphasizes several key points:

• Understanding disaster risk from every angle, especially the social vulnerabilities that exist.

• Fostering inclusive governance that amplifies the voices of women, youth, and marginalized communities.

• Carrying out disaster planning, early warning systems, and recovery efforts that are sensitive to gender needs.

Take the Philippines, for example; community-driven DRR initiatives have significantly boosted women's leadership roles in evacuation planning, emergency responses, and resource distribution, ultimately lowering disaster-related deaths and building resilience (Shaw et al., 2014).

5.5. Policy Implementation Challenges and Gaps

Despite some progress, there are still significant challenges to face when it comes to executing gender-responsive climate policies:

• **Tokenistic inclusion:** While women may be included in discussions on paper, they often lack genuine influence in decision-making processes.

• **Data gaps:** The lack of sex-disaggregated and intersectional data makes it difficult to plan effectively based on reliable evidence.

• **Resource constraints:** Gender-responsive initiatives often grapple with insufficient funding.

• **Institutional silos:** Various ministries, such as those focused on the environment, women's affairs, and disaster management, frequently operate in isolation, complicating the implementation of cohesive policies. To address these challenges, we need a coordinated approach that spans multiple governance levels, supported by international frameworks, national laws, and efforts to strengthen local capacities.

6. Case Studies

In this section, we shine a light on three compelling examples of gendered climate vulnerability and rights-based interventions across Africa, Asia, and Latin America. Each case illustrates how using an intersectional lens, feminist political ecology, and a rights-based approach can lead to effective adaptation strategies.

6.1 Case Study 1: Smallholder Women Farmers in Sub-Saharan Africa Context

In Sub-Saharan Africa, women make up about 50–70% of the agricultural workforce, mainly involved in subsistence and smallholder farming (FAO, 2018). Even though they play a crucial role in food production, women frequently face significant barriers when it comes to accessing land, credit, seeds, extension services, and climate information. These systemic inequalities heighten their vulnerability to climate change, especially in the face of drought, unpredictable rainfall, and soil degradation.

Climate Impacts

• Droughts and inconsistent rainfall lead to lower crop yields, which heightens food insecurity.

• Insecure land tenure makes it tough for women to invest in technologies that could help them adapt to climate challenges.

• As men migrate or crops fail, women often take on additional labor burdens to compensate.

Rights-Based and Intersectional Interventions Programs that incorporate rights-based approaches have shown tangible improvements:

• Secure Land Tenure Initiatives: In Kenya, legal reforms that recognize women's land rights have boosted access to microcredit and climate-resilient resources, thereby enhancing their ability to adapt (Agarwal, 2010).

• Participatory Extension Services: NGOs and government bodies are working with women farmers to create knowledge-sharing networks, providing access to drought-resistant seeds, climate forecasts, and sustainable farming practices.

• Empowerment Through Cooperatives: Women-led cooperatives are helping to improve access to markets and climate finance, which strengthens economic resilience.

6.2. Case Study 2: Urban Heat and Gender in Informal Settlements (South Asia)

The rapid growth of cities in South and Southeast Asia has led to the rise of sprawling informal settlements, where infrastructure is lacking, sanitation is poor, and residents face a high risk of heatwaves. Women, especially those who take on domestic responsibilities and caregiving roles, find themselves particularly vulnerable to the extreme heat.

Climate Impacts - Women are more likely to suffer from heat-related illnesses because they often can't leave their homes during the hottest parts of the day due to their caregiving responsibilities. - Limited access to cooling devices due to energy poverty, combined with the nature of informal housing, makes heat exposure even worse. - Social norms can restrict women's ability to move freely and access public health services during extreme weather events (Sultana, 2014).

Rights-Based and Intersectional Interventions-

Community Cooling Centers: Urban planning that takes gender into account can create accessible cooling shelters for women, the elderly, and children.

Participatory Disaster Planning: Local women's groups play a crucial role in spreading early warnings and health outreach initiatives.

Capacity-Building: Women receive training in climate-resilient construction methods and urban green infrastructure to help mitigate heat stress.

6.3. Case Study 3: Migration and Gendered Climate Displacement (Latin America)

In Latin America, climate-induced migration is becoming more frequent due to issues like deforestation, drought, flooding, and hurricanes. Women and marginalized groups encounter specific challenges during these displacements, such as limited mobility, restricted access to essential services, and heightened vulnerability to exploitation.

Climate Impacts

• When rural livelihoods are lost, families often find themselves relocating to urban or peri-urban areas.

• The weight of labor tends to fall more on women, who usually take on the responsibility of keeping the household running while men look for work elsewhere.

• During migration or while living in resettlement camps, women face heightened risks of violence and health challenges (Bottazzi & Battistella, 2020).

Rights-Based and Intersectional Interventions

• Legal Protections for Migrants: It's crucial to implement policies that guarantee access to land, healthcare, and education for displaced families, with a special focus on women and children.

• Community-Based Support Networks: Women's organizations play a vital role by providing training, psychosocial support, and job opportunities in their new communities.

• Integration of Indigenous Knowledge: Valuing the traditional knowledge and leadership of Indigenous women can significantly boost community resilience and help safeguard cultural heritage.

6.4. Synthesis of Case Studies

When we look across these three regions, some important patterns start to stand out:

1. Intersectionality is key: Vulnerability isn't the same for everyone; it shifts based on gender, class, caste, ethnicity, age, and location. Policies that try to fit everyone into the same mold just don't work.

2. Rights-based approaches boost resilience: It's not just about technical fixes; legal recognition, active participation, and empowerment are just as vital.

3. Participation and agency: Women aren't merely passive recipients of aid; they're at the forefront as leaders and innovators in climate adaptation efforts.

4. Policy integration: The most effective interventions connect local actions with broader national and global policy frameworks (like NAPs, NDCs, SDGs, and the UNFCCC GAP).

These case studies show that truly transformative climate adaptation hinges on blending theory, policy and practice, all while embracing feminist, rights-based, and justice-oriented viewpoints.

- In Sub-Saharan Africa, the adaptive capacity of women smallholder farmers gets a significant boost when they have secure land rights, cooperative structures, and access to participatory knowledge networks.
- South Asia: Urban heat impacts in informal settlements require gender-sensitive planning, cooling infrastructure, and participatory governance.
- Latin America: Climate-induced migration affects women disproportionately; rights-based and community-centered interventions reduce risks and support integration.
- Intersectional, rights-based, and participatory strategies consistently enhance resilience and equity.

7. Barriers to Gender-Responsive Climate Policy and Forward-Looking Policy Recommendations

7.1. Barriers to Gender-Responsive Climate Policy

Even though there's a growing awareness of how crucial gender is in climate adaptation, several systemic hurdles still stand in the way of effective implementation:

a. Institutional Barriers

- Fragmented governance: Climate, gender, and disaster management departments often work in isolation, which hampers coordination.
- Limited capacity: Policymakers and institutions might not have the necessary training in gender mainstreaming and intersectional analysis.
- Weak enforcement: While legal frameworks supporting gender equality may be in place, they are often applied inconsistently in climate policies (UN Women, 2018).

b. Cultural and Social Barriers

- Patriarchal norms limit women's involvement in decision-making at the household, community, and national levels.
- Social stigma and discrimination can hinder marginalized women from accessing resources for adaptation, disaster relief, or training programs.
- The perception of vulnerability often casts women as mere victims, overlooking their agency and expertise in managing resources (Rocheleau et al., 1996).

c. Economic Barriers

- Limited access to funding for gender-responsive adaptation initiatives, especially in low-income countries.
- Unequal distribution of labor: Women's unpaid domestic work takes away time from engaging in adaptation activities or diversifying their livelihoods.
- Relying on external funding can lead to a focus on technical projects rather than socially inclusive, rights-based approaches (World Bank, 2019).

d. Data and Knowledge Gaps

- The absence of sex-disaggregated data and intersectional metrics restricts evidence-based policymaking.
- The underrepresentation of local knowledge, particularly from Indigenous or marginalized women, diminishes the effectiveness of adaptation strategies.

7.2. Forward-Looking Policy Recommendations

To tackle these challenges and foster equitable climate resilience, governments, development agencies, and policymakers can consider the following strategies:

a. Mainstreaming Gender Policies

• Make gender analysis a fundamental aspect of every phase of climate policy, from the initial planning stages right through to monitoring.

• Integrate gender considerations into National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs), and Disaster Risk Reduction (DRR) strategies, ensuring they align with Sustainable Development Goals 5 and 13, as well as the UNFCCC Gender Action Plan.

• Employ intersectional approaches to identify the most vulnerable groups, especially women from marginalized ethnic, caste, or socioeconomic backgrounds.

b. Participatory Governance

• Ensure that women truly have a voice in local, regional, and national climate decision-making bodies.

• Promote community-based adaptation planning that leverages local knowledge and Indigenous practices.

• Establish accountability mechanisms, such as citizen oversight committees and gender-sensitive reporting systems.

c. Financing Gender-Responsive Climate Action

• Allocate specific funding for women-led and gender-inclusive adaptation initiatives.

• Make sure vulnerable households can access microfinance, insurance, and climate funds.

• Link funding to measurable gender outcomes to foster accountability and sustainability.

d. Capacity-Building and Knowledge Sharing

• Offer training for policymakers, practitioners, and community leaders on gender mainstreaming and intersectional vulnerability assessments.

• Promote knowledge sharing among countries, regions, and communities about best practices in gender-responsive climate adaptation.

• Create climate early warning systems and adaptation technologies that are accessible and inclusive for everyone.

e. Legal and Policy Safeguards

• Strengthen the enforcement of land rights, inheritance laws, and labor protections for women.

• Weave climate change adaptation into broader human rights frameworks, connecting national policies to international obligations like CEDAW, UNDRIP, and the SDGs.

Ensure climate policies address both mitigation and adaptation with attention to gender and social equity.

7.3. Integrating Lessons from Case Studies

The case studies we've discussed earlier highlight the effectiveness of rights-based, participatory, and intersectional approaches:

• For smallholder women farmers, securing land rights and forming cooperatives have significantly boosted their ability to adapt.

• In urban informal settlements, implementing gender-sensitive cooling infrastructure and encouraging community participation have strengthened resilience.

• When it comes to climate-induced migration, establishing legal protections and fostering community networks have helped reduce vulnerability and empower women. To scale these successful strategies, we need strong institutional support, adequate resources, and collaboration across different sectors, ensuring that our adaptation efforts are fair, sustainable, and focused on justice.

7.4. Key Takeaways for Policymakers

1. Intersectionality is crucial: Vulnerability is complex and varies by context. Policies should address the overlapping disadvantages people face.

2. Rights-based approaches build resilience: Acknowledging women as rights holders not only empowers them but also leads to lasting adaptation benefits.

3. Participation is key: It’s vital to include women and marginalized groups in decision-making, planning, and implementation processes.

4. Data and monitoring are essential: Collecting gender-disaggregated, intersectional data is necessary for creating effective and accountable policies.

5. Financing fuels action: Ensuring there’s sufficient, dedicated funding for gender-responsive initiatives is critical for achieving real outcomes.

8. Conclusion

8.1. Synthesis of Intersections: Gender, Climate and Rights

In this chapter, the complex links between gender, climate vulnerability, and rights-based development through a multi-faceted lens that includes:

• Intersectionality theory (Crenshaw, 1989), which helps us understand how different factors like gender, class, caste, race, and age create distinct climate vulnerabilities.

• Feminist political ecology, which places environmental changes within the framework of political and social power dynamics, revealing the gendered dimensions of resource access, labor, and decision-making.

• The capabilities approach (Sen, 1999; Nussbaum, 2000), focusing on the genuine freedoms and opportunities individuals have to adapt, thrive, and assert their agency. • Rights-based development frameworks that recognize gender equality as a fundamental right, rather than just a desirable social goal.

• Climate justice theory, which links global disparities in emissions, vulnerability, and adaptation capacity to our ethical responsibilities for mitigation and support.

• Gender-responsive disaster risk reduction, which integrates social inclusion into preparedness, early warning, and recovery efforts. Throughout these frameworks, one clear message emerges: vulnerability is shaped by social constructs, is context-specific, and is intersectional. Thus, adaptation policies must address structural inequalities, not just environmental challenges.

8.2. Key Insights from Empirical Evidence

The case studies from Sub-Saharan Africa, South Asia, and Latin America reveal that:

1. Women are not only vulnerable but also powerful agents of change—acknowledging their agency is essential for effective adaptation.

2. Intersectional approaches uncover hidden vulnerabilities—policies must consider various layers of disadvantage to prevent exclusion.

3. Rights-based strategies boost sustainability—legal protections, active participation, and empowerment enhance the effectiveness of adaptation efforts.

4. Participation and knowledge integration are essential – local and Indigenous knowledge improves policy relevance and outcomes.

5. Policy integration across scales matters – alignment of global frameworks (UNFCCC, SDGs, CEDAW) with national instruments (NAPs, NDCs, DRR plans) strengthens implementation.

8.3. Urgent Policy Needs

To effectively address climate change while also championing gender equity, policymakers should consider the following steps: • Integrate gender into climate planning: It's crucial to weave gender analysis into National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs), and Disaster Risk Reduction (DRR) strategies.

• Prioritize intersectional vulnerability assessments: Focus on identifying the most marginalized groups and tackle the overlapping challenges they encounter.

• Strengthen participatory governance: Make sure women and marginalized communities have a seat at the table in decision-making processes at all levels.

• Allocate adequate funding: Ensure there are dedicated resources for gender-responsive adaptation initiatives.

• Monitor and evaluate outcomes: Develop gender-sensitive indicators and set up accountability mechanisms to track progress.

8.4. Implications for Global Climate Governance

Incorporating gender, rights, and intersectionality into climate policy isn’t just a social obligation; it’s a practical necessity for effective climate action. Ignoring these aspects can:

• Increase social inequalities

• Lower the effectiveness of adaptation programs

• Weaken climate resilience

On the flip side, gender-responsive, rights-based, and intersectional adaptation strategies can:

• Boost community resilience

• Empower marginalized groups

• Ensure fair access to climate finance, technology, and knowledge

• Align global climate efforts with principles of human rights, justice, and sustainable development.

Effective climate governance must place gender and social justice at its heart, acknowledging that climate change is not just an environmental issue but also a profoundly social and political one.

Climate change is a major force that highlights the inequalities already present in our society. Women, especially those from marginalized communities, bear the brunt of its impacts, but they also play crucial roles in adapting to, mitigating, and building resilience against these changes. By weaving together concepts like intersectionality, feminist political ecology, capabilities, rights-based development and climate justice.

• Grasp the complexities of vulnerability

• Develop policies that are inclusive, participatory, and focused on justice

• Connect global commitments with the realities faced at the local level

The message is urgent: taking gender-responsive action on climate change isn't just a nice-to-have, it's absolutely vital for sustainable development, protecting human rights, and fostering equitable resilience worldwide.

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Chapter 4: Environmental Justice and India: A Comprehensive Review

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Abstract

Environmental justice in India is the outcome of long pending inequalities that have taken place in India hindering the sustainability of the environmental segment. The major reasons that have given rise to these types of inequalities in the environmental sector include growth and developmental policies of government, expansion of industrial setup in almost all possible sectors and governance structure that has negatively affected the marginalized communities. A lot of research scholars in the late twentieth century have highlighted the various issues that lead to degradation of environment such as environmental dislocation and degradation and increase in all types of pollution which are unevenly distributed across societal groups and impacting mostly to tribal segments of society and also greatly impacting lives of people residing in rural areas. Conversation with respect to environmental justice in India finds its paths from the interpretations we seek from constitution, several litigations from the public and establishment and development of environmental setup between 1980s and 1990s that accounts for addressing innovations such as National Green Tribunal that was established under the scope of National Green Tribunal Act, 2010. Experiential analysis considering the functional mechanism of tribunal, decisions made on judicial patterns and conflicts raised in the environmental arena reveal the development towards assessing justice and determining legitimate structural challenges. The current research study explores the status of environmental justice in India by examining legal, institutional and socio political viewpoints through the synthesis of several documents accessed from published desks including several disciplinary and interdisciplinary studies that have an emphasis on environmental discrimination, judicial reactions towards environmental discrimination and results for marginalized communities.

Keywords: Environmental Justice, India, National Green Tribunal, Environmental Disparity, Marginalized Community, Environmental Regulation, Sustainable Growth etc.

Introduction

Focus on considering environmental justice as a critical evaluation factor in India was initiated due to the rise in patterns of environmental injustice and was not considered as an element of concern like several other issues post independence. This lead to further degradation of environment through initiation of large scale industrialization in potential and other sectors, starting of new infrastructure projects to boost infrastructure mechanism of India, extraction of resources at mass level, increase in migration pattern and unplanned expansion of urban areas that had a direct and significant impact on environment and added more fuel to its destruction. It further had a more severe impact on people who were directly dependent on natural resources for their livelihood and supporting their economic needs through natural and environmental resources. These beneficiaries included marginalized communities, small scale farmers, urban poor, taboo groups etc. This phenomenon further enlarged as environmental justice was not even considered as a development policy issue for a longer period of time in development policies of India (Leelakrishnan, 1999; 2005; 2008). Even several environmental governance frameworks and processes were developed to achieve a critical path for effectively implementing turnaround mechanisms with respect to environment but the focus remained only on papers and due to high level of resource exploitation and environmental degradation, India saw a crucial phase in terms of mass migration for access to better living standards, increase in all types of pollution, huge loss to common resources and no concern from political ideology Baviskar (1995; 2004).The first conflict with respect to environmental injustice and degradation came into light through development induced conflict from Narmada Valley and finally these types of conflicts turn the shape of legal domain in 1980's. This got noticed when the Indian Judiciary thoroughly interpreted Article 21 of the Constitution that has a focus on the right to a healthy environment. This enabled the community to think over the issues associated with environmental justice and find out the ways towards increasing scope of environmental rights and making a path for communities that could seek remedies through law when affected negatively (Leelakrishnan, 2005). During this period of time significant shifts were seen to enrich mechanisms for upholding environmental justice and judiciary played a crucial role in upgrading environmental governance platforms, addressing several ways for controlling pollution, enforcing ways for conservation of forests and protecting ecological domains and also making communities to believe that a level of sustainable development could never be achieved with a suitable policy towards ensuring environmental justice. Martinez-Alier (2002) in their study emphasized on the issues associated with environmental harms and deliberated that these harms are giving rise to ecological conflicts. Further marginalized groups are being affected both economically and socially and in addition to this their cultural values, survival patterns are being affected up to greater extent conceptualizing a new concept called environmentalism of the poor. In addition to this Agrawal's (2005), demonstrated that environmental governance in India is largely being functioned through technologies that regulate knowledge and patterns and

are reshaping participation patterns and restricting participation from all affected and beneficiary groups that lie within conservation framework. The Government of India established the National Green Tribunal Act in 2010 and through this law implemented the National Green Tribunal that provides a specialized forum to address issues related to the environment and provides effective and immediate environmental justice through integration of legal and scientific expertise, strengthening access to remedies and laying platforms for institutional development. This has been a landmark decision that has been effectively shaping India's environmental justice landscape. All these legal, social, political and institutional developments now bring forth that environmental justice in India is not only a legal concept now but a dynamic and challenging process shaped through developmental priorities, judicial intercession, governance practices and continued resistance from marginalized communities seeking rights for recognition, effective participation and unbiased outcomes.

Literature Review

The concept of environmental justice has taken so many decades and multidimensional studies to get a final shape and it is still widening its scope as the advanced studies are being carried out in this area. It has taken evidence from environmental law, political ecosystem, expansion studies and environmental governance that collectively documents how environmental degradation and depletion is leading to social inequality. Leelakrishnan (1999; 2005 & 2008), was among the leading and first researchers who had comprehensive studies with respect to legal aspects of the environmental regime in India. He traced the evolution of environmental laws in India from the 1970s and its further journey towards development and expansion through study of new dimensions and implementation of revised mechanisms from time to time whenever the need arose. It further translated the true meaning of Article 21 of the Indian Constitution that holds for the right to a clean and healthy environment and allowed people to raise voice through public interest litigations for addressing issues like pollution, environmental degradation, protection of wide life, extraction of resources on uneven basis and other related issues. Baviskar (1995; 2004), while conducting a research study on ethnographic structure of Narmada Valley, brought forth a critical analysis based on social and political dimensions with respect to displacement through induced development. The study further illustrated the several ways through which tribal communities have to experience environmental injustice in the form of loss of land, loss of cattle, loss of livelihood patterns, loss of cultural identity etc. This has further exposed the insignificance among environmental protection, social justice and state led development. Martinez-Alier (2002), strongly put a focus on the issue that marginalized communities oppose environmental degradation not as environmentalists but they act as defenders to it as their livelihood is dependent on forest reserves only and do not have any other source that supports their living. They further highlight that considering purely economic growth leads to increase in resource extraction and pollution that directly impacts the poor. Agrawal (2005), environmental

governance in India nowadays is being implemented and monitored through AI based technologies that have a common mechanism for all which can never be acceptable for different types of situations and in different geographical areas. The establishment of the National Green Tribunal in India has raised new hopes among communities which are able to provide more refined and feasible results. It has also made ways for using scientific knowledge, enhanced scope and other flexible procedures to address diversified issues. Diduck, Patel & Malik (2022), considered that environmental justice in India has taken new shape and is considering cases through exact recognition, finding critical paths, spreading results among masses and initiating that justice is reached to its exact beneficiary. Collectively, environmental justice in India is taking new shape and exploring new dimensions through legal innovations, new reforms and community participation.

Objectives

1. To observe the perception of environmental justice in the Indian context.
2. To analyze the evolution of environmental law in India.
3. To assess environmental inequalities affecting marginalized communities in India.
4. To evaluate the role of judicial and institutional mechanisms in ensuring environmental justice.
5. To identify challenges in achieving equitable environmental outcomes in India.

Methodology

The current research study is based on secondary data only. The data has been extracted from various types of secondary sources such as legal texts published from time to time, several types of institutional studies, studies based on disciplinary and interdisciplinary sectors and segments that has a clear focus on constitutional developments, constitutional structure, functioning of tribunal and several documented environmental conflicts that has shaped the outcomes pertaining to environmental justice in India.

Results

The results emerging from the reviewed literature and institutional analyses indicate that environmental justice in India has undergone measurable transformation through judicial and institutional developments, particularly since the growth of environmental jurisprudence in the 1980s and the founding of specialized adjudicatory mechanisms in the following decades. Leelakrishnan (2008) documents that the recognition of the right to a clean and healthy environment under Article 21 of the Constitution significantly broadened admittance to justice by enabling citizens and affected groups to approach courts in the course of public interest lawsuit, reducing procedural barriers such as strict locus stand and allowing collective grievances related to pollution, deforestation, and environmental degradation to be addressed. Research results presented by Gill (2017), presented that founding of National Green Tribunal under the banner of National Green Tribunal Act, 2010 was a remarkable step of the government and it started operating in 2011 with a mission and vision of promoting mechanisms for specific and dedicated

environmental mediation. It has integrated the phenomenon of processes based on scientific and judicial patterns. Gill (2011, 2015) critically reviewed the cases that lead to success in terms of public litigations that have drawn enhanced results for society and masses that look for environmental remedies. The Tribunal has further accounted for innovative patterns which include establishment of committees based on experts, real time investigations and analysis to strengthen decision making backed by evidence and helps in reducing dependency on conventional and traditional processes. Further results from interdisciplinary studies presented by Diduck, Patel, and Malik (2022) showed despite taking these aggressive and constructive steps environmental justice has not shown considerable improvements as the majority of the marginalized segment have not been considered while addressing the issues or were not allowed to take active part in the procedures. This hindered accurate impact assessment, partial data for analysis thus making it difficult to address environmental clearances and devising regulatory processes. Further several sectors such as coastal development, industrial settings, hydropower, mining etc witnessed that due to regularity weaknesses and developmental pressures justice based outcomes remained partial. All the above segments showed that the environmental justice framework has made remarkable progress but marginalized communities are still facing limitations from partial implementation of several mechanisms and needs to be addressed as early as possible.

Discussion

The results highlight that environmental justice in India has advanced significantly through judicial activism and institutional reform, yet these gains exist jointly with relentless structural constraints that limit the realization of substantive justice for marginalized communities. The extension of environmental theory from 1980s to 1990s as presented by Leelakrishnan (2008), was a significant step towards bringing an established version of constitution for a healthy environment as presented in Article 21 and making believe that societal concern towards a sustainable and health environment is need of the time and must be collectively addressed by all segments of the society. This further made ways towards eliminating procedural barriers and enabled the judiciary to intervene and address issues like pollution, deforestation that lead to ecological destruction. In addition to this the judicial system made ways for improving access to justice but it alone could produce outcomes based on justice and remove limitations that are barriers towards effective implementation of governance procedures for environmental upgradation. Gill's (2017), through analysis of National Green Tribunal showed that establishment of this tribunal has no doubt enhanced environmental arbitration through integration of scientific procedures, providing effective decisions and expanding its scope and that has also been reproduced as a success rate from 2011 to 2015, further suggests role of a refined institutional design necessary for effective outcomes towards environmental justice. Diduck, Patel, and Malik (2022), asked for a refined mechanism that deals with all problems faced by environmental sustainability and procedures associated with it. Martinez-Alier's (2002), focused on the theme of conflicts

raised because of uneven ecological distribution that leads to environmental injustices and leads to heavy environmental risks. Agrawal's (2005), focused on the issues that we need a mechanism for environmental sustainability that should include participation from all segments, conversational mechanisms for all types of issues, technical expertise and a dedicated database to monitor the performance and growth. On concluding note these studies come out with the joint conclusion that India's environmental justice framework has made remarkable progress on legal and institutional front and particularly via establishment of National Green Tribunal but there is still a strong need to address the perseverance of procedural segregation, enforcement based on uneven patterns environmental harm caused in the name of growth and development. Further environmental justice must never be considered in the form of just a judicial outcome shaped by the outcome of legitimate power and limitations of power in addressing inequalities that have been deeply rooted hindering environmental justice.

Conclusion

The outcome witnessed towards analyzing environmental justice in India represents that considerable development has been achieved through effective introduction and implementation of environmental justice mechanism and reforms related to it specially through introduction of environmental justice as a recognizing parameter and subsequent recognition of rights associated with the introduction of constitution and further expansion of its scope from time to time Leelakrishnan (2008). Gill (20217) effectively considered through his research outcome that formal introduction of National Green Tribunal under the National Green Tribunal Act, 2010, has been a landmark decision and has been catering multiple dimensions of environmental justice including cognitive structure, collaboration and integration of expertise based on scientific facts, further elaboration of provisions and expansion of its scope and other process and product based innovations adopted from time to time in order to improve environmental justice. However it has been further witnessed that besides enhancing scope of environmental justice, the outcomes are not being traced out as per expectations especially for marginalized communities Diduck, Patel, and Malik (2022). The major reasons adding fuel to this poor outcome include lack of proper measurement of environmental impact, unnecessary enforcement of laws several times and unnatural uplifting outcomes across several sectors such as hydropower, mining and other developments in the industrial sector. The study by Martinez-Alier's (2002) also brought several other issues like uneven distribution of ecology, extraction of huge quantities of resources to pace industrialization and lack of pollution control measures has further weakened society both socially and economically. Addition and proper implementation of governance practices with respect to environment are a driving force towards promoting environmental conservation Agrawal (2005). All collected results come out with the conclusion that India's Environmental justice framework has expanded its scope up to a larger extent but still environmental justice could not be achieved fully and we need to align political and economic structures to further enhance

its feasibility and make it more viable. Further strategic decisions need to be taken aggressively with respect to people, living conditions and supporting the environment.

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Chapter 5: The Stolen Future: Colonial Temporal Rupture and Indigenous Pathways to Sustainable Livelihoods in Pre-colonial Manipur

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Abstract

This chapter explores colonization not as progress but as a *temporal rupture*, a disruption of historical time that arrested Manipur's indigenous developmental trajectory. While colonial and developmental narratives have frequently portrayed imperial rule as a pathway to modernization, this study argues, in dialogue with Dipesh Chakrabarty's critique of linear modernity and Walter Mignolo's concept of the coloniality of time, that colonization actively derailed existing systems of sustainability and self-sufficiency. By replacing community-based ecological practices with industrial dependency, colonial intervention redirected Manipur away from its own socio-ecological logic and toward contemporary forms of environmental vulnerability. Drawing on the conceptual framework of "*temporal skipping*" informed by decolonial thought (Mignolo; Mbembe), the chapter examines how pre-colonial Manipuri society functioned through distinct socio-economic and ecological systems grounded in Indigenous knowledge as epistemology, rather than folklore, as articulated by Boaventura de Sousa Santos's Epistemologies of the South. Cultural practices such as Sagol Kangjei (modern polo), alongside resilient agricultural and food systems based on subsistence economies and local production, reveal modes of development oriented toward ecological balance rather than extractive growth. These practices challenge dominant narratives of progress that equate industrialization with advancement, echoing Arturo Escobar's post-development critique of Western development models.The chapter compares the old ways of Manipur, where people controlled their own food and land with the problems we face today, like pollution, unpredictable weather, and poverty. It shows that Indigenous knowledge is not just "old history"; it is actually the key to fixing our future. To truly protect the planet, we shouldn't just talk about being "fair." We must admit that societies like Manipur already had a "green" and peaceful way of living long ago. This better way of life was simply cut short by the British Empire before it could fully grow

Keywords: Manipur, Decoloniality, Indigenous Knowledge, Sustainable Livelihoods, Colonial Temporal Rupture, Global South

Introduction

Modern historical consciousness has trained us to view colonialism as an event that inserted "modernity" into stagnant societies, with empire seen as a disruptive yet transformative force. However, this narrative presupposes that history unfolds along a singular, linear path, and that societies advance by approximating a European model of progress. This temporal assumption warrants scrutiny[1]. This chapter proposes that colonialism in Manipur can be understood not just as political subjugation or economic restructuring but as a rupture in historical time. It wasn't simply what colonial rule introduced, but what it interrupted. Pre-colonial Manipur sustained internally coherent systems of production, land stewardship, and knowledge transmission, operating according to their own rhythms and logics. These systems did not conform to industrial metrics of advancement, but were dynamic and adaptive. Dipesh Chakrabarty urges us to provincialise Europe, dislodging the assumption that European historical experience constitutes universal time. Applied to Manipur, this perspective allows colonialism to be seen not as an acceleration into modern time, but as temporal dislocation[1]. The British Empire didn't merely introduce new systems; it reordered the coordinates through which the future could be imagined, rendering indigenous sustainability illegible within the grammar of progress.

To speak of *"temporal rupture"* is to recognise that colonialism displaced developmental pathways already embedded in ecological reciprocity and collective responsibility. Pre-colonial Manipur was organised around subsistence agriculture, local food economies, and knowledge systems, which were adaptive responses to the environment, not remnants of a primitive past. By privileging extractive models, colonialism recast these practices as backward, eroding ecological autonomy[2].

While transformation is natural, the argument overlooks the power asymmetry that colonialism imposed. Indigenous knowledge was relegated to folklore, while European rationality took epistemic authority. Boaventura de Sousa Santos describes this as an "abyssal line" separating recognised knowledge from what was deemed nonexistent. In Manipur, this line severed sustainable practices from legitimacy, leading to their decline[2]. The consequences of this rupture persist in contemporary environmental instability, agrarian precarity, and food insecurity. These cannot simply be attributed to failures in development policy; they must be understood within the context of a longer history where ecological futures were curtailed. Revisiting pre-colonial systems is not nostalgia, but a critical intervention into dominant developmental discourse.

Methodologically, this study adopts a qualitative and interpretive approach at the intersection of postcolonial theory, intellectual history, and regional historical analysis. It reconstructs pre-colonial socio-ecological formations through historical scholarship and

indigenous sources while reading colonial administrative rationality as a discourse structured by temporal hierarchy. The concept of *"temporal skipping"* functions as an analytical tool to identify moments when colonial institutions displaced local rhythms of transformation.

This chapter proceeds in six sections:

Section I- critiques linear historicism and introduces *temporal rupture.*

Section II- reconstructs pre-colonial Manipur's socio-ecological coherence.

Section III- interprets colonial incorporation as *temporal skipping.*

Section IV- traces the consequences of this rupture in contemporary vulnerabilities.

Section V- repositions indigenous knowledge as future-oriented epistemology.

The concluding section reflects on reclaiming interrupted temporalities in a pluriversal horizon.

1. Against Linear Time: Theoretical Framing of Temporal Rupture

To say that colonialism reorganized time, and not merely territory is to shift the axis of analysis from geography to temporality. Empires did not only redraw borders or annex land; they installed a particular grammar of historical time through which colonized societies were compelled to understand themselves. The conquest was epistemic before it was administrative. It naturalized a narrative in which Europe appeared as origin, measure, and telos of history, while the rest of the world was assigned a deferred arrival[1].

The nineteenth century bequeathed to political modernity a powerful historicist consciousness. Historicism did not simply propose that everything has a history; it advanced the claim that history unfolds in a singular, cumulative, developmental sequence[3]. Within this framework, societies were arranged along a temporal gradient: some were "advanced" others "backward" yet all were presumed to be travelling along the same road. The difference between colonizer and colonized was thus rendered as a difference in time. The latter did not merely occupy another space; they inhabited an anterior moment.

This structure may be described as the logic of the "not yet". The colonized were imagined as inhabiting a waiting room of history, capable of modernity, but only after a preparatory interval[1]. Political inequality was thereby translated into temporal delay.

Colonial power derived legitimacy not merely from administrative authority but from a theory of historical succession grounded in developmental time.

Under historicism, development was construed as evolution: gradual, organic, sequential. The Industrial Revolution in England was treated as the first instance of a universal process. Other societies were expected to follow in due course. This expectation rested upon what Walter Benjamin famously described as the homogeneous and empty time of historicism: measurable, uniform, and open to occupation by any society sufficiently advanced[4]. To develop was thus to approximate a pre-existing model.

Yet development may also be understood as interruption. The colonial encounter did not merely accelerate internal trajectories; it fractured existing temporalities. Precolonial rhythms: ritual cycles, agrarian calendars, genealogical time, were subordinated to the linear time of capital, bureaucracy, and the modern state. Railway timetables, census operations, revenue settlements, and codified law imposed regimes of simultaneity and synchronization. Time was standardized; plurality was disciplined.

What is at stake here may be described, following decolonial thought, as the coloniality of time. Coloniality does not end with the formal withdrawal of empire; it persists as a structure of knowledge and power[5]. The coloniality of time refers to the hierarchical ordering of cultures through temporal categories. Some are designated "modern" others "traditional". These classifications are not neutral descriptors; they authorize intervention, reform, and correction. They produce the colonized as subjects who must catch up.

To argue that colonialism reorganized time is to suggest that it installed this hierarchy as common sense. The modern colonial state governed not only territory but historical self-understanding. Concepts such as progress, reform, and civilization functioned less as neutral descriptors than as temporal verdicts. They located colonized societies within a universal chronology whose origin lay elsewhere. Against this linearity, I propose the concept of *temporal skipping*. By *temporal skipping* I refer to a condition in which multiple, heterogeneous temporalities coexist without being fully subsumed into a single developmental sequence. This is not merely the survival of the past in the present. It is the active interruption of linear time by alternative modes of inhabiting history. *Temporal skipping* disrupts the expectation that societies must traverse predetermined stages. It names the phenomenon whereby political modernity and non-modern life-worlds coexist, overlap, and contest one another.

The concept is introduced here not as a metaphor but as an analytic heuristic. While theories such as uneven development account for asymmetry within a shared historical scale, they remain committed to the assumption of a single temporal metric. *Temporal*

skipping, by contrast, questions the metric itself. It identifies situations in which heterogeneous temporal regimes do not simply lag behind but persist alongside, resist, or reconfigure the dominant chronology. *Temporal skipping* differs from the theory of uneven development. Uneven development presumes a single historical scale and admits only asymmetry within it. *Temporal skipping*, by contrast, questions the scale itself. It refuses to treat ritual time, sacred time, or customary authority as residues awaiting dissolution. Instead, it recognizes them as coeval forms of life that do not fit comfortably within homogeneous historical time[6].

In this sense, development as interruption becomes analytically significant. When universal adult franchise was instituted in societies with low literacy, or when subaltern groups entered electoral politics without first undergoing bourgeois civic formation, linear time was unsettled. The historicist "not yet" was replaced by a political "now"[7]. Such moments do not abolish historicism, but they strain its authority.

Colonialism reorganized time by establishing a singular narrative of arrival and delay. It transformed the difference into temporal lag. To provincialize this narrative is not to deny the global circulation of ideas such as rights, citizenship, or sovereignty. It is to insist that these ideas do not unfold everywhere according to the same rhythm[1]. The postcolonial present is not a simple derivative of a European past; it is a site of layered, overlapping, and sometimes incommensurable temporalities.

In the context of Manipur, this reorganization of time structured the colonial reclassification of land, labor, and sovereignty, embedding indigenous socio-ecological systems within a hierarchy that rendered them temporally obsolete. The following sections translate this theoretical argument into a regional analysis, demonstrating how *temporal skipping* operates not merely as abstraction but as a historically grounded condition. At this point, a clarification is necessary. By *temporal rupture*, I do not imply the absolute destruction of precolonial temporalities, nor a clean break between past and present. Colonialism rarely annihilated existing rhythms; rather, it subordinated, reordered, and rendered them hierarchically secondary within a dominant chronology. In this sense, coloniality of time names the structure of imposed temporal hierarchy, while *temporal skipping* designates the condition that exposes and unsettles that hierarchy through enforced coexistence.

To understand colonialism as a reorganization of time is therefore to recognize that its most enduring legacy may not be territorial boundaries but the internalization of a temporal hierarchy. The task of critical thought is not to romanticize the past, but to refuse the measurement of all histories against a single clock.

2. Indigenous Time Before the Rupture: Socio-Ecological Coherence in Manipur

To speak of "Indigenous Time Before the Rupture" is to reject the idea that Manipur awaited history. Before colonial intervention, the region had its own temporal grammar: structured, dynamic, and internally differentiated. This temporality was neither static nor archaic; it was cyclical, ecological, and relational. It unfolded through land, ritual, kingship, and embodied practice. What colonialism interrupted was not inertia but a trajectory already in motion.

This reconstruction draws upon indigenous chronicles like the *Cheitharol Kumbaba*, colonial administrative records, oral traditions, and existing historiography on Manipuri socio-economic and ritual life. These materials are not neutral repositories but historically situated texts whose silences and emphases must be interpreted. The primary spatial focus of this section is the Meitei polity of the Imphal valley, while acknowledging that pre-colonial Manipur comprised multiple hill and valley communities with distinct socio-political formations. The argument foregrounds the valley court as a central node within a wider and differentiated regional landscape.By "temporality" I refer to the patterned structures of time embedded in agrarian cycles, ritual recurrence, genealogical record-keeping, labor organization, and cosmological narration. Temporality is thus identified through observable rhythms of production, ceremony, authority, and memory.

This study is a critical ethnohistorical inquiry, reconstructing pre-colonial Manipur as a self-organizing socio-ecological formation. Land, ritual, labor, and sovereignty are treated as interconnected elements of historical time, rather than separate themes. The interpretation follows a layered theoretical framework, drawing on Reinhart Koselleck's idea of multiple temporalities, Pierre Bourdieu's theory of symbolic capital, and decolonial critiques of epistemic hierarchy by Walter Mignolo. These perspectives allow time to be understood as a structured experience shaped by power, legitimacy, and narrative authority.

Sources are read critically. Colonial administrative records are seen as regulatory discourse shaped by imperial rationality, not objective descriptions of indigenous life. Indigenous chronicles like the *Cheitharol Kumbaba* are political texts that helped construct and legitimize sovereignty. Oral traditions are engaged as mnemonic archives that preserve memory, not as folklore. Attention is given to what sources omit, privilege, or reframe.

The primary analytical unit is the Meitei polity understood as an integrated temporal ecology. Agrarian systems, ritual sovereignty, ecological adaptation, and cultural practices are analyzed as interdependent strata within a coherent, though differentiated, lifeworld. Ecology, ritual, and political authority are examined as mutually constitutive domains rather than hierarchically arranged sectors. Methodologically, "rupture" refers to structural reconfiguration, the displacement of indigenous temporal grammars by colonial

administrative rationality and imperial chronologies. Rupture signifies a transformation in the regime of temporal authority itself: a shift in how time is organized, narrated, legitimized, and inhabited.

2.1 Land, Subsistence, and Ecological Reciprocity

The agrarian order of the Imphal valley was organized around wet-rice cultivation sustained by irrigation systems and seasonal coordination. Agricultural rhythms followed monsoon cycles, lunar calendars, and ritual observances. Time was not abstractly measured; it was socially inhabited. Seed, rain, labor, and festivals formed a continuum. Landholding structures combined royal authority, clan organization, and village-level regulation. While hierarchy existed, access to cultivation was embedded in obligation and collective responsibility, not commodification. Production was largely subsistence-oriented, though regional trade networks existed. The economy was integrated without being extractive. The *lallup system* required people to give periodic service to the state. It worked within a system where farming, military duty, and political authority were closely linked. Labor was not treated as paid work but as part of community sovereignty, not wages or profit.

Loktak Lake, with its floating biomass, sustained distinctive fishing and habitation patterns. Communities adapted to ecological fluctuations, not merely exploiting but negotiating with the environment. This signals ecological intelligence shaped by continuity. Handloom weaving, especially among Meitei women, was integral to economic and cultural life. Production was skill-intensive, oriented toward use and cultural meaning rather than mass surplus. This was development as equilibrium, calibrated expansion rooted in ecological prudence.

2.2 Kingship, Ritual Sovereignty, and Temporal Order

Political authority in Manipur was embedded in ritual temporality. Coronation and royal ceremonies were not merely administrative transitions; they carried cosmological and religious significance. The king's authority was symbolically linked to land, deity, and lineage, and sovereignty was sacral long before it assumed a juridical meaning in the modern sense. As described in the *Cheitharol Kumbaba* and in traditional accounts of coronation at Kangla, the ruler underwent elaborate rites- ritual purification, offerings to deities, participation of clan heads, and ascent to the Kangla throne, signifying not simply political succession but cosmic investiture. Kingship was therefore both sacred office and political authority.

With the consolidation of British political influence after 1891, following the Anglo-Manipur War, royal authority was gradually subordinated to colonial supervision. Court protocols increasingly reflected imperial hierarchy, and accession required recognition

under British paramountcy. Ceremonial forms were not abolished, but their meaning was reframed within a colonial political order. The ruler became a subordinate sovereign within the British imperial structure, and authority was repositioned within an external imperial chronology rather than solely within indigenous ritual time. This transformation can be observed in later coronation practices. Earlier coronations, embedded in indigenous ritual frameworks, emphasized sacred rites, invocation of deities, and reaffirmation of lineage within a cosmological order. Under British paramountcy, however, coronation ceremonies incorporated imperial recognition and formal protocols aligned with British authority. The presence of colonial officials and the requirement of imperial sanction reoriented accession toward imperial legitimacy. This shift is also visible in the 1908 coronation painting by Rajkumar Chandrajitsana Singh, preserved at the RKCS Art Gallery and Museum, where ritual regalia coexists with unmistakable symbols of imperial presence.

The *Cheitharol Kumbaba*, maintained over centuries, represents a long-standing indigenous mode of historical recording. Yet under colonial rule, bureaucratic documentation and codified governance reshaped how political legitimacy was defined and recorded. Genealogical memory encountered administrative modernity. The rupture, therefore, was not an immediate erasure of tradition but a gradual displacement of ritual sovereignty by colonial administrative rationality, visible in both textual chronicles and visual representations.

2.3 Sagol Kangjei as Civilizational Ethos

Sagol Kangjei, later codified as Polo, should be understood not merely as a sport but as a civilizational ethos. It expressed a symbiotic relationship between rider and the Manipuri Pony, endemic to Manipur's terrain. Mastery was tacit and embodied, shaped through prolonged interaction with terrain, climate, and the horse's temperament[11]. Participation was socially embedded, linked to court rituals, communal spectatorship, and performative honour. The practice fostered discipline, valour, and collective solidarity, avoiding commodification. Prestige came from cultural legitimacy and cosmological resonance, not commercial capital[13].

Sagol Kangjei was as much a sacred practice as an athletic one. It was intertwined with devotion to Marjing (the Meitei god of horses) and ritual enactments within Lai Haraoba. The game operated within a mythic temporality, reflecting cosmology in embodied form. It also structured alliances, royal patronage, and symbolic hierarchy [12],[14]. Reducing it to a precursor of polo overlooks its theological and political significance. Through Pierre Bourdieu's concept of cultural capital[18], we see how Sagol Kangjei accrued symbolic capital through ritual and ecological embeddedness. When appropriated by British officers in the 19th century, it was transformed into an aristocratic leisure activity[10],[15].

The practice's logic shifted from sacred prestige and communal sovereignty to exclusivity and imperial cosmopolitanism. Simultaneously, as Walter Mignolo describes, colonialism caused epistemic displacement- reclassifying indigenous knowledges within a colonial power structure[15]. Polo's codification didn't merely standardize rules; it redefined origin, authority, and narrative. The local was rendered derivative, and the imperial universalized. Sagol Kangjei represented an integrated lifeworld where ecology, cosmology, and polity coalesced. Polo, by contrast, represented abstraction, deterritorialization, and entry into the imperial leisure economy. The key transformation lies not in historical precedence but in epistemic reclassification- the shift from a civilizational practice to an imperial commodity.

2.4 Cultural Plurality and Layered Time

Pre-colonial Manipur was characterised by a stratified sacred order, not religious uniformity. The consolidation of Vaishnavism under Pamheiba (Garib Niwaz) in the early eighteenth century reconfigured court rituals and normative codes. However, this did not erase indigenous Meitei cosmological traditions. Sanamahism, rooted in the worship of Lainingthou Sanamahi, Leimarel Sidabi, Pakhangba, and the Umang Lais, continued to structure domestic piety and sacred geography[16]. Meitei households preserved ritual space for Sanamahi, even as Vaishnavism became more prominent.

Historiography often presents the eighteenth century as a rupture between an "animistic" past and a "Hindu" present, suggesting a unilinear religious progress. However, evidence points to palimpsestic coexistence rather than substitution[16],[12]. Even where reform was coercive, indigenous cosmology persisted in embodied practices and seasonal festivals. The festival of Lai Haraoba exemplifies this continuity, reenacting cosmogony through ritual movement and gesture[16]. In contrast, Ras Lila, under Vaishnav patronage, aestheticized Radha-Krishna devotion[17]. These practices coexisted, revealing incorporation rather than rupture.

Reinhart Koselleck's concept of layered temporality[3] clarifies this structure: past and present exist as overlapping, operational strata. Indigenous ritual time: cyclical and reenactive, coexisted with Vaishnav linearities, focused on salvation and scriptural authority. The transformation was asymmetrical: Vaishnavism consolidated royal legitimacy, while Sanamahi worship remained embedded in domestic and clan structures. External influences were indigenized within an existing cosmography.

Time was not conceived as supersession; the past was reactivated through ritual performance. Lai Haraoba served as mnemonic infrastructure, renewing cosmological legitimacy across generations. This section demonstrates the layered temporality of pre-

colonial Manipur, showing that colonial intervention was a rupture, not a natural progression.

3. Colonialism as Temporal Skipping

Colonialism in Manipur did not merely alter political administration; it reshaped how time, development, and change were understood. Colonial records, including revenue settlements, census operations, and Political Agent correspondence, were not neutral but administrative instruments. These materials structured obligation by quantifying land, labour, and population, placing them within fixed fiscal cycles. Agricultural and social rhythms had to adjust to these imposed schedules. This restructuring was not unique to Manipur. In Bengal under the Permanent Settlement (1793), land revenue demands reshaped local economic rhythms. Similarly, hut taxes in African colonies forced participation in cash-crop markets to meet colonial revenue needs. The shift from subsistence-based systems to fiscal priorities was gradual but structural.

The contrast between British and Meitei temporal organisation clarifies this shift. Britain's industrial economy, based on clock time and wage labour, measured productivity through quantifiable output. Meitei society, by contrast, was agrarian, structured around seasonal cultivation, ritual calendars, and ecological timing. Colonial revenue cycles formalized this system and imposed an external temporal logic.

The Second Nupi Lal (Women's Revolt) of 1939 illustrates this transformation. Sparked by the export of rice during harvest season, it led to a famine-like situation. Manipuri women protested the export policies, which were rooted in colonial economic demands. This revolt highlighted how colonialism reshaped both economic systems and the local temporal organisation, subordinating agricultural rhythms to market logic and altering the region's concept of time. Reinhart Koselleck's idea of modernity reshaping the "horizon of expectation"explains this shift. Manipur, once assessed through ecological sustainability, was now measured against British institutional norms, leading to a linear and comparative understanding of time. Colonialism did not just affect economic systems but redefined the future. Indigenous developmental trajectories were reoriented toward imperial priorities. In this sense, colonialism "stole" potential futures, narrowing the developmental paths of Manipur. This restructuring redefined what constituted legitimate progress, marginalising futures that did not align with imperial models.

Drawing on Achille Mbembe's analysis, colonial governance reorganised not just territory but temporality, creating a condition of comparative belatedness. *Temporal skipping*, therefore, refers to a displacement where local temporal frameworks, shaped by agrarian cycles and customary governance, were subordinated to externally defined

administrative time. Development came to mean alignment with imperial standards rather than internal transformation.

Colonialism redefined governance, economy, and the criteria for evaluating historical change. The most significant shift lay in the transfer of authority over the meaning and measurement of progress.

4. Colonial Legacies and Contemporary Vulnerabilities

Colonialism in Manipur didn't just impact its past; its legacy continues to shape the region's economy and environment today. Colonial rule interrupted local agricultural systems and social structures, creating vulnerabilities that persist. Under British rule, Manipur's agricultural systems, once in harmony with local ecology and focused on self-sufficiency, became increasingly tied to external economic demands. The British introduced revenue-based policies that shifted production from balance to surplus, integrating the economy into the global market and leaving it vulnerable to external pressures. Local practices, once environmentally sustainable, had to adapt to a system focused on extraction and export.

A clear example of this shift is seen in the Second Nupi Lal of 1939. The revolt was sparked by the export of rice from Manipur, worsening food shortages during harvest. Women, integral to the agrarian economy, protested the policy, showing the direct impact of colonial economic policies on agriculture and food security. The shift from a self-sustaining economy to market dependence reflects a broader colonial agenda of integrating Manipur into the global economy. British-imposed rigid timelines for revenue collection and surplus production disrupted the natural rhythm of local agricultural practices. Traditional systems around Loktak Lake, once rooted in sustainable practices, were altered, leading to ecological damage after the construction of the Ithai Barrage.

Colonial rule also restructured social systems. The Lallup system, once community-driven, was co-opted into colonial administration, reducing local autonomy. This shift in governance made communities more dependent on external authority, contributing to unrest, as seen in the Second Nupi Lal.The colonial restructuring left Manipur's ecological balance disturbed. The local economy, once adaptive and self-regulating, is now dependent on external markets and policies disconnected from the region's historical and environmental context. The legacy of colonialism continues to shape Manipur's struggles today, from an economy reliant on external markets to a loss of local governance and agency

5. Indigenous Knowledge as Future-Oriented Epistemology

There is a persistent misunderstanding that indigenous knowledge belongs only to the past, that it is merely a cultural remnant waiting to be replaced by modernity. This view stems from a linear conception of history, one that assumes all societies must follow the same developmental path. According to this model, indigenous knowledge is seen as an earlier stage, something outmoded and destined to be superseded by scientific progress. However, this assumption is flawed and warrants critical examination.

Indigenous knowledge systems are not outdated survivals; rather, they are sophisticated, structured ways of understanding the world. These knowledge systems are deeply rooted in relational concepts of ecology, social harmony, and intergenerational responsibility. Far from being backward-looking, they are inherently forward-thinking, focusing on sustainability, balance, and the endurance of life across time. The idea of "epistemicide" as coined by Boaventura de Sousa Santos, aptly describes the systematic devaluation of non-Western knowledge systems in favor of Eurocentric science and rationality[2]. What is dismissed in this process is not irrationality or myth, but alternative rationalities, ways of knowing that are grounded in lived experience and ecological interdependence. These "epistemologies of the South" highlight how knowledge systems, born out of colonial domination, offer valuable insights into justice, sustainability, and coexistence.

Indigenous knowledge systems in Manipur, particularly those related to agriculture, land tenure, and social governance, serve as models of sustainable thinking. Wet-rice farming, for instance, is attuned to the monsoon cycles and seasonal rhythms, while traditional fishing practices are adapted to the fluctuation of local ecosystems. These practices are not mere traditions, but calibrated systems that respond intelligently to ecological limitations. Their logic is not rooted in the pursuit of rapid growth, but in the maintenance of continuity and ecological balance.

This kind of ecological awareness is increasingly recognized in the context of global sustainability. Today's climate crisis underscores the importance of local knowledge in building resilience to environmental challenges. Communities that have historically relied on intergenerational stewardship such as the indigenous farmers and fishermen in Manipur possess insights that are now acknowledged as critical to addressing issues of resource depletion and climate change.

However, the global sustainability discourse often treats indigenous knowledge as something to be used as a tool within modern frameworks, without addressing the deeper epistemic assumptions of the dominant development model. Simply inserting indigenous knowledge into modern policies without altering the structures of power that marginalize

these traditions is a form of appropriation. The real challenge lies in reshaping the very framework through which development is understood, moving beyond extractive growth models toward a more pluralistic conception of progress that values ecological balance, reciprocity, and collective well-being.

In Manipur, indigenous knowledge systems are repositories of an alternate future, a future that is not defined by endless expansion, but by equilibrium and intergenerational care. The knowledge systems that governed land use, agricultural cycles, and social responsibility were grounded in an understanding of time that was recursive, rather than linear. This cyclical conception of time emphasizes continuity and stability over acceleration and consumption. In contrast, the extractive logic of colonial and modern capitalist economies measures progress through consumption and expansion, disregarding ecological and social limits.

This distinction between indigenous and modern conceptions of time and progress is crucial. Modern developmental paradigms often frame progress as measurable growth, more goods, more services, more output. Indigenous frameworks, on the other hand, prioritize balance and sustainability. The focus is on long-term stability and the well-being of the community, rather than short-term gains. This alternative vision of progress is not about rejecting modernity, but about proposing a more sustainable path that accounts for ecological and social limits.In sum, indigenous knowledge is not a remnant of the past, but a living, dynamic system that offers pathways to a future where sustainability and justice are paramount. These systems challenge the assumption that progress must always be linear and growth-oriented. By recognizing indigenous knowledge as a future-oriented epistemology, we open up new possibilities for creating more sustainable and equitable societies.

6. Reclaiming Interrupted Temporalities: Toward Pluriversal Futures

If colonialism reorganized time, and if its afterlife persists as a hierarchy of historical stages, then decolonization cannot remain confined to territory or governance. It must also entail a reconfiguration of temporality. The task is not merely to accelerate toward a delayed modernity but to question the very narrative that defines delay. The dominant developmental question- *How do we modernize Manipur?* presumes that modernity is singular, pre-constituted, and geographically located elsewhere. It assumes a universal trajectory along which societies are positioned at varying distances. Within this framework, reform is measured as approximation. Such a premise silently reinstates the logic of the "not yet." In this view, Manipur is perpetually behind and requires "catching up."

Decolonial thought unsettles this assumption. Walter Mignolo's formulation of pluriversality challenges the universality claimed by Western modernity. The pluriverse is not a relativist fragmentation of the world; it is the recognition that multiple ontologies and epistemologies coexist, each grounded in distinct historical experiences[2]. Arturo Escobar similarly speaks of a "world where many worlds fit" a horizon in which alternative pathways to collective life are not subordinated to a single civilizational script[3].

To invoke pluriversality in the context of Manipur is not to withdraw from globality. It is to refuse the reduction of globality to homogenization. The issue is not whether Manipur participates in modern institutions- electoral democracy, higher education, digital communication. It already does. The deeper question concerns the normative framework within which such participation is evaluated.

The discourse of "multiple modernities" offers a partial corrective by acknowledging that modernity manifests differently across societies. Yet even this formulation sometimes retains an implicit centre, from which variations are measured. A more rigorous position would recognize that what is termed modernity may itself be internally plural and historically contingent. In such a view, indigenous temporalities are not deviations from a norm; they are coeval formations with their own trajectories of transformation.

Reclaiming interrupted temporalities, therefore, does not imply restoration of an untouched past. Historical processes are irreversible; colonial rupture cannot be undone. What can be undertaken, however, is a critical revaluation of suppressed logics- ecological prudence, collective land stewardship, ritual accountability, and non-extractive subsistence models, not as relics, but as conceptual resources for a pluralistic future.

Decolonial environmental thinking reinforces this imperative. The current planetary crisis exposes the fragility of extractive acceleration. Growth without limit, productivity without reciprocity, and consumption detached from regeneration have produced structural instability. In this context, indigenous ecological frameworks appear less as ethnographic curiosities and more as viable paradigms of sustainability. Their emphasis on continuity, relationality, and intergenerational responsibility offers a counterpoint to the temporality of immediate gain.

The reclamation envisaged here is epistemic rather than nostalgic. It calls for the recovery of intellectual confidence in local categories of thought. It invites critical dialogue between indigenous knowledge and global theory, without subsumption of one into the other. Such a dialogue would neither romanticize the precolonial nor absolutize the modern. It would accept historical transformation while resisting historical hierarchy.

The closing provocation, then, must be framed with care. The pertinent question is not: *How can Manipur catch up?* It is: *What trajectories were rendered invisible when its time was recalibrated according to an external clock?*

If its developmental logic had unfolded without forced acceleration, if subsistence had not been reoriented toward extractive dependency, if ecological equilibrium had not been subordinated to surplus production, if ritual sovereignty had not been displaced by bureaucratic rationality- what forms of political, economic, and environmental modernity might have emerged?Such speculation is not counterfactual fantasy. It is a methodological strategy. By imagining the continuity of interrupted trajectories, one exposes the contingency of the dominant model. One recognizes that history could have taken, and may yet take different paths. Pluriversal futures do not reject modern institutions; they pluralize their foundations. They acknowledge that democracy, sustainability, and development need not be tethered to a singular temporal grammar. They open conceptual space for coexisting temporalities within a shared world.

To reclaim interrupted time, therefore, is to challenge the monopoly over the future. It is to assert that alternative rhythms of life, slower, reciprocal, ecologically attuned, are not remnants of a superseded era, but propositions for a world in crisis.The work ahead is not to return to a lost origin, nor to accelerate uncritically toward a prescribed destination. It is to deliberate, with intellectual sobriety, on the plurality of possible futures.

7. Conclusion :

Colonialism in Manipur not only transformed political structures but also disrupted the region's socio-economic and ecological systems. The shift from self-sustained, locally regulated agricultural practices to a market-driven economy, driven by colonial revenue policies, left Manipur vulnerable to economic instability and ecological harm. Indigenous temporalities, once aligned with local cycles and ecological rhythms, were replaced by externally imposed schedules focused on productivity and surplus. This disruption created long-lasting vulnerabilities, which continue to shape the region's struggles today. To move forward, Manipur must reclaim and integrate its indigenous knowledge systems, which emphasize sustainability, collective responsibility, and ecological balance. Doing so would challenge the colonial legacy and open up possibilities for development that respect local practices and ensure a sustainable future.

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Chapter 6: Family Socialisation and Emotional Regulation as Pathways to Psychological Resilience among Marginalised Youth in the Global South: A Conceptual Framework

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Abstract

Youth in the Global South often grow within contexts marked by socio-economic disadvantage, cultural marginalisation, and limited access to psychological resources, which increase vulnerability to emotional distress and mental health challenges. In such settings, psychological resilience appears as a crucial capacity for sustaining well-being and adaptive functioning. Although existing literature has examined family socialisation, emotional regulation, and resilience as independent constructs, these domains have rarely been integrated within a unified conceptual framework, particularly in relation to marginalised youth populations. The present chapter proposes a conceptual framework that positions family socialisation and emotional regulation as key developmental pathways to psychological resilience among marginalised youth in the Global South. Drawing upon developmental psychology, emotional regulation theory, cultural psychology, and resilience research, the chapter argues that early family environments play a foundational role in shaping emotional learning processes, regulatory capacities, and coping orientations. Through emotional socialisation practices such as parental modelling, emotional validation, and disciplinary styles, youth get emotional scripts that influence how they perceive, interpret, and manage emotional experiences across development. Emotional regulation is conceptualised as the central psychological mechanism mediating the relationship between family socialisation and resilience. Adaptive emotional regulation capacities such as emotional awareness, cognitive reappraisal, acceptance, and self-control enable marginalized youth to cope with stress, adversity, and structural constraints more effectively. These regulatory processes support meaning-making, psychological flexibility, and stress tolerance, thereby helping-resilient functioning. By

integrating family systems and emotional regulation within a culturally grounded resilience framework, this chapter advances a holistic understanding of psychological resilience as a developmental and relational outcome rather than an individual trait. The proposed model has implications for culturally sensitive mental health interventions, youth development programs, and preventive strategies aimed at promoting sustainable psychological well-being among marginalised populations in the Global South.

Keywords: Emotional regulation, Family socialisation, Global South, Marginalised youth, Psychological Resilience

1. Introduction

Youth in the Global South grow up within socio-cultural and structural environments characterised by economic inequality, social marginalisation, political instability, and limited access to educational and mental health resources. These conditions place young people at increased risk of psychological distress, emotional dysregulation, and mental health difficulties, particularly during critical developmental periods marked by identity exploration, social transitions, and heightened emotional vulnerability. The World Health Organisation estimates that nearly 75% of mental health problems begin before the age of 25, with the burden of untreated psychological disorders being disproportionately higher in low- and middle-income countries (1,2). Marginalised youth in the Global South often face compounded stressors such as poverty, discrimination, family instability, and restricted opportunities, which significantly affect emotional development and psychological well-being (3,4).

In this context, psychological resilience emerges as a crucial developmental resource for sustaining well-being and adaptive functioning. Psychological resilience refers to the capacity to cope with adversity, regulate emotional distress, maintain psychological balance, and recover from challenging life experiences (5). Contemporary models conceptualise resilience not as a fixed personality trait but as a dynamic and developmental process shaped by social environments, emotional learning, and relational experiences (6,7). Recent global mental health research suggests that resilience is particularly important for youth exposed to chronic stress and structural disadvantage, as it enables adaptive coping, emotional regulation, and meaning making in the face of persistent adversity (8,9).

One of the most influential yet under-explored determinants of resilience is the family environment**.** Developmental psychology has consistently emphasised that families constitute the primary social systems through which emotional competencies, coping orientations, and regulatory capacities are acquired (10,11). Family socialisation refers to

the processes through which caregivers transmit emotional norms, values, and behavioural patterns that shape children's emotional development and self-regulation (12). Through everyday interactions, children learn how emotions are expressed, interpreted, managed, and valued within their cultural context. These early emotional learning experiences form internal emotional scripts that guide emotional responses, coping behaviours, and interpersonal functioning across the lifespan (13).

Closely related to family socialisation is the construct of emotional regulation**,** which represents a core psychological mechanism underlying mental health and adaptive functioning. Emotional regulation is defined as the processes by which individuals monitor, evaluate, and modify emotional reactions in order to achieve personal goals and respond effectively to environmental demands (14). Emotional regulation involves multiple dimensions, including emotional awareness, cognitive reappraisal, emotional acceptance, attentional control, and behavioural modulation (15). Empirical research demonstrates that individuals with effective emotional regulation skills show greater psychological flexibility, lower levels of anxiety and depression, and higher levels of subjective well-being (16,17). Conversely, deficits in emotional regulation are associated with emotional dysregulation, maladaptive coping strategies, and increased vulnerability to mental health problems (18).

Recent research highlights emotional regulation as a key psychological factor influencing resilience among youth, particularly in contexts of social adversity and marginalisation (19,20). Emotional regulation enables young people to manage stress, tolerate emotional discomfort, reinterpret negative experiences, and maintain psychological coherence during challenging life circumstances. These regulatory capacities are especially critical in the Global South, where youth often lack access to formal psychological services and must rely on internal and relational coping resources (21). In such contexts, emotional regulation functions not merely as an individual skill but as a socially shaped capacity emerging through family interactions and cultural emotional norms.

From a cultural psychology perspective, emotional development and resilience cannot be fully understood without considering socio-cultural contexts. Cultural models of the self, emotional expression, and interpersonal relationships shape how emotions are experienced, regulated, and interpreted (22). In collectivistic societies common to the Global South, emotional regulation is often oriented toward maintaining social harmony, fulfilling family expectations, and regulating emotions in relational contexts rather than expressing individual emotional needs (23). These cultural norms influence parenting practices, emotional socialisation strategies, and the development of regulatory skills, thereby shaping resilience in culturally specific ways (24).

Despite the conceptual relevance of family socialisation and emotional regulation, existing literature has largely examined these constructs in isolation within separate theoretical traditions. Developmental psychology has focused on parenting and emotional socialisation, emotional regulation research has emphasised intrapersonal regulatory mechanisms, and resilience studies have primarily concentrated on individual traits or external protective factors such as social support and community resources (25–27). However, there remains a lack of integrative frameworks that systematically connect family socialisation, emotional regulation, and psychological resilience within a unified developmental model, particularly in relation to marginalised youth populations in the Global South.

This theoretical fragmentation limits the ability of researchers and practitioners to understand how early family environments shape emotional competencies that subsequently influence resilience across development. It also restricts the design of culturally sensitive mental health interventions that address relational and developmental foundations of resilience rather than focusing solely on individual-level coping strategies. Given the central role of families in emotional development, especially in resource-constrained settings, there is a critical need for conceptual models that position family socialisation and emotional regulation as key developmental pathways to psychological resilience.

The present chapter seeks to address this gap by proposing a conceptual framework that integrates family socialisation and emotional regulation as core developmental mechanisms underlying psychological resilience among marginalised youth in the Global South**.** Drawing upon developmental psychology, emotional regulation theory, cultural psychology, and resilience research, this framework conceptualises resilience as a relational and developmental outcome shaped by early emotional learning and regulatory processes. By offering a culturally grounded and theoretically integrated model, the chapter aims to contribute to global mental health scholarship and provide a foundation for future empirical research, policy development, and culturally responsive mental health interventions targeting marginalised youth populations.

2. Review of Literature

2.1 Marginalised Youth in the Global South: Context and Challenges

Marginalised youth in the Global South experience complex social, economic, and psychological challenges that significantly shape their mental health trajectories. The Global South broadly refers to regions characterised by lower levels of economic development, higher poverty rates, social inequality, and limited access to institutional

resources such as education and healthcare (28). Youth in these contexts are disproportionately exposed to chronic stressors, including economic deprivation, social exclusion, political instability, gender-based discrimination, and restricted social mobility, all of which contribute to heightened vulnerability to psychological distress (3,4,29).

Global mental health research consistently shows that adolescents and young adults in low- and middle-income countries exhibit higher prevalence rates of anxiety, depression, and emotional distress compared to youth in high-income nations (31,32). Structural inequalities, including limited mental health infrastructure, shortage of trained professionals, and cultural stigma, further exacerbate these vulnerabilities (33). Consequently, many psychological difficulties among marginalised youth remain undiagnosed and untreated, leading to long-term consequences for emotional development, educational attainment, and social functioning (34).

Socio-economic marginalisation plays a critical role in shaping emotional and psychological outcomes. Poverty is associated with increased exposure to adverse childhood experiences, family stress, insecure living conditions, and limited psychosocial support (35). These conditions disrupt emotional development and increase the likelihood of emotional dysregulation and maladaptive coping strategies (36). Longitudinal studies further indicate that early exposure to socio-economic adversity predicts poorer emotional regulation capacities and lower resilience during adolescence and early adulthood (37).

In addition to economic deprivation, social marginalisation based on caste, ethnicity, gender, and minority status further intensifies psychological vulnerability (38). Experiences of discrimination and social exclusion contribute to chronic emotional stress and reduced psychological well-being (39). These forms of marginalisation often intersect with family-level stressors such as parental unemployment and unstable caregiving environments, creating cumulative developmental risk (40).

From a developmental perspective, these structural conditions influence emotional learning and coping development. Youth growing up in marginalised environments must navigate emotional challenges within contexts of limited institutional support, making families and communities the primary sources of emotional guidance and psychological regulation (41,42). In many Global South settings, families function as central emotional safety nets, providing moral frameworks and coping strategies in the absence of formal mental health services (21). Consequently, family socialisation becomes a critical context through which emotional regulation skills and resilience capacities are acquired.

2.2 Family Socialisation and Emotional Development

Family socialisation constitutes one of the most influential developmental systems through which individuals acquire emotional habits, self-regulatory capacities, and psychological orientations toward the self and others. Families function as primary microsystems in which emotional meanings, behavioural norms, and coping strategies are transmitted across generations (10,11). Family socialisation refers to the processes through which caregivers shape children's emotional development by modelling emotional expression and responding to emotional needs (12).

Through everyday parent–child interactions, children internalise emotional scripts that guide how emotions are perceived and regulated (13). Parents play a crucial role in teaching children how to label emotions, manage emotional intensity, and tolerate distress (11). These emotional learning processes form internal working models of emotion that remain relatively stable across development and influence psychological functioning into adulthood.

Parenting styles provide a central framework for understanding family socialisation. Baumrind's typology classifies parenting into authoritative, authoritarian, permissive, and neglectful patterns (55). Authoritative parenting, characterised by warmth and emotional responsiveness, has been associated with higher emotional competence and better self-regulation among youth (56). In contrast, authoritarian parenting is linked to emotional suppression and internalising problems (47), while permissive and neglectful styles are associated with impulsivity and emotional dysregulation. Emotional socialisation practices mediate the relationship between parenting styles and emotional outcomes. These include parental reactions to children's emotional expressions and emotional coaching (12). Parents who validate emotions and provide supportive guidance foster emotional awareness and adaptive regulation, whereas dismissive or punitive emotional responses contribute to emotional inhibition and dysregulation.

Meta-analytic evidence indicates that emotionally supportive parenting is associated with lower anxiety and depression and better social functioning (16,46). These patterns are particularly salient in marginalised contexts, where family stressors such as poverty and parental mental health problems may compromise emotional availability and caregiving quality. Culturally, emotional development is shaped by culturally specific emotional scripts that influence how emotions are socialised and regulated (22,24). In collectivistic cultures common to the Global South, emotional regulation is often oriented toward maintaining interpersonal harmony and fulfilling family obligations rather than asserting individual emotional needs (23). These cultural norms significantly influence parenting practices and emotional socialisation strategies.

2.3 Emotional Regulation and Mental Health

Emotional regulation represents a central psychological mechanism underlying mental health and adaptive functioning. It is defined as the processes by which individuals monitor, evaluate, and modify emotional reactions to achieve personal goals (14). Contemporary models conceptualise emotional regulation as encompassing emotional awareness, attentional control, cognitive reappraisal, and emotional acceptance (15).

Empirical research consistently demonstrates that effective emotional regulation is associated with greater psychological flexibility and well-being (16). Adaptive regulatory strategies such as cognitive reappraisal are linked to reduced anxiety and depression, while maladaptive strategies such as emotional suppression are associated with psychological distress (17).

Emotional regulation is particularly important in marginalised contexts, where youth are exposed to chronic stressors such as poverty, discrimination, and family instability (3,4). Emotional regulation enables individuals to tolerate uncertainty, manage emotional distress, and maintain psychological coherence under adversity (20). Developmental models further emphasise that emotional regulation is a learned skill shaped through early family socialisation experiences (11). Thus, emotional regulation serves as the psychological bridge linking family socialisation to mental health outcomes.

2.4 Psychological Resilience in Youth

Psychological resilience refers to the capacity to maintain adaptive functioning and well-being in the face of adversity (6). Contemporary resilience theory views resilience as a dynamic developmental process shaped by individual, relational, and contextual factors (7). Emotional regulation is identified as a core mechanism underlying resilient functioning, as it supports stress tolerance, emotional balance, and cognitive flexibility.

In the Global South, resilience is strongly influenced by family support, emotional socialisation, and culturally embedded coping practices (41,43). Family relationships provide emotional security and social identity, which serve as protective factors against psychological distress (26). Emotional socialisation within families enables youth to acquire regulatory strategies that support adaptive functioning despite ongoing challenges.

2.5 Research Gap and Rationale

Although substantial literature exists on marginalised youth, family socialisation, emotional regulation, and psychological resilience, these domains remain largely

fragmented within existing research. Most studies examine these constructs independently, without integrating them into a unified developmental framework. In particular, resilience is often conceptualised as an individual trait or outcome, while limited attention is given to the relational and emotional processes through which resilience emerges. Furthermore, existing models of emotional regulation and resilience are predominantly grounded in Western individualistic perspectives, with insufficient incorporation of culturally embedded family systems common to the Global South. There is a notable lack of conceptual frameworks that explicitly link early family-based emotional socialisation to emotional regulation capacities and subsequent resilience among marginalised youth.

The present chapter addresses this gap by proposing a culturally grounded conceptual framework that integrates family socialisation and emotional regulation as developmental pathways to psychological resilience. By adopting a relational and developmental perspective, the chapter seeks to reposition resilience as an outcome of emotional learning and regulatory processes shaped within family contexts. This integrative approach contributes to theoretical advancement and provides a foundation for designing culturally sensitive mental health interventions for marginalised youth in the Global South

3. Proposed Conceptual Model

The present chapter proposes an integrative conceptual framework (Fig.1) that positions family socialisation and emotional regulation as central developmental pathways to psychological resilience among marginalised youth in the Global South**.** This framework is grounded in the assumption that resilience is not an isolated psychological trait, but a dynamic developmental process shaped by early relational experiences, emotional learning, and culturally embedded socialisation practices. Rather than viewing resilience as an individual capacity emerging independently, the model conceptualises resilience as an outcome of emotionally regulated functioning that develops through family-based emotional conditioning and adaptive regulatory processes across development.

The framework adopts a developmental and relational perspective, emphasising that youth growing up in marginalised contexts acquire emotional competencies primarily through family interactions, caregiving environments, and culturally transmitted emotional norms. In settings where institutional mental health resources are limited, families serve as the primary emotional learning systems through which young people develop regulatory strategies and coping orientations (21,41). Emotional regulation is therefore conceptualised as the key psychological mechanism that mediates the relationship between family socialisation and resilient functioning.

3.1 Theoretical Background of the Proposed Framework

The proposed conceptual framework is theoretically grounded in multiple psychological traditions, including ecological systems theory, social learning theory, emotion regulation theory, and contemporary resilience theory**.** Together, these perspectives support the central premise that emotional regulation and resilience are developmentally shaped through family-based emotional socialisation.

Bronfenbrenner's ecological systems theory conceptualises human development as occurring within nested environmental systems, with the family representing the most immediate and influential microsystem (10). Within this framework, family environments shape emotional learning, behavioural regulation, and psychological development through sustained interpersonal interactions. Parenting practices, emotional communication patterns, and caregiving relationships constitute the primary contexts in which youth acquire emotional scripts and regulatory tendencies. Ecological models further emphasise that developmental outcomes are shaped by the interaction between individual characteristics and contextual resources, making family systems particularly significant in marginalised environments where external institutional support is limited (6,7).

Social learning theory provides further explanation for how emotional regulation capacities emerge through observational learning, modelling, and reinforcement processes (44). According to this perspective, children learn how to express, suppress, interpret, and regulate emotions by observing caregivers' emotional behaviours and coping strategies. Through repeated exposure to parental emotional responses, youth internalise emotional norms and regulatory patterns that guide their own emotional functioning across development. Empirical research demonstrates that parental modelling of emotional behaviours plays a crucial role in shaping children's emotional competence and psychological adjustment (11,12).

The framework is also supported by emotion regulation theory, which conceptualises emotional regulation as a central psychological process underlying adaptive functioning and mental health (14). Emotional regulation involves processes such as emotional awareness, attentional control, and cognitive reappraisal, which influence emotional experience and behavioural outcomes (15). Emotional regulation capacities enable individuals to manage emotional distress, maintain psychological balance, and respond flexibly to stressors, thereby facilitating psychological adaptation and well-being (16).

Finally, contemporary resilience theory conceptualises resilience as a dynamic and relational process shaped by developmental experiences, emotional competencies, and social relationships (6,7). Rather than viewing resilience as an inherent personality trait,

resilience models emphasise the role of protective processes, emotional resources, and contextual supports in facilitating adaptive functioning under adversity. This perspective aligns with the present framework by positioning emotional regulation and family socialisation as key developmental mechanisms through which resilience emerges, particularly in marginalised contexts characterised by chronic stress and structural disadvantage (41,43).

3.2 Development of the Stages of the Framework

The proposed framework consists of five interrelated developmental stages: family socialisation, emotional socialisation, emotional regulation, psychological resilience, and sustainable well-being**.** These stages represent a sequential yet dynamic process through which emotional learning and regulatory capacities contribute to resilient functioning among marginalised youth.

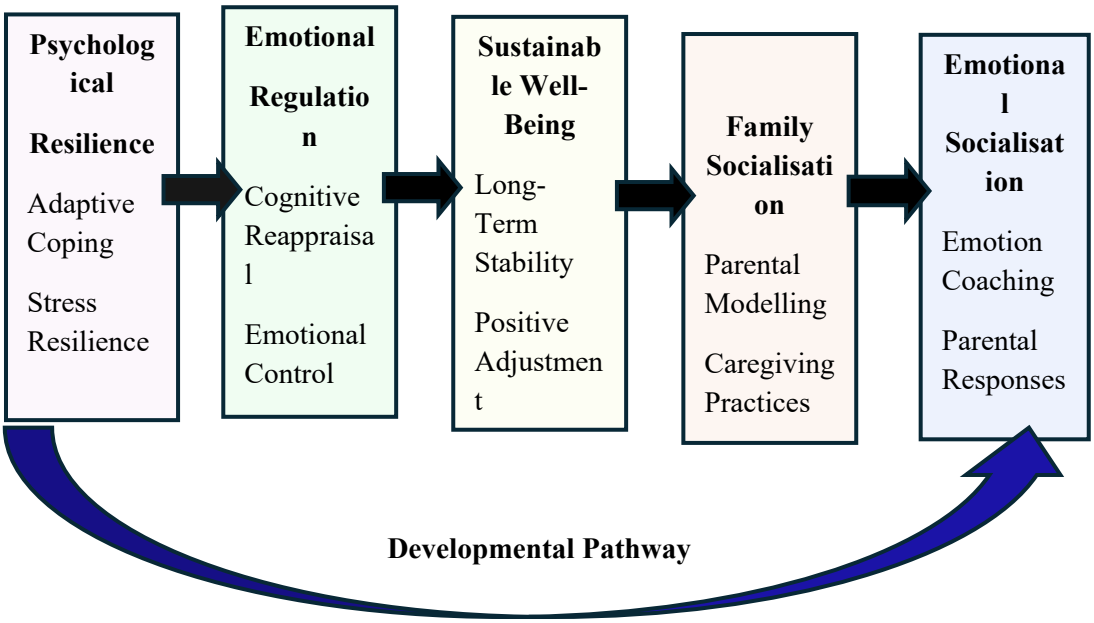


Figure.1-Proposed Conceptual Model of Family Socialisation, Emotional Regulation, and Psychological Resilience leading to Sustainable Well-Being.
Note: The model presented is an original conceptual framework developed by the author.

At the first stage, family socialisation operates as the primary emotional conditioning environment. Family socialisation involves the transmission of emotional norms, values, coping strategies, and behavioural expectations through caregiving practices and parent–child interactions (11,12). Parents influence emotional development through emotional modelling, disciplinary strategies, emotional responsiveness, and communication patterns. Supportive and emotionally responsive parenting fosters emotional awareness, secure attachment, and reflective self-regulation, whereas emotionally restrictive or inconsistent parenting may contribute to emotional suppression and maladaptive coping (55,56).

The second stage, emotional socialisation**,** refers specifically to the processes through which caregivers shape children's understanding and management of emotions. Emotional socialisation practices include emotional validation, emotional coaching, emotion-related discipline, and parental reactions to children's emotional expressions (12). These practices shape how youth interpret emotional experiences, regulate emotional intensity, and develop emotional self-awareness. Research suggests that emotionally supportive socialisation predicts greater emotional competence and adaptive regulation, whereas dismissive or punitive emotional responses are associated with emotional dysregulation and psychological vulnerability (11,58).

The third stage, emotional regulation**,** represents the central psychological mechanism of the framework. Emotional regulation involves the capacity to monitor, evaluate, and modify emotional reactions in accordance with situational demands and personal goals (14). Adaptive regulatory strategies such as cognitive reappraisal and emotional awareness enable youth to manage emotional distress, tolerate uncertainty, and respond flexibly to adversity (15,16). Emotional regulation thus functions as the psychological infrastructure that links early family experiences to later resilience outcomes.

The fourth stage, psychological resilience, emerges as the integrative outcome of emotionally regulated functioning. Psychological resilience refers to the capacity to maintain emotional stability, psychological coherence, and adaptive coping in the face of adversity (6,7). Youth with effective emotional regulation skills are better equipped to reinterpret stressful experiences, manage emotional discomfort, and sustain psychological balance under conditions of chronic stress and marginalisation (21,43). Emotional regulation supports resilience by facilitating meaning-making, stress tolerance, and psychological flexibility.

The final stage, sustainable well-being**,** reflects long-term adaptive functioning characterised by emotional stability, positive self-concept, and social adjustment. Sustainable well-being refers to the capacity to maintain psychological health over time despite ongoing socio-economic challenges and structural constraints (1,28). In the Global

South, where youth often face persistent adversity, sustainable well-being is achieved not through the absence of stress, but through the development of internal regulatory resources and relational support systems that promote resilience.

3.3 Implications of the proposed conceptual Framework

The proposed conceptual framework has significant implications for mental health practice, youth development programmes, and policy interventions in the Global South. By positioning family socialisation and emotional regulation as central mechanisms of resilience, the framework highlights the importance of relational and developmental approaches to mental health promotion.

From a clinical perspective, the model suggests that psychological interventions for marginalised youth should move beyond symptom-focused treatments and incorporate family-based and emotionally informed therapeutic approaches. Interventions that target emotional awareness, cognitive reappraisal, and family communication patterns may enhance resilience by strengthening regulatory capacities at both individual and relational levels (16,21). Such approaches align with global mental health frameworks that emphasise culturally sensitive and community-based mental health care (1,33).

From a preventive perspective, the framework underscores the importance of early emotional socialisation and family support in promoting long-term psychological resilience. Community-based programmes that strengthen parenting skills, emotional literacy, and caregiver–child communication may foster emotional competencies that buffer against the negative effects of poverty, discrimination, and social marginalisation (41,42). These interventions are particularly relevant in low-resource settings, where families remain the primary agents of emotional and psychological development. At the policy level, the framework highlights the need for culturally sensitive mental health policies that recognise families as central developmental contexts for resilience. Integrating family-based emotional development strategies into public health initiatives, school-based mental health programmes, and youth welfare policies may contribute to sustainable mental health outcomes in marginalised populations (21,28). By situating resilience within family systems and emotional regulation processes, the framework offers a culturally grounded and developmentally informed model for promoting psychological well-being in the Global South.

4. Discussion

The present chapter sought to develop a conceptual framework that integrates family socialisation and emotional regulation as key developmental pathways to psychological resilience among marginalised youth in the Global South. Drawing upon developmental

psychology, emotional regulation theory, and resilience research, the model advances a relational and culturally grounded understanding of resilience as a process shaped through early emotional learning and regulatory capacities. This framework responds to a critical gap in existing literature, which often treats resilience either as an individual trait or as a static outcome, without sufficient attention to the developmental and emotional processes that underlie resilient functioning.

The conceptual model highlights the centrality of family environments as primary emotional learning systems, particularly in low-resource and marginalised contexts where institutional mental health support remains limited. In such settings, families serve not only as caregiving units but also as the main sources of emotional guidance, moral socialisation, and coping strategies. Emotional socialisation practices—such as parental modelling, emotional validation, and disciplinary responses—shape how young people learn to interpret and manage emotional experiences, thereby influencing long-term regulatory patterns and coping orientations.

By positioning emotional regulation as the mediating psychological mechanism, the framework underscores its foundational role in resilience development. Emotional regulation enables individuals to manage emotional distress, tolerate uncertainty, and respond flexibly to adversity, which are essential capacities for navigating the chronic stressors associated with socio-economic marginalisation. The model aligns with contemporary transdiagnostic perspectives in psychology, which recognise emotional regulation as a core mechanism underlying both vulnerability and resilience across multiple forms of psychological functioning. Importantly, the framework adopts a culturally sensitive lens by situating resilience within the socio-cultural realities of the Global South. Rather than conceptualising resilience solely as personal strength or individual adaptation, the model emphasises relational processes, cultural norms, and emotional learning environments. This perspective reflects a shift from Western individualistic models of resilience toward more ecological and relational approaches that recognise the influence of family systems, cultural scripts, and structural conditions on psychological development.

The integrative nature of the framework also contributes to theoretical advancement by bridging fragmented domains of research. While previous studies have independently examined family socialisation, emotional regulation, and resilience, few models have explicitly linked these constructs within a unified developmental pathway. The proposed framework thus offers a novel conceptual synthesis that enhances understanding of how resilience emerges through emotionally regulated functioning shaped by early relational experiences.

Overall, the discussion highlights that psychological resilience among marginalised youth should be understood not as a fixed outcome, but as a dynamic developmental process rooted in emotional learning, regulatory capacities, and family-based socialisation. This perspective has important implications for how mental health research, intervention design, and policy frameworks conceptualise resilience in culturally diverse and resource-constrained settings.

5. Implications of the Chapter

The proposed conceptual framework has important implications for mental health practice, youth development programmes, and policy initiatives in the Global South. By identifying family socialisation and emotional regulation as core mechanisms of resilience, the model suggests that psychological interventions should move beyond symptom-focused approaches and incorporate emotionally informed and family-centred strategies. Interventions that strengthen emotional awareness, cognitive reappraisal, and adaptive coping skills may enhance resilience by addressing the underlying regulatory processes that support psychological stability. At a preventive level, the framework underscores the importance of early emotional socialisation and parenting practices in promoting long-term mental health. Community-based programmes that focus on emotional literacy, parenting skills, and caregiver–child communication may serve as effective tools for fostering emotional competencies that buffer against the negative effects of poverty, discrimination, and social exclusion. Such initiatives are particularly relevant in marginalised settings, where families remain the primary agents of emotional development.

From a policy perspective, the framework highlights the need for culturally sensitive mental health policies that recognise families as central developmental contexts for resilience. Integrating family-based emotional development strategies into school systems, youth welfare programmes, and public health initiatives may contribute to more sustainable and equitable mental health outcomes. Overall, the framework provides a developmental and relational foundation for designing culturally grounded mental health interventions aimed at strengthening resilience among marginalised youth.

6.Limitations

Despite its conceptual contributions, the present chapter has certain limitations that must be acknowledged. First, the framework is theoretical in nature and is not supported by direct empirical testing within this chapter. While the model draws upon well-established psychological theories and empirical literature, future research is required to validate the proposed pathways through quantitative and qualitative studies.

Second, the framework offers a broad conceptualisation of marginalised youth in the Global South, which may overlook important contextual variations across regions, cultures, and socio-political environments. Marginalisation is a heterogeneous phenomenon, and the specific emotional and family dynamics influencing resilience may differ across communities.

Finally, the model primarily focuses on family-level processes and does not explicitly incorporate broader structural factors such as education systems, labour markets, or political institutions, which also play significant roles in shaping resilience. Future research should extend the framework by integrating macro-level influences alongside family and emotional processes.

7. Conclusion

The present chapter proposed a conceptual framework that integrates family socialisation and emotional regulation as central developmental pathways to psychological resilience among marginalised youth in the Global South. By synthesising insights from developmental psychology, emotional regulation theory, and resilience research, the model advances a relational and culturally grounded understanding of resilience as a dynamic process shaped through early emotional learning and regulatory capacities.

The framework challenges individualistic and trait-based conceptions of resilience by emphasising the foundational role of family systems in shaping emotional competencies and coping orientations. Emotional socialisation practices within families such as parental modelling, emotional validation, and disciplinary responses serve as critical mechanisms through which young people acquire emotional scripts and regulatory strategies that influence long-term psychological functioning. Emotional regulation emerges as the central psychological process linking early relational experiences to adaptive functioning under adversity.

By situating resilience within the socio-cultural realities of the Global South, the framework highlights the importance of culturally embedded emotional learning environments and relational resources. In marginalised contexts characterised by chronic stress, limited institutional support, and structural inequality, families remain the primary emotional and psychological safety nets. The model therefore underscores the need to conceptualise resilience not merely as individual strength, but as a relational and developmental outcome shaped by emotional regulation processes within family systems. Overall, this chapter contributes to theoretical advancement by offering an integrative conceptual model that bridges fragmented domains of research on family socialisation,

emotional regulation, and resilience. The framework provides a foundation for future empirical research and offers practical insights for designing culturally sensitive mental health interventions aimed at strengthening resilience among marginalized youth. By placing emotional regulation and family systems at the centre of resilience development, the chapter promotes a more holistic and contextually grounded understanding of psychological well-being in the Global South.

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Chapter 7: Decolonial Approaches to Development: Education, Colonisation, Apartheid South Africa, and Union-Led Transformation

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Abstract

Universalisation of Western modernity has historically developed mainstream models of development based on colonial and Eurocentric epistemologies that marginalise African societies, Indigenous knowledge systems, and minority experiences. Development in Africa could not exist without colonisation, which was more of an extraction device, a mechanism of labour control, and an epistemic domination rather than human flourishing. These processes were exacerbated in South Africa during apartheid when racialised education, spatial-engineering, and labour control were a coherent developmental formulation aimed at maintaining white dominance. In spite of the fact that apartheid officially came to an end in 1994, its structural and epistemic legacies still influence the outcome of development, especially the education system. The chapter develops a decolonial development theory that also positions education as a major site of historical injustice and transformative potential. It uses the decolonial theory and African scholarship to examine how colonial and apartheid education systems institutionalised inequality, epistemic exclusion, and cultural alienation, and how these patterns are perpetuated under post-apartheid neoliberal reform models. Indigenous knowledge systems are introduced in the chapter as the basis for alternative, relational, and sustainable ways of development towards African worldviews. Special consideration is also given to the role of organised educators with particular reference to the Professional Educators Union (PEU) as a positive example of union-led decolonial praxis. PEU illustrates how teacher unions may be epistemically, professionally, and developmentally active in the state through ubuntu-based professional development, curriculum engagement, and policy advocacy. The chapter ends with a proposal for a pluriversal model of decolonial development based on historical justice, the agency of minorities, and ecological sustainability.

Keywords: Decolonial development; African colonisation; Apartheid education; Indigenous knowledge systems; Teacher unions; South Africa

1. Introduction

The history of colonisation, dispossession, and even racial domination that had formed the political, economic, and epistemic conditions of the continent cannot be ignored in understanding development in Africa. Colonialism was not simply breaking African patterns of social organisation, but was actively reorganising economies, cultures, education systems and knowledge hierarchies to fulfil imperial needs. The development, as understood and executed by the colonialists, served as an extractive, labour-control, and governmental mechanism, rather than a mechanism for social wellbeing [1].

These processes in South Africa culminated in apartheid, a distinctively institutionalised form of racial capitalism that legalised inequality in the form of education, labour control and spatial planning. Although apartheid in politics was terminated in 1994, the structural and epistemic legacies of the apartheid system still influence development outcomes, especially in the education sector. The ongoing disparity in the quality of schooling, relevance of the curriculum, and epistemic acknowledgement are transmutations of the inter-colonial, apartheid, and post-apartheid development paradigms [4,5].

These limitations result in decolonial approaches to development. Decoloniality does not aim to fit into the existing structures, but it questions the epistemological basis of development itself. It anticipates historical injustice, Indigenous knowledge systems, and agency of objects historically placed in the position of development [3]. Education is a focal ground in this war because it is both the site of colonial conquest and the potential site of epistemic compensation.

The chapter continues a decolonial study of development, focusing on the continent of Africa and South Africa. It explores the developmental technology of colonial and apartheid education, post-apartheid continuities and proposes the future of teacher unions, specifically the Professional Educators Union (PEU), as little-known contributors to decolonial development.

2. Colonisation and Development in Africa

The colonisation of Africa by Europeans was essentially an economic, political, and ideological initiative that was based on extraction and domination [1,2,6]. Since the end of the nineteenth century, and especially since the Berlin Conference of 1884-1885, African lands were forcibly incorporated into the global capitalist system as sources of raw materials, inexpensive labour, and imperial rivalry [1,6]. Colonial governments restructured African economies on the basis of monoculture production of agricultural goods, e.g. cocoa, cotton, coffee, and groundnuts, and intensive mining of mineral resources, e.g. gold, diamonds, copper, and coal. The economic restructurings were intended to serve metropolitan industries and markets, rather than local needs or regional integration [1,6].

African land tenure, trade, and government were systematically dismantled or placed under colonial control [2,3]. The communal landholding systems that sustained subsistence agriculture, pastoralism, and reproduction among communities gave way to a system of personal ownership, forced evictions, and taxation that pushed African people into wage labour [1,6]. Hut and poll taxes, colonial systems of taxation, were coercive labour controls, which forced African men into the mines, plantations, and settler farms and destabilised household economies and gender relations [1,7]. Development, therefore, became a struggle over dispossession and labour discipline rather than social progress [1,2].

The extractive logic is also depicted through colonial infrastructure. Rails, ports, and roads were built not to facilitate intra-African trade or even regional development, but to link mines and plantations directly to export ports [1,6]. This trend solidified uneven growth, resulting in many areas being economically marginalised and changing dependence on external markets [1,2]. The spatial disparities created by colonial infrastructure planning still determine development outcomes in Africa, including uneven urbanisation, poverty in some regions, and weak national economies [1,10].

In addition to the material exploitation, colonisation played out major epistemic violence. African knowledge systems: the agricultural, environmental, medicinal, governmental systems, the spiritual system, and the educational systems, were delegitimised and suppressed in a systematic way [2,3]. The colonial discourse portrayed Africa as ahistorical, irrational, and incapacitated, making European knowledge the only source of progress and reason [2,6]. This hierarchy was increased thanks to missionary and colonial education systems that privileged European languages, histories and epistemologies and marginalised Indigenous languages and worldviews [3,12].

This epistemic domination was not an incident but was at the centre of the colonial project. Demonstrating that African forms of knowing were invalid, colonial masters weakened the legitimacy of native systems of government and legitimised political domination [3,6]. The societies of Africa were placed in a continuous position of students who needed instructions, and self-determined development became impossible in the colonial context [2,3]. Consequently, development became a notion imposed on Africa and no longer by Africans [1,2].

Decolonial theorists conceptualise the continuation of these frameworks as the coloniality of power, a theory that demonstrates the persistence of race, labour and knowledge in their hierarchical organisation long after the formal colonialism period [3,6]. Although most African states attained political independence during the mid-twentieth century, colonial tendencies of economic dependence, epistemic inferiority, and institutional forms remained largely unchanged [1,2]. The development policies of post-independence depended on foreign knowledge, Western developmental paradigms, and global financial sources to reproduce the unequal power relations between the Global North and Africa [1,6].

Many development interventions that do not take this historical context into account often reproduce dependency, technocratic governance, and epistemic exclusion [1,3]. The mainstream systems of development reinforce the same disparities they are supposed to mitigate by giving preference to externally informed measures of development, such as GDP growth and industrial production, and downplaying the importance of local knowledge, cultural values, and social relationships [1,2,6]. The decolonial approaches thus stipulate that the effective development in Africa must address the sources of underdevelopment, re-establish epistemic control, and re-centralise Indigenous knowledge systems as valid bases of social, economic, and ecological change [2,3,19].

3. Education as a Colonial Technology

In the colonial project in Africa, education had a central and strategic position. Colonial education was not a neutral or benevolent technology; rather, it was a technology of governance intended to construct subjectivities, control labour, and legitimise imperial rule [3,7]. Colonial education systems were specifically designed to produce a small African elite to serve colonial regimes in the capacities of clerks, interpreters, and teachers, as well as to train the majority of the population to work in mines, plantations, or on settler farms [1,7]. Education was therefore used to reinforce the racialised division of labour that underpinned colonial economies [1,6].

Colonial education taught obedience, discipline, Christian morality and loyalty to the colonial rule [7,8]. History and geography were taught from European perspectives, which worshipped imperial conquest and wiped out African civilisations, resistance, and intellectual traditions [2,3]. The use of critical thinking and political awareness was also actively discouraged as educated Africans were a possible threat to the stability of colonialism [7,11]. In this respect, education was an ideological machine that normalised domination and internalised inferiority among colonised people [7,11].

This reasoning was enhanced by the formal classification and segregation of race in South Africa [8,9]. Initially, mission schools were the only areas with limited opportunities for African learners, but they gradually came under state control as white settlements established their hold [8]. The colonial logic of schooling was formally institutionalised by the mid-twentieth-century policies of apartheid education. The *Bantu Education Act of 1953* made racial differentiation of curricula a matter of law so that the black South Africans could only get education to the level necessary to work as unskilled and semi-skilled labour [8,11]. The developmental purpose of education is also very evident, as apartheid architect Hendrik Verwoerd said that there was no place in European society beyond some kind of labour for the Bantu, and the developmental purpose of education is very evident [8].

A very strong weapon of epistemic domination was language policy. Introduction of European languages such as English, French, Portuguese, and Afrikaans as the media of instruction to achieve instructional objectives alienated African students from their cultures and restricted their access to education [3,12]. The native languages were deliberately suppressed or avoided in formal education, and this served as the foundation to the idea that only assimilation into the European linguistic and cultural standards guaranteed intellectual progress [12]. This status of the language hierarchy rendered African languages inappropriate for science, philosophy, or government, thereby compromising the epistemic status of these languages [3,12].

Ngugi wa Thiong is one of the main controllers of language, and as such, he believes that language domination is a cut-off of the relationship between language and culture and identity [12]. The students had no choice but to think, write, and imagine in their subjugated languages in the African classrooms, which created a divided colonial consciousness as defined by Fanon [11,12]. These developmental implications of this alienation were long-term and also led to high dropout rates, poor learning performance and devaluation of Indigenous knowledge systems [9,13].

These colonial educational institutions had a great influence on the post-colonial African states. Even though political independence led to significant increases in access to schooling, the epistemic foundations of education remained largely unchanged [1,5]. Most post-colonial governments inherited schooling systems that were not connected to local realities, based on imported curricula, and adapted to Western models of development [2,6]. This further led to a more credential-based education, with a greater focus on enrolment numbers, exam pass rates, and formal certification, with relevance, critical thinking, and social change becoming less important [10,16].

The democratic transition that happened post-1994 in South Africa saw a formal renouncement of apartheid education, but the structural and epistemic aftermaths of that system still exist [4,9]. Curriculum reforms aimed at inclusion and redress have failed to bring about a shift; Eurocentric knowledge frameworks prevail in textbooks, assessment regimes, and teacher training [5,16]. Schools in historically disadvantaged areas are still under-resourced, and African languages are still placed in a peripheral position after the first grades [9,12]. Reducing development to a rather limited skills-based approach that only allows market participation is prone to recreating colonial hierarchies and, instead of community empowerment, aligns education with neoliberal labour outcomes [6,10].

Education is a contested terrain of struggle as viewed through the prism of decolonisation. To decolonise education means not just making minor changes to the curriculum, but reconsidering knowledge, language, pedagogy, and power radically [3,5]. It incorporates reconstructing Indigenous epistemologies, legitimising the use of African languages as means of intellectual production, and positioning learners and teachers as agents in the construction of developmental ways [12,19]. In the absence of this change, education must remain a colonial technology in post-colonial conditions, duplicating inequality and proclaiming improvement [3,6].

4. Apartheid South Africa as a Racialised Development Model

South Africa exemplifies institutionalised coloniality, where laws, policy, and state planning entrenched white dominance. Apartheid was more than racial segregation; it was a structured development model intended to uphold white economic, political, and epistemic control. Through interconnected laws affecting land, labour, education, and spatial planning, the state secured low-cost Black labour and limited Black South Africans' political participation, intellectual advancement, and social mobility [8,3].

Apartheid rested on racial capitalism. White wealth depended on extracting surplus value from Black labour in mining, agriculture, manufacturing, and domestic service [1,6]. The state controlled labour through pass laws, migrant labour systems, and influx control, forcing African men into cycles of urban work and rural subsistence [8]. This system kept rural regions underdeveloped, turning them into labour pools instead of thriving communities [1,3]. Development served white interests rather than benefiting the majority [6]. This racialised development strategy was anchored in a tailored education system. The *Bantu Education Act of 1953* institutionalised schooling specifically designed to meet apartheid's labour needs [8,11]. Policymakers openly stated their goal was to deny Black learners scientific, technical, or critical knowledge that could empower them as professionals or leaders [11]. Instead, curricula were designed to produce compliant, semi-skilled workers to preserve the racial order [8].

Bantu Education epitomised apartheid's development logic by explicitly linking education to economic subordination. Black schools were deliberately underfunded, overcrowded, and poorly resourced [8,9]. Teacher training institutions were inferior and segregated, and syllabi emphasised rote learning, obedience, and vocational skills as preparation for menial labour [11]. Subjects like geography, science, and mathematics were watered down or excluded, reinforcing the belief that intellectual rigour was reserved for white students [11,12]. As a result, education perpetuated generational inequalities rather than enabling development [3,7]. Language policy reinforced racial and ethnic hierarchies. African learners were mostly taught in Afrikaans and English, the languages of state authority and power, while Indigenous languages were limited to primary levels or disregarded [12,8]. This led to resistance, particularly against Afrikaans as a medium of instruction in secondary schools, which triggered the 1976 Soweto uprising [8,12]. This resistance underscored the connection between language, power, and development, demonstrating that the education system became a battleground for political conflict rather than a neutral space for skills acquisition [12,11].

Spatial planning exacerbated educational and economic marginalisation. Urban planning segregated black communities into townships and homelands that were too distant from the economic centres, making the transportation costs too high and preventing them from accessing quality education [8,9]. There was systematic neglect of schools in the regions, and they lacked basic facilities such as libraries, laboratories, and sanitation [9]. Conversely, white schools received sustained investment, smaller class sizes, and access to superior curricula [8]. These geographical disparities ensured that educational achievement followed racial geography, entrenching inequality in the physical geography of South Africa [9,3].

Democracy ended the apartheid legal framework in 1994, but its development logic remains. Spatial, educational, and economic disparities from apartheid persist [4,9]. Township and rural schools, mostly serving Black and minority students, still face underfunding, overcrowding, and poor facilities. Former white schools retain advantages such as resources, experienced teachers, and strong parental ties [9].

These trends are more a matter of continuity than discontinuity in the development path South Africa has undertaken. Although the post-apartheid policy has been access-oriented and redress-oriented, reform has frequently been constrained by neoliberal macroeconomic models that do not allow redistribution or structural change [6,10]. The policy of education has placed much emphasis on performance-based and standardised testing and on aligning labour markets, often at the cost of epistemic justice and past redress [5,16]. Because of this, schooling remains a reflection of inequalities of the apartheid era, despite the language changing to be more inclusive and equitable [9,16]. From a decolonised view, apartheid South Africa shows how development can oppress, not liberate. Ongoing educational inequality is not just a policy failure; it exposes colonial influence over knowledge, power, and the economy [3,6]. To counter this legacy, technical reform is insufficient. We must rethink development, centring historical injustice, restoring epistemic dignity, and making education a tool for emancipation rather than control [3,5,12].

5. Post-Apartheid Development and Its Limits

The 1994 South African democratic transition was a turning point in South African politics, bringing an end to formal apartheid and marking the start of a constitutional order grounded in equality, human rights, and social justice. Nevertheless, this change was not an epistemic or economic break with the past. The post-apartheid development policy has been mostly framed along global neoliberal paradigms, where market efficiency, fiscal discipline, standardisation, and quantifiable results are put at the centre stage. Although such strategies contributed to macroeconomic stability and increased access to basic services, they have been found inadequate in addressing the deep-rooted structural inequalities inherited from apartheid [10].

After apartheid, the education sector expanded access, desegregated schools, and changed governance systems. Enrolment rates grew, and discriminatory laws ended. However, large gaps remain by race, location, and class. Marginalised schools are still overcrowded, under-resourced, and have poor learning outcomes. Former white schools still have material and cultural advantages. These patterns show that developmental inequality remains, despite changes in political leadership.

Curriculum reforms like Outcomes-Based Education (OBE) and the Curriculum and Assessment Policy Statement (CAPS) acknowledge the need to Africanise and include Indigenous knowledge. Still, real epistemic change is rare [16]. African knowledge is mostly added on as an afterthought, while curricula, evaluations, and teaching still favour Eurocentric models. Standardised tests and accountability measures reinforce narrow ideas of success and ignore local learning and critical thinking.

These reforms place additional pressure on teachers to drive change within unequal systems with limited professional control. Decolonial thinking shows we must go beyond access and resources to change the core of education and development. Without these shifts, post-apartheid development will repeat colonial patterns under the appearance of reform, instead of meeting the democratic aim of true liberation.

6. Decolonial Theory and African Development

The main idea behind decolonial theory is that Western modernity is based on the assumption that it is the highest stage of human evolution and the universal horizon to which every society should head. Rather, it reveals modernity as something inseparable from colonialism, the racial subjugation, and epistemic violence [3,6]. Frantz Fanon's work remains a classic in this regard. Fanon saw colonialism as a form of economic exploitation as well as a form of psychological and cultural domination to an extent that created alienation, inferiority, and internalised oppression among the colonised people. In his view, Fanon holds that genuine development entails political emancipation as well as the renewal of colonised subjectivities through epistemic and cultural emancipation [7,11].

Ngugi wa Thiong'o builds on this argument by putting language at the centre of decolonisation. He states that colonial domination works best when it controls people's language for thinking, imagining, and understanding reality. Denying African languages in learning and daily life becomes epistemic dispossession. Thus, decolonisation requires reclaiming African languages, narratives, and cultural structures as valid avenues for knowledge and growth [12].

On the basis of these observations, Mignolo and Walsh define decoloniality as the undertaking of epistemic delinking from the generalising postulates of Western modernity. They suggest pluriversality as a different developmental horizon, that is, a formation that signals the simultaneous existence of many legitimate forms of knowing, being, and structuring social life without ranking them hierarchically [3]. In the case of Africa, this means abandoning development models that prioritise external standards over local histories, values, and ecological contexts [1, 2].

When applied to African development, decolonial theory predicts the presence of Indigenous knowledge systems, communal morality, and relational notions of wellbeing, grounded in interdependence among human beings, land, and ancestors [2,19]. The concept of development is redefined not as economic growth or market integration, but as progress toward social dignity, ecological balance, cultural continuity, and collective agency [15, 22]. This reframing is especially urgent in the South African context because of the legacies of apartheid and racial capitalism that the country continues to experience [4, 8].

In this vision, education stands at the centre. Decolonial education changes both curriculum content and pedagogical relationships, institutional power, and professional practice [5, 13, 16]. It challenges authoritarian models of schooling and supports dialogical, context-aware, community-based approaches. Learners and teachers become co-creators of knowledge and social development [3, 11, 17].

7. Indigenous Knowledge Systems and Sustainable Development

Indigenous knowledge systems (IKS) form dynamic and adaptive knowledge economies. People maintain long-term, close-range relationships with specific ecosystems and social situations, shaping these systems. IKS is not a dead art or just a set of icons from the past. Instead, communities create and sustain it as a living body of knowledge through intergenerational observation, experimentation, and practice [21]. In Africa, these systems span agriculture, environmental governance, conflict resolution, health practices, and spiritual worldview. They emphasise reciprocity, balance, and collective responsibility; they do not seek domination over nature.

African Indigenous agricultural practices, such as the use of African Indigenous varieties of vegetables, have traditionally prioritised biodiversity, soil regeneration, and climate resilience. Hundreds of years ago, communities have learnt to adapt to ecological variability through polycropping, seed savings, seasonal mobility, and stewardship of common land. An example of this adaptive knowledge is the San people of southern Africa, who have developed complex environmental tracking abilities to manage wildlife, predict droughts, and monitor biodiversity. Empirical evidence shows that San ecological knowledge can perform even in local settings and can be superior to technologically driven conservation instruments, especially in weak ecosystems [22]. *Ubuntu* is another African epistemology with direct implications for sustainable development. Specifically, *Ubuntu* is based on the concept that 'a person is a person through other people,' emphasising relational identity rather than individual autonomy. Building on this foundation, *Ubuntu* articulates a relational ethic connecting individual well-being to collective prosperity and ecological accountability. As a result, it challenges models of development, extraction, and individualism by highlighting social cohesion, mutual care,

and the interdependence between people and the environment. For example, in South Africa, *Ubuntu*-informed strategies have shaped community governance (shared decision-making by local groups), restorative justice (repairing harm with community involvement), and environmental stewardship programs (community-led management of natural resources). Other examples of ways Indigenous epistemologies can guide alternative development paradigms can be found worldwide, including *buen vivir (sumak kawsay)* in Latin America. *Buen vivir* redefines development as living well in balance with nature, community, and future generations, and opposes development that prioritises growth over ecological and cultural sustainability [24]. These theories are closely aligned with African relational worldviews.

Despite their global importance, Indigenous knowledge systems have long been pushed aside, used for profit, or taken without consent, such as in bioprospecting and extractive conservation. This leads to unfair treatment and financial harm, so ethical practices such as restitution, Free, Prior and Informed Consent (FPIC), and community leadership are important [23]. Still, decolonial sustainable development means more than recognizing Indigenous knowledge; it means restoring Indigenous control over knowledge, land, and development paths.

8. Teacher Unions and Decolonial Development

The teacher unions stand at a strategic location at the crossroads of labour, knowledge, and state policy, making them not only a means of collective bargaining but also a key factor in the educational landscape. In the past, labour movements played a key role in the anti-colonial and anti-apartheid campaigns, connecting the struggle against social injustices with demands for equitable education and a democratic process [7,11]. This historical heritage positions teacher unions as potent sites of resistance, capable of undermining the firmly established hierarchies in the state and in schools. In modern settings, unions are not only material condition lobby groups but also arenas of professional study, knowledge sharing, and policy action. In the context of decolonisation, teacher unions are crucial in challenging technocratic reforms that further marginalise educators as executors of externally formulated curriculum and assessment orders. Unions can fight against the commodification of education and against its subjection to universalised, market-oriented models by foregrounding teachers' lived experiences, culturally grounded pedagogical knowledge, and context-specific expertise [2.6].

In addition, unions can transform education into a participatory, locally accountable, and socially transformative public good. The teacher unions can positively intervene in the decolonial project through policy formulation, advocating inclusion in the curriculum and promoting indigenous knowledge systems, so that education is both democratic and emancipatory, and not exclusively driven by economic interests.

9. The Professional Educators' Union (PEU) as Decolonial Praxis

9.1 Historical and Organisational Context

The Professional Educators Union (PEU) is part of the Federation of Unions of South Africa (FEDUSA). It holds a special place in South Africa's labour and education sectors. Unlike unions known for militant politics or mass mobilisation, PEU emphasises teacher professionalism, ethical behaviour, and labour rights as inseparable from school change [7, 17, 19]. The union emerged in the late apartheid and early democratic years. It aimed to represent teachers during a time of political change, institutional confusion, and new educational demands in a post-authoritarian society [19]. After apartheid, PEU's organisational identity broadened to include new labour interests, such as wages, service conditions, and workplace safety. While these remained core issues, the union started addressing educational purpose, inequality, and curriculum relevance in an unequal schooling system. This shift reflected growing disillusionment among teachers. They saw that legal equality and wider access had not delivered educational justice, especially in long-marginalised schools [9, 10, 16].

PEU's focus on professionalism positions teachers as both policy implementers and intellectual workers. Teachers have ethical duties and situational knowledge. This view challenged technocratic concepts of education reform, which stressed compliance, standardisation, and external accountability over professional judgement [3, 6, 17]. PEU increased its influence by championing teacher voice. This helped redefine teachers as agents of change rather than just recipients of reform [2, 11].

PEU operates on both provincial and local levels. This allows it to engage with national policy and the realities faced in schools. Its multi-scalar presence allows the union to express systemic critiques while remaining rooted in educators' lived experiences in township, rural, and under-resourced settings [9, 17]. In this way, PEU's development signals a broader decolonial trend. It recognises that meaningful educational change must come from local contexts and challenge power dynamics from the colonial and apartheid periods [3,7,11].

9.2 Ubuntu-Informed Professional Development

PEU's approach to professional development contrasts sharply with the compliance-focused, technocratic training that has dominated much of post-apartheid education change [10, 16,17]. Rather than enforcing policy or focusing on limited performance, PEU views teacher learning as relational, reflective, and ethically driven [3,6]. This approach is shaped by the African philosophy of *ubuntu*, emphasising interdependence, mutual recognition, and collective responsibility [12, 19]. PEU creates spaces for educators to critically reflect on their pedagogy. It also enables knowledge exchange and addresses shared challenges around inequality through Communities of Practice, peer-led workshops, and mentorship programmes [17, 18]. These opportunities are especially valuable in under-resourced schools, where teachers often struggle to adapt due to multilingual classes, socioeconomic disadvantage, and historical marginalisation [9,10].

Ubuntu educates PEU about their professional path by conceptualising teaching not merely as a technical process but as a moral and social process, enshrined in the well-being of the community [12,19]. It is suggested that teachers understand themselves as members of a larger social fabric, not just focused on academic outcomes, but also on cultivating dignity, belonging, and critical consciousness in their learners [11,17]. Such relational framing is quite different from neoliberal models of professional development that postulate on individual performance, competition, and managerial accountability [6,16].

Importantly, the PEU sees teachers as knowledge producers, not just consumers of outside knowledge [3,18]. Professional learning communities celebrate local teaching innovations, teaching practices that reflect students' cultures and backgrounds, and knowledge gained from direct experience. These approaches align with decolonial principles that reclaim control over knowledge creation (epistemic agency) for people who have long been marginalised in knowledge production [2,3]. Placing *Ubuntu* and collective learning at the centre of PEU's professional development fosters decolonial practices that challenge colonial expertise and empower educators as agents of change [3,7,19].

9.3 Curriculum Engagement and Indigenous Knowledge

PEU is now an active contributor to the discussion of curriculum change in post-apartheid South Africa. It especially engages in debates about the inclusion of Indigenous knowledge systems (IKS) [5,13,16]. Although official policy frameworks recognise the significance of Africanisation, PEU insists that lasting change needs more than token inclusion or a brief nod to Indigenous content [3,16].

PEU promotes curriculum approaches that recognise and build upon learners' cultural, linguistic, and historical strengths, avoiding deficit perspectives [12,13]. Central to their position is support for multilingual education that values Indigenous languages as legitimate for instruction and intellectual engagement, particularly in primary education [12,14]. By objecting to the dominance of English and Afrikaans, PEU highlights how language becomes a central site of exclusion in the curriculum [3,12]. PEU also encourages incorporating local histories, local community knowledge, and place-based learning into the curriculum [2,19]. These will allow students to relate formal learning to their lived experiences, fostering relevance, engagement, and critical insight [11,13]. Encouraging inquiry-based pedagogy involves appreciating learners' questions, experiences, and interpretations rather than imposing inflexible content delivery [6,17].

More importantly, PEU opposes treating Indigenous knowledge as just an addition to the curriculum. The union stresses that IKS must be addressed ethically and critically. Community ownership and contextual meaning are key [20,21]. This stance shows awareness of the risks of appropriation and depoliticisation that often come with state-directed curriculum reforms [3,22].

PEU can help redefine educational development as an epistemic project that aims to dissolve colonial knowledge hierarchies and foster plural, context-specific learning experiences [3,5,13].

9.4 Policy Advocacy and Labour–Epistemic Justice

Outside the classroom, PEU is a key activist in education policy, lobbying national and provincial governments on curriculum, assessment, teacher workload, and governance. The union questions reforms that prioritise efficiency, monitoring, and performance over professional autonomy and strong teaching values. PEU's advocacy shows an understanding of the link between labour justice and knowledge justice. Policies that reduce teachers' independence, such as strict administration, standardized tests, and top-down controls, also take away their ability to assess situations and innovate. From a decolonial perspective, these reforms replicate old forms of control by requiring teachers to follow orders rather than think for themselves. PEU supports labour-epistemic justice by defending teachers' rights to a professional voice and involvement in decisions, seeing educators as key to progress. This approach highlights the need for education change led by those working in the field.

PEU's role in policy forums, bargaining, and political debates puts decolonial ideas into practice. It challenges old power structures in education and supports development based on dignity, relationships, and diverse knowledge.

In this way, PEU shows how unions can act as both labour groups and forces for social change in decolonial development in post-apartheid South Africa.

10. Toward a Pluriversal Framework for Decolonial Development

Based on the historical, theoretical, and empirical discussion in this chapter, the pluriversal approach to decolonial development is proposed as a means of confronting linear, Eurocentric theories of development. This framework does not believe in the development as a single path heading towards Western modernity but acknowledges the possibility of diverse epistemic, cultural, and ecological ways of development.

The pillar of historical and epistemic restitution is the first, and it acknowledges that colonialism and apartheid created long-lasting material and knowledge-based injustices. Development should thus be initiated by addressing historical dispossession, racialised exclusion and epistemic violence by changing the curriculum, reclaiming language, and reforming institutions. In the absence of such restitution, the development interventions will be characterised by the recreation of colonial hierarchies in new forms [3].The second pillar, Indigenous and minority agency, places historically marginalised communities at the centre of the development discourse rather than as beneficiaries. This means that Indigenous knowledge systems, Indigenous cultural practices and Indigenous governance models should be valued as valid sources of development. This, in the African context, involves communal stewardship of land, *ubuntu* ethics and locally based educational practices.

Third, professional transformation through unions underscores the importance of organised educators who can drive development through the state's internal institutions. Teacher unions can also serve as epistemic actors, as shown in the case of the Professional Educators Union, by promoting the relevance of the curriculum, professional autonomy and decolonial pedagogy, especially in historically disadvantaged schools [19]. Lastly, relational and ecological sustainability redefine development as the process of seeking social dignity, interdependence, and the balance between the environment and individuals. Indigenous relational ontologies oppose the extractivist development model and present regenerative alternatives that are critical of the climate crisis and ecological degradation.

11. Conclusion

The current developmental predicaments of Africa cannot be explained out of context in relation to the history of European colonisation and in South Africa, the institutionalised racial capitalism of apartheid. These systems conditioned not only economic and spatial inequalities, but also the epistemic basis of education, governance

and development in its turn. Even after political autonomy and a democratic shift, colonial knowledge production, valuation, and exclusion patterns still govern development policy and educational practice.

Decolonisation strategies offer important avenues for addressing these legacies. Decolonial development redefines progress in historical terms; centred on historical justice, Indigenous knowledge systems, and collective agency, it revises the idea of progress as a social process and an ethical practice rather than a technocratic form of growth. Education is a key battleground for power and emancipation, and can reproduce inequality or bring about epistemic liberation.

The example of teacher unions, such as the Professional Educators Union, shows that organised educators may serve as decolonial agents within the state. PEU shows that, even with the use of Ubuntu-informed professional development, curriculum engagement, and policy advocacy, labour organisations can play a role in advancing epistemic justice and sustainable development.Based on the observations of Fanon, *wa Thiong'o, Mignolo,* and African scholarship, this chapter argues that paying homage to pluriverses, hundreds of worlds of knowledge, being, and becoming, is not merely an ethical mandate but a practical requirement of curbing increasingly social and ecological crises in Africa and other parts of the world [3,11,12,17,19].

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Chapter 8: Gendered Precarity: Sexual Violence And Survival During Bengal Famine Of 1943

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Abstract

The famine has to be interpreted as more than a loss of food production to get to the catastrophic human consequences of 1943 but rather a failure of food entitlement and economic access. On the other hand, gendered precarity describes the combination of social vulnerability and survival in the circumstances of systemic deprivation. The objective of the study has been to perform a gender analysis for identifying gendered precarity of sexual violence and survival for the Bengal famine of 1943. The application of the secondary qualitative research method had been performed in the study to obtain the necessary pre-published information on gendered precarity of sexual violence and survival for the Bengal famine of 1943. The conclusion which can be drawn from the study was that the disintegration of families due to death, migration, and abandonments women ended up being the main caregivers. The displacement caused by the famine on a mass scale created not only a displacement but also a breakdown of social control and accountability in the society especially to women and children. Girls, in most cases, were enticed by the promises of shelter and food and then brought into the brothels by coercion by debt peonage or violence. Women in these spaces were more prone to harassment, assault and exploitation and they could not do anything or call anybody to action. A large percentage of famine migrants was female migrants alone or with children and that marked a sharp contrast to the pre-famine pattern of male dominated migration. Additionally, the Bengal Famine is not only to be interpreted as a breakdown in food distribution but also the breakdown of basic human rights. For instance, the economic collapse that had supported the famine was marked by the monetization of survival that was fast and involved ever greater separations between access to food and productive ability or social production. They were the caregivers not only for the children of their own families but also for orphaned family members, children of neighbours, and dependent elderly people. Such a feminisation of care happened at the time when women most lacked access to food, shelter and income. Reliefs were frequently distributed on the basis of household membership to make single women and female headed household units statistically and administratively marginal.

Keywords: Bengal Famine of 1943, Bengal population, social disintegration, gendered precarity, sexual exploitation

Introduction to the Bengal Famine of 1943: A Demographic Catastrophe

The Bengal Famine of 1943 is one of the most tragic human tragedies in the history of South Asia that can be found in the chronicles of the 20th century disasters. In about a year, Bengal, which was a province of British India had impacted a population of 1.5 million, who had been overcome by a severe food crisis. Because of such an occurrence a significant amount of Bengal population had been wiped. It was recorded that more than 3 million individuals had died at the height of the famine. This was due to the extensive extent of starvation and diseases that were brought about due to the famine. On the other hand, it was estimated that a total mortality close to 4 million, had occurred. This was due to the under-reporting of deaths in the rural areas, and also in the collapsing of health systems. Additionally, the hospital beds of approximately 13,000 individuals was made available during the moment of the crisis. This was an overwhelming amount, which resulted in the demolition of the hospital systems, and gave them barely any time to react to the decreased populace. The human cost was huge and multi-dimensional as the spread of human destitution and death encompassed a humongous number of the Bengal population.

Death was not evenly distributed: in parts of the rural areas the famine process had started as early as the middle of 1942. On the other hand, there was a sudden alarming accelerated inflation of rice prices that had almost doubled the basic food prices in only a limited number of months. The last peak of starvation was reached in November 1943, and since then, the disease has become the main killer as the malnutrition left the immune systems of people weak. Additionally, malaria, cholera, smallpox and dysentery epidemics caused by the disease had resulted in a high number of deaths in a period when the health infrastructure of the population had almost been malformed. The magnitude of excess mortality, the deaths over and above normal background levels, attested the state of Bengal as a full-blown famine. This could not be regarded as a localized food crisis only in some parts of the state. The prevalence of regional differences enhanced the extent of the demographic fall across the Bengal districts. For example, some of the districts which experienced the greatest spike in mortality include Chittagong, Noakhali, Rangpur and Mymensingh because of their geographical susceptibility and disturbed food supply. Thus, the over-mortality rates were way above normal averages especially in the rural regions where families were reliant on daily subsistence and had minimal buffer against economic shock.

In addition to aggregate mortality rates, it has also been reported that the demographic disaster of the Bengal Famine was characterized by significant disruptions in the age,

gender, and household structure. For instance, there was an unequal distribution of the mortality among the social groups with maximum excess rates being clumped towards the infants, the elderly and economically marginal adults. When famine struck, areas of infant death increased drastically in some places more than twice the pre-famine levels as the women who continued to breastfeed already died of starvation and disease. On the other hand, the failure of maternal nutrition led to large numbers of stillbirths, miscarriages and neonatal deaths which most of them were not reported. Additionally, adult patterns of mortality also show some gendered differentials. For example, in the first years of the famine, men suffered more starvation deaths because they migrated more often and were more exposed. However, later in the duration of the famine, women were killed in greater numbers. This occurred as a result of months and months of deprivation and disease and months and months of reproductive stress.

In this context, it has been explained Bengal to be a slow and prolonged disaster that was shaped by the neglect of colonial rule, and it was not just a sudden shortage of food. However, in contrast to this, this famine was mainly a crisis that was intensified by the impacts of the epidemic. The study has supported the view of Malik by providing an argument that the disease became deadly only after starvation sustained for a longer period of time. These have further made the women weaker through sustained deprivation, and they have faced a higher rate of mortality in the later phases of the famine.

It could be noted that the famine indicated that much of the surviving households had lost one of the adult members, a basic change in family set up. Widowhood was raised to a great extent and formed a segment of the population deprived of economic cushioning due to their single state. Whole villages were cited to have asymmetrical sex ratios with all the male migration and mortality. On the other hand, the abandonment of the familiar constructions by women overlapped with the survival of the females under challenging circumstances. These demographic unbalances did not prove to be short-lived. This was due to these changes which transformed the marriage markets, inheritance patterns and the arrangement to provide care over a period of years since 1943. Therefore, the famine acted like a demographic break accompanied by population scars that were long term in terms of effects.

Purpose and scope of study

The study is based upon the belief that the Bengal Famine of 1943 cannot be completely explained without gender analysis. This prefigures the experience that women and girls had to go through in the crisis. Although the mass demographic information and economic studies have determined the magnitude of the mortality and production patterns, they have frequently ignored the gender aspects of survival. This was recorded especially the way in which the sexual violence became interwoven with subsistence strategies when

conditions of extreme deprivation occurred. The purpose of the introductory chapter is to provide factual and conceptual ground to the analysis of gendered precarity as one of the major frames of analysis. With strict interaction with statistical facts, chronicles, economic statistics, and eyewitness testimonies, the further chapters will examine the way gender determined vulnerability and agency in the situation of one of the most serious humanitarian disasters of the 20th century. The secondary qualitative research method has been performed in the study for obtaining the information based on the gendered precarity of sexual violence and survival for the Bengal famine of 1943. Through thematic analysis of the obtained data, the reviews for the concepts and subjects of the topic had been performed. The study has attempted to change the perspective on famine as a detached, aggregate phenomenon to that of famine as a collection of gendered lived experiences, wherein sexual violence was both a threat and survival strategy of thousands of women and girls. Only by anticipating the peripheral information, and by placing them in the wider socioeconomic context that was the Bengal Famine, can an actual human cost of this catastrophe be known. Thus, by such an action, a tribute can be paid not only to the millions who died, but also to the perseverance and struggle of the survivors.

Economic degeneration and failure of food entitlement

Bengal had been a country of rice cultivators and rice consumers, and during the famine, approximately 36% growth of rice import had occurred. Because of such, the extensive rice cultivation was reported to be grown on nearly 88% of the arable land. However, even in 1943, when, by all standards, a crop was large enough to nourish the population as a whole, millions of people starved due to inability to obtain the food.

The causes of the famine were all in the policies of war and distortions of the economy. For example, the British colonial rulers feared that the Japanese might invade them in the course of World War II. Because of this, they introduced a chain of policies, such as transportation seizure such as the boats, and the carts and denial policies, which broke the local trade and food distribution channels. In addition, export of rice by surrounding countries had already been suspended with the defeat of Burma and Singapore in 1942. In October the same year, a cyclone destroyed the autumn rice harvests in Bengal. However, the amount of output produced cannot solely be held responsible for the level of deaths. This is because the deaths were also the effect of price inflation and hoarding due to the policy and rice, which became unaffordable by those the poorest that turned a supply crisis into mass starvation. In economic perspective, the famine depicted a failure in food entitlement. This was because the food was available in markets, but the buying power of wage labourers and rural workers had disappeared. This was due to the fact that the food prices in certain areas had increased by several hundred percent. Although emergency measures such as free meal distributions programmes serving free meals they could hardly make a difference in the demands of an ever penniless population.

The social stratification increased with landless labourers, small-holding peasants, low-caste artisans, and market women being unable to afford even basic sustenance. The economy of the state was also in humongous turmoil as hundreds of thousands of families lost the need to sell land, livestock, tools and even household utensils to buy food. For instance, up to 10 million people had perished in the famine, especially due to food shortage even with selling or mortgaging their land in order to meet the food shortage. Such trends prepared the groundwork of permanent poverty way beyond the years of famine. Additionally, a relationship could be constructed between the wages of the population and the price of rice. Even when the latter increased exponentially, the daily wages of the agricultural labourer and urban informal workers remained stagnant or fell in real terms. In other districts the purchasing power of a labourer's daily wage had declined to less than a third of what it had been before the famine. This disintegration of the economy hit particularly the women, who were lined up in low-paid, irregular or no paid types of labour like paddy processing, domestic service and home-based production. Thus, women, when resources in households fell, were commonly the first to cut the food bill, taking the nutritional shocks to keep the children or the male earner of the families alive and working.

Lastly, the disintegration of informal credit systems also increased the level of hardship. For instance, once the traditional lenders moved away, the interest rates increased and debt bondage came back both in rural and urban settings. Grain speculation and hoarding enhanced the perception of scarcity leading to panic purchasing and strengthening price spirals. Besides such, the capital requirements raised pushed out small traders, as well as female market vendors, who were removing vital sources of income to women-headed families. However, the relief mechanisms constructed during such a situation were made in a financially inadequate manner, and the majority of the Bengal population lacked effective support. For instance, the ration scales often included many fewer calories than was necessary to sustain the longevity of the people. Such a condition had developed the resulting entitlement failure, which was not only a fortuitous occurrence but also a structural one. This was based on an economy that had developed market logic and wartime priorities in the Bengal arena. On the other hand, the impact of colonial governance had also acted as a way of economic degeneration that marginalized the poorest in Bengal. Especially in the case of women, economic disintegration was directly translated into the risk to the body. This was due to the lack of survival opportunities, the lack of means of living constrained them, and the lack of means forced them into exploitative relationships. Hence, a cumulative disintegration and devastation regulated Bengal’s condition that covered the boundary between labour, service, and coercion.

Similarly, in this context, it has been argued that economic policies that were adopted during the colonial times destroyed the purchasing power of the rural people, and it has

also intensified the level of inequality during the period of famine. On the other hand, it has been suggested that the failures of the local market were much more important than the extraction conducted by the imperial power. This study has strategically aligned its concept with the points justified and it also considers the dimension of gender. During this time, women had lost their income first, and then they consumed less amount of food within the household to give preference to others. As a result of this, the collapsing economy had directly translated into the vulnerability of women in their bodily characteristics.

The Social fabric unravels the displacement and destitution of the Bengal population

The Bengal famine has not only destroyed the system of food, but it has also had a devastating impact on social life. As a result of this, several families were forced to leave their village so that they could search for another means of survival. This kind of displacement made the ties in the community very weak, it removed the social protection, and it also exposed the people to the newer risk. During this time, the women and children had suffered the most as the familiar support system had collapsed entirely.

It can be reported that the social impacts of the Bengal famine were as disastrous as the demographic results of the same. Whole families, who could not make ends meet in rural villages, had gone out in large numbers to migrate to urban centres like Calcutta in pursuit of food or employment. It has been estimated that tens of thousands of poor migrants flooded the cities and filled slums and already strained urban services. On the other hand, the distribution of these displacement waves was unequally favourable to women. Adult women were reduced to penniless more than men, due to the prevalence of gendered entitlement failures. Additionally, women were often heading impoverished households especially when their male breadwinners starved to death or went out to find employment. The availability of social support networks destroyed and the establishment of traditional gender roles destroyed, the survival methods that would not have even been considered possible in normal times became depressing realities. For a great number of families, migration was not only the change of place but also a compelled reprisal of social identity and survival strategies.

The factors that turned into places of struggle were urban slums and relief kitchens where insufficient food was matched with congestion and unsanitary environments that were disease-prone. These are the key places where women and children lived in conditions where the spread of diseases were extremely high. The occurrence of diseases such as cholera and dysentery was severe and medical care was scarce. Hospitals had indicated that mortality in women was increasing at an alarming rate, especially those who are child bearing and those in adolescent age. There was also a gendered aspect of the breakdown of rural livelihoods and village economies. In particular, women were

involved in harvesting, paddy husking, weaving, fishing and small-scale trading in the normal rural society. As the famine continued, the majority belonging to these economic niches had died and women were now left with the option to do unpaid labour or informal jobs in overcrowded urban markets. The prevalent social norms and traditional caste barriers did not permit many women to access paid labour placing them deeper into economic precarity.

When villages were drained and caste structures were broken, the ancient means of protection, extended family, caste councils, neighbourhood solidarity, were no longer able to intervene. Namely, the displaced people formed temporary social places in railway stations, market towns, temples, and roadside encampments characterized by anonymity and precarity. Urban officials found it difficult to handle the population influx within the state. This was as the housing options were not even close to the demand and many women had to sleep in the open areas where people could hardly be sure of their safety. Thus, the destitution camps, which were supposed to be relief mechanisms, were congested and unsanitary, and there was little division of gender and age.

Women often did not go to camps at all as they were afraid of being victims of violence and instead resorted to dangerous life on the streets. This was due to the loss of social identity amongst them, which caused a devastating result for them. Displaced women were deprived of any sign of respectability associated with village life, marital status, and caste identification, which made them socially non-existent. This invisibility helped to commit abuses because murder of poor women rarely aroused suspicion and indignation. On the other hand, the displacement served as an act of material and symbolic deprivation of protection, and turned hunger into a multidimensional aspect of threat, in which survival was a matter of negotiating risk constantly. The disintegration of the social fabric has left circumstances where gendered harm, especially towards women, had become a common instance. One of the consequences of displacement due to famine that are often ignored by most was the reorganization of care roles in situations of severe scarcity.

A significant number of displaced women noted that they put emphasis on the survival of the dependents at their own expense, which hastened physical decline and predisposed them to illnesses. Childcare duties also constrained the mobility of women thereby lowering their capacity to find employment or reach remote relief centres. In cities, where women had several dependents, wage labour was often not open to them because of rigid working environments and a lack of childcare facilities. Poverty recreated itself in the form of those social necessities of care that were necessary, but not economically compensated. Besides, there were severe psychological expenses involved in caring, during the times of famine. The fear of seeing children and seniors slowly starve, with guilt, grief, and powerlessness were the most traumatic experiences. These burdens were mostly outside of the scope of official assessment which quantified displacement not by

experience but by numbers. Thus, it can be noted that the Bengal famine was the social disintegration of the population that not only displaced bodies but also reallocated misery. Such an act was on a gendered basis, especially against the weaker sex and had instilled long-term inequalities into post-famine recovery.

According to the analysis, it is a period when the model of economics based on the village and the system of protection collapses, and this leaves the poor without any sort of social support. In this context, a vivid description of the scenario by showing that during the famine, women were more severely affected because their safety is dependent on roles that are recognised and linked to honour cast as well as family. The displacement that was given by famine has forced the women to leave their familiar places where they used to get protection. in familiar towns, camps and streets, there was a lack of social recognition. The scenario made it difficult for the women to survive, and it also led to higher neglect, harassment and sexual exploitation. It can be therefore said that displacement has so transformed hunger into a condition that gives constant social and physical insecurity to the women.

During such a time, there was also the crisis of social visibility and legal acknowledgement as a result of displacement. During the famine, especially amongst women who lived outside of formal households, the lack of social visibility and legal acknowledgement occurred for them. With identity becoming more attached to access to relief, ration cards and charity, women were left out of these assistance systems. They mainly bore the traits of ones who had no known family ties, widows, deserted wives, and the migrants who were left without family ties. Such invisibility led to increased vulnerability with women with no official recognition being compelled to rely on informal networks or personal contacts to survive. Police methods of dealing with visible female destitution were focused on removal, detention or forced relocation in lieu of protection. On the other hand, instances of trafficking and forced labour were also assisted by the loss of legal identity. This was especially seen in the case of women who dropped off the relief data and did not leave much of a footprint in the records. In the case of women, this lack of acknowledgment added physical hunger to the civic obliteration, which strengthened a situation when only submission to unregulated power could help one survive. However, displacement should not only be seen as being simply about movement in space but also a fall into administrative and social non-existence It can also be deduced that gender acted as a crucial factor to calculate whose life counted and whose was expendable. Additionally, the children who were with displaced women were also not registered and, hence, vulnerable to separation, sale, and abandonment. Thus, the resulting famine created a group of socially unexplainable people under the sufferings who were not a matter of concern to the institutions.

Gendered precarity and survival strategies within the Bengal population

When hunger became unbearable, people had to select painful options to survive. In this scenario, women and girls had to face a great amount of risk because social and economic support entirely disappeared from society. Based on gender, several decisions were made, like who will eat less, who will work more and who will be forced to accept unsafe arrangements. As a result of all these, there was no dignity in the survival of humans, and people had to endure extreme hardships.

Gendered precarity was not an abstract idea in the situation of the Bengal Famine, but a reality experienced by millions of women and girls on a daily basis. With the families starving, social safety nets damaged, women were faced with appalling options to choose between, which were influenced not only by gender expectations but also by simple necessity. Sale or the exchange of sexual labour was one of the worst survival tactics, majorly in the case of women. The prostitution, which is a peripheral issue in most rural set ups, became a bleak lifeline with traditional sources of support lost. During the famine years, the number of women in the brothels in Calcutta more than doubled as poor women and girls turned to sex work to get their subsistence. Girls were trafficked in entire boat loads and it was reported that they were sold into cities and disappeared into brothels or urban prostitution rings and sold to buy food or trifling sums of money. There was a tendency of young girls, some of them as young as the early teens, being targeted. In addition to such a situation, families, who sought to preserve the lives of other children in any way, even gave their girls overnights with the rich landowners. This was in exchange for food, barter or even little money, and hence, girls were sold out by the family members to the rich as permanent sex slaves.

Sexual violence such as rape, coercion and forced prostitution became a ubiquitous action. However, they were not reported extensively as a part of the survival in famine. As the police were overburdened and the social structures that once regulated people were destroyed by mass starvation, most women could not find a way of seeking refuge against violent exploitation. Such gendered vulnerability was supplemented by the disintegration of the social barriers. Even before the famine, the social conventions on female chastity and movement partly shielded women in the countryside against the blatant exploitation of sexuality. Even when these norms were disintegrated, the migration of the families had occurred due to the economic meltdown. The lack of male guardians could be especially destructive to women and girls in the form of death, desertion, or migration. For most of the survivors, the repercussions of forced sexual labour went way beyond the famine years. Women who got involved in prostitution or were victims of sexual violence were not allowed to socialize in the society after the acts. These were mainly because of the existing norms that the victims were stigmatized, not those who committed such acts.

Thus, the long-term costs of such actions led to the loss of marriage prospects, family honour, and community acceptance.

Moreover, the strategies of survival that were adopted by the women during the famine are not to be understood as free choices that can be made under any normal condition. Due to hunger, all the possibilities were narrowed, and this further forced the women into a situation where refusal became impossible. When there was a scarcity of food, the power had totally shifted toward the one who had the authority to control resources, labour and shelter. In such conditions, the bodies of women were basically treated as means of exchange for sustaining life. Sexual exploitation then blended into the survival practices every day, and it also became a routine rather than an exceptional event. Furthermore, all the experiences did not end with famine, but they had left physical, emotional and social scars on the women for a long period of time. These reinforced the concept of stigma and exclusion even after the supply of food had returned.

The concaving nature of hunger, disease, and Human Rights collapse

Hunger had a vivid impact on human life then. The poor living conditions and the lack of proper care had made the suffering of the people worse. Therefore, the social determinants of health, namely sanitation, clean water, nutrition, shelter, were destroyed as hunger spread. It was noted that during the famine, radical increments in the mortality rates related to the diseases that may be avoided under normal conditions. For instance, the deaths due to malaria in late 1943 were over signficiantly higher than the monthly averages. This was even before the famine as malnutrition resulted in a weaker immune system and the outbreak of mosquitoes was more common in overcrowded camps. Further increasing the number of deaths were the cholera and smallpox outbreaks that augmented the already devastating disease burden. Public health facilities could not react as the famine hospitals had few beds compared to the number of starving patients, which can be identified through the drawings of Chittaprosad Bhattacharya. On the other hand, relief kitchens at times provided food of low quality that caused digestive diseases to the same populations they were supposed to serve. Thus, hunger and disease were brought together in a deadly vicious routine that drove death further as the famine continued to progress.

The mortality rates of infants and children increased causing families that had difficult-to-choose situations to get unable to feed and protect the young ones. It was identified that a large number of children were sold, abandoned or orphaned trying to find food to feed their siblings. On the other hand, others were bought with several kilograms of rice and were kept in homes where they worked in poor conditions, which were even slightly reminiscent of servitude. In the case of women, this combination of hunger and deprivation of body control were experienced with tragic outcomes in the form of maternal malnutrition, poor reproductive health, and increased susceptibility to sexually

transmitted diseases. For instance, pregnant and nursing women were under greater mortality risk and were subjected to physical suffering of famine without proper nutrition, maternal care, or other protection networks, resorting to manual scavenging. Even during such times, sexual violence was not only a necessarily episodic and spectacular but also frequently structural and normalized one. The occurrence of consecutive acts of sexual violence against women was ingrained in daily transactions of survival within the Bengal population. Under the conditions of famine, the consent blurring is not simple, because the women were deprived of any meaningful choice by starvation. It was reported that a large percentage of women who were involved in sexual labour in 1943 were not employed by formal brothels. However, they were obtained instead via informal, temporary agreements with employers, landlords, relief workers, soldiers or urban affluent people.

Another aspect of gendered precarity in the famine was the authorized disempowerment of the body of women in circumstances of hunger technologies. It was identified that the relief camps, food distribution systems and even private charity networks tended to be the institutions of informal power to mediate access to sustenance in terms of gendered hierarchies. The relief kitchens, congested shelters, and grain depots were dominated by men and were not subject to any regulatory authority. Because of such, women especially, widows, single women and adolescent girls, were subjected to coercive requests. Hence, hunger was a control system and food, a form of currency, of sexual access, domestic labour and obedience.

It can therefore be said that during the famines, suffering was everywhere, but it was seen or acknowledged rarely. The human bodies were made weak by hunger slowly, and so people were unable to fight against the common illnesses. Due to this, the disease spread easily in the crowded camps where the basic amenities like clean water, rest and medical care were not present. In addition to all these, women faced physical strains too and that also during caregiving and pregnancy times. They had suffered immensely due to starvation, illness and physical exhaustion repeatedly. For them, sexual violence was in addition to disease and hunger, and so it became a daily part of their existence. There was no system that could give them protection or bring justice to them, and so all these harms continued, and there was no resistance at all. Altogether, it can be said that such instances have turned the famine into a distortion of human dignity and care.

Conclusion

This study demonstrates that the Bengal Famine of 1943 was not merely a crisis of food scarcity but a deeply gendered humanitarian catastrophe shaped by economic collapse, displacement, and the erosion of social protections. Women and girls experienced disproportionate suffering as hunger intersected with sexual violence, forced

labour, and the feminisation of care. The breakdown of family structures, entitlement systems, and relief mechanisms rendered women both invisible and expendable within colonial governance frameworks. By foregrounding gendered precarity, this research reframes the famine as a collapse of basic human rights, highlighting how survival for many women depended on negotiating exploitation amid extreme deprivation.

Moreover, the study of famine through a gender lens shows that during that time, survival solely depended on unequal accessibility towards food, power and also control over one's body. The experiences of women show the manner in which hunger, violence and invisibility in society strongly reinforced each other. Through a thorough apprehension of all these realities gives a different understanding of famine, which is beyond any numerical data and shortages. Rather, it reveals a deep crisis of morality and also a collapse of the basic dignity of humans and their rights.

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Chapter 9: Continuities of Resistance and Marginalisation (A Comparative Study of the 2022 Aragalaya Movement and Sri Lanka's Civil War)

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Abstract

Recurrent crises stemming from structural marginalization, restrictive governance, and unequal growth have been prevalent in Sri Lanka's recent history. The Aragalaya movement of 2022 and the civil war (1983–2009) are two pivotal events that arose in separate historical circumstances and used various kinds of resistance, but they both reflect collective reactions to the postcolonial state's prolonged failures. Aragalaya arose as a mostly non-violent civic revolt brought on by economic collapse and fading political legitimacy, whereas the civil war mostly took the form of an armed ethno-political conflict. In order to look at continuities in marginalization and resistance in Sri Lanka, this research compares these two moments. The study traces patterns of exclusion, governance failure, and state responses throughout time by analyzing academic literature, policy reports, human rights documentation, and reliable media sources using a qualitative, secondary-data-based methodology. The methodology is based on theories of social movements, political economy, and structural marginalization, allowing for an integrated study of how resistance changes in response to shifting political and socioeconomic circumstances. The study places armed conflict and civic protest within a wider range of political reactions defined by power imbalances and limited political potential, rather than equating the two. These findings illustrate that the structural factors that led to marginalization, centralized government, unequal growth, and limited political inclusion, remained mostly unaddressed even after the armed conflict ended in 2009. Through nonviolent and interethnic forms of civic action, these continuities helped resistance resurface during the 2022 economic crisis. The study contends that rather than addressing underlying injustices, changes in resistance tactics are a reflection of shifting political environments. This study emphasizes the necessity to address structural exclusion as a prerequisite for long-term stability, democratic resilience, and sustainable development by connecting marginalization and resistance to discussions on inclusive and sustainable futures in the Global South.

Keywords: Aragalaya movement; Sri Lankan civil war; structural marginalization; nonviolent civic resistance; Sri Lanka

1. Introduction

Recurrent crises stemming from structural marginalization, restrictive governance, and unequal development have characterized Sri Lanka's political history. The Aragalaya movement of 2022 and the civil war (1983–2009) are two pivotal events that arose in different historical circumstances and used various kinds of resistance; however, both signify collective reactions to enduring failures of the state. (1,2) Aragalaya started as a large-scale, mostly peaceful civic revolt brought on by economic collapse, whereas the civil war was essentially an armed ethno-political confrontation. This piece of writing contends that despite these distinctions, both instances show persistence in exclusion and resistance, providing crucial insights into Sri Lanka's ongoing structural issues and its quest for inclusive and sustainable futures. The vast majority of individuals concur that majoritarian nationalism, deeply embedded ethnic marginalization, and the postcolonial state's incapacity to support multiple ethnicities through inclusive governance were the causes of the civil war. (3,4) While militarism and emergency rule curtailed democratic space, policies pertaining to language, land, education, and political representation contributed to the systematic exclusion, especially of Tamil communities. (5) Thus, armed resistance developed as a political reaction to the decline of nonviolent channels for resolving long-standing grievances as well as a security phenomenon. Governance, inequality, and state-society interactions are still influenced by the war's repercussions of Sri Lanka. (6)

The Aragalaya movement of 2022 signified yet another shift in Sri Lanka's political landscape, over a decade after the end of the war. The movement rapidly expanded into a national demand for accountability and fundamental political reform, spurred by an unprecedented economic crisis marked by financial collapse, inflation, fuel scarcity, and shortages of food. (7) Through the occupation of public spaces and widespread digital mobilization, protestors articulated a collective rejection of established political elites. Aragalaya mobilized a wide range of social groups, including youth, professionals, women, urban poor, informal workers, and people of all ethnic and religious backgrounds. (8,9)

The civil war and Aragalaya are frequently treated in existing scholarship as analytically separate phenomena, with one being framed as ethnic conflict and the other as economic protest. This paper challenges this compartmentalization by emphasizing the structural conditions that lead to resistance over time. Both episodes originated from long-term governance failures, uneven development trajectories, and an exclusion of citizens from political decision-making. (2,10)

This study applies a comparative qualitative approach and only relies on secondary data, such as academic literature, policy reports, human rights documentation, and reliable media sources. Drawing from theories of political economy, social movements, and structural marginalization, the analysis places both armed conflict and civic protest within a larger continuum of resistance. By connecting Sri Lanka's experiences to discussions on marginalization and sustainable futures in the Global South, the paper makes the case that addressing the structural inequalities that frequently give rise to resistance rather than treating each crisis as an isolated incident.

2. Conceptual and Theoretical Framework

In order to investigate how various forms of resistance arise in reaction to ongoing exclusion within the Sri Lankan state, this study is based on an interdisciplinary conceptual framework that incorporates structural marginalization, political economics, and social movement theory. The approach places both armed conflict and civic protest within a spectrum of political reactions influenced by power imbalances, poor governance, and unequal development in the Global South, rather than seeing them as analytically distinct phenomena. The notion of structural marginalization, which is defined as the deliberate exclusion of specific social groups from economic resources, political authority, and meaningful involvement in decision-making processes, forms the basis of the study. Institutional structures, legislative frameworks, and prevailing ideologies all contribute to structural marginalization by normalizing inequalities over time. Such marginalization has traditionally shown up in Sri Lanka along language, ethnic, regional, and socioeconomic lines, resulting in unequal access to development, security, and citizenship. This idea offers a critical perspective through which to view how the Aragalaya movement and the civil war both resulted from prolonged patterns of exclusion rather than from individual complaints or transient crises.

Political economy approaches to conflicts and crises, which highlight the link between state authority, distribution of resources, and economic governance, further inform the framework. Political economy viewpoints emphasize the ways in which uneven growth paths, elite capture, and centralized power fuel societal dissatisfaction. In the instance of Aragalaya, these processes manifested as economic collapse, austerity, and the degradation of livelihoods; in the setting of the civil war, they interacted with ethnic nationalism and militarism. By using this perspective, the study shows how political and economic mechanisms influence collective resistance by connecting micro-level marginalization experiences with macro-level governance failures.

The research uses social movement theory, specifically ideas about political opportunity structures, collective action, and repertoires of disputes, to analyze the forms and dynamics of resistance. Sri Lankan resistance has taken on various forms throughout

history, which may be explained by social movement theory. Armed resistance emerged as a result of the civil war's suppression of dissent and closing of democratic space, which hindered peaceful mobilization. In contrast, large, nonviolent protest at Aragalaya in 2022 was made possible by the relative openness of civic space, the function of internet communication, and cross-class coalitions. Crucially, this theoretical framework enables the research to examine variations in resistance tactics without reducing them to strategic or moral parity. A comparative analytical method that emphasizes continuities over direct equivalency is used to combine these theoretical viewpoints. The theory suggests that both civic protest and armed conflict are influenced by persistent structural circumstances inside the state, rather than that they are interchangeable. Resistance is seen as a relational process that changes in reaction to shifting social imaginaries, state policies, and political chances. This method enables the study to track how, in the event that governance institutions are unable to change or adapt, unresolved marginalization may resurface in different forms.

The paradigm is in line with more general discussions on inclusive and sustainable future in the Global South. Sustainability is defined as political systems' ability to tackle injustice, guarantee social justice, and facilitate participatory governance, rather than solely in terms of the economy or the environment. The framework places Sri Lanka's experiences in the context of international conversations about conflict avoidance, democratic resilience, and transformational development by connecting marginalization and resistance to sustainability issues. This conceptual foundation ensures coherence throughout the study and strengthens its contribution to interdisciplinary scholarship by serving as the foundation for the methodological approach and empirical analysis that precede.

3. Methodology

In order to investigate patterns of marginalization and resistance in Sri Lanka's civil war and the 2022 Aragalaya movement, this study applies a qualitative, comparative research approach that is solely reliant on secondary data. A desk-based approach is both acceptable and methodologically sound given the historical breadth of the study and the delicate nature of conflict-related research. Without depending on primary fieldwork, the method allows for a longitudinal and contextual analysis of the structural dynamics influencing resistance.

3.1 Research Design

With a focus on two pivotal political episodes in Sri Lanka's recent history, the research is structured as a comparative analytical study. The study examines these moments as results of persistent structural circumstances rather than as discrete occurrences. The

comparative design makes it possible to spot trends, continuities, and changes in state reactions, modes of resistance, and forms of marginalization throughout time. This method is especially well-suited for investigating how, in various historical and political contexts, same structural constraints might result in distinct manifestations of political dispute.

3.2 Data Sources

The analysis ensures both analytical depth and empirical dependability by relying on a v ariety of reliable and current secondary sources. These resources include:

1. Scholarly books and peer-reviewed articles in journals covering social movements, post-war governance, and Sri Lanka's civil war
2. Reports and policy documents from international organizations such as the United Nations, World Bank, UNDP, and OHCHR
3. Publications by human rights organizations, including Amnesty International and Human Rights Watch
4. Analyses and briefing papers from research institutions and think tanks
5. Reputable national and international media coverage, particularly for documenting the Aragalaya movement and the 2022 economic crisis

In order to capture real-time interpretations of the demonstrations, official reactions, and changing public discourse, particular attention is given to sources published between 2022 and 2024 for the Aragalaya movement. To contextualize long-term patterns of marginalization and resistance throughout the Civil War, reputable historical analyses and post-war analyses are applied.

3.3 Data Analysis

Thematic analysis is the main technique used in the study to understand the data. To find recurrent patterns about state authority, opposition tactics, governance failure, and structural marginalization, data were methodically examined. After then, these motifs were compared between the two examples in order to draw attention to both contextual variances and continuities. In order to ensure that empirical findings are consistently interpreted through recognized conceptual lenses, the analysis is guided by the theoretical framework previously described.

The methodology emphasizes analytical comparison over causal generalization, concentrating on how comparable structural conditions result in distinct political outcomes based on historical context, political opportunity structures, and modes of

collective mobilization. This strategy avoids confusing military conflict with nonviolent protest in favor of a more nuanced concept of resistance.

3.4 Ethical Considerations and Limitations

Since the study only uses secondary data that is accessible to the public, it does not require formal ethical approval because it does not include human participants. However, while interpreting information about conflicts, ethical awareness is upheld, especially when it comes to avoiding stigmatizing or oversimplifying the impacted groups. This methodology's main drawback is its dependence on documented facts and preexisting interpretations, which may be biased by political or institutional factors. However, this constraint is lessened and the analysis's credibility is increased by triangulating many sources and perspectives.

4. Sri Lankan Civil War - Marginalization and Armed Resistance

Deeply ingrained structural disadvantage within the postcolonial state gave rise to the Sri Lankan civil war (1983–2009). The war was the result of long-term political exclusion, unequal growth, and the methodical reduction of democratic space rather than an abrupt outburst of violence. (3,4) Particularly impacting Tamil communities in the Northern and Eastern areas, policies pertaining to language, education, land allocation, and political representation strengthened center-periphery disparities and established ethnic hierarchies. (5)

The development of majoritarian nationalism inside state institutions was a key factor in this marginalization. Minority groups' access to citizenship and meaningful political engagement was restricted by the emphasis on a single national identity. Dissent was frequently treated with repression rather than reform, and electoral systems and constitutional structures progressively failed to accommodate multiple identities. (2,4) Armed resistance developed as a political reaction to ongoing marginalization and the seeming lack of peaceful channels for redress as democratic options became more limited.

From the standpoint of political economics, uneven distribution of resources and development additionally drove the civil war. Urban and southern areas were given priority in state-led growth strategies, whereas war-affected areas faced chronic underinvestment, relocation, and economic stagnation. (2) By allocating public resources to security operations at the expense of social welfare and inclusive development, militarization further solidified existing discrepancies. Perceptions of the state as exclusive rather than protecting were strengthened for disadvantaged populations by their daily experiences of economic hardship and instability. (5)

Therefore, armed resistance during the civil war should be viewed as a type of political mobilization driven by institutional limitations rather than just as separatist violence. The viability of nonviolent resistance was impeded by protracted repression and emergency rule, which helped normalize armed conflict as a form of political propaganda. (3,4) This perspective emphasizes how persistent marginalization alters the repertory of disagreement accessible to impacted populations rather than equating state and non-state violence. Cycles of exclusion were strengthened by state reactions to opposition. Minority groups were disproportionately impacted by emergency rules, military governance, and monitoring, which undermined civil rights and increased mistrust between the state and communities with limited resources. (6) Despite the war's official end in 2009, post-war government prioritized infrastructure-led prosperity and security above political inclusion, accountability, and authentic reconciliation. (5,6) As a result, during the post-war era, many of the structural issues that encouraged armed resistance remained unresolved. Since unresolved marginalization persisted to influence political unrest and state-society interactions after the war, this legacy is essential to comprehending later forms of resistance in Sri Lanka.

5. The Aragalaya Movement (2022) - Economic Crisis and Civic Resistance

The 2022 Aragalaya campaign originated in the midst of Sri Lanka's worst economic crisis since independence, which was characterized by food and fuel shortages, hyperinflation, sovereign debt default, and the breakdown of vital public services. (7,11) Although the movement's immediate cause was economic, it was a reflection of longer-standing and more profound patterns of marginalization stemming from elite capture, poor governance, and the decline in popular confidence in state institutions. (10) Thus, Aragalaya was a communal response to the structural constraints that had gradually barred significant portions of the population from meaningful political and economic involvement, rather than just a protest against economic destitution.Aragalaya highlighted concerns that spanned ethnic, religious, and geographical boundaries, in contrast to the civil war, which was mostly influenced by ethnic marginalization and regional exclusion. Everyday lives were disproportionately impacted by the economic crisis, especially those of women, children, informal workers, and lower-income households. These revealed vulnerabilities brought about by decades of debt-driven development and inadequate social protection. (10,11) Social networks who were previously split along identity lines were able to establish broad-based coalitions thanks to shared experiences of economic precarity. (8)

Protesters used internet tools to rally support and spread narratives of accountability, organized decentralized assemblies, and occupied public locations as a component of the movement's nonviolent civic resistance. (9) Protesters used internet tools to build support and spread narratives of accountability, organized decentralized assemblies, and occupied

public locations as a component of the movement's nonviolent civic resistance. (12) From the standpoint of social campaigns, Aragalaya profited from a confluence of political potential structures, such as widespread public disenchantment with political elites, obvious administration failure, and diminishing regime legitimacy. (9,12,13) The lack of centralized leadership impeded the movement's ability to translate protest demands into long-term institutional transformation, but it also allowed it to magnify a variety of views and fend off co-optation. Aragalaya experienced securitized governmental measures, such as emergency rules, protestor arrests, and limitations on public assembly, despite its generally nonviolent nature. (14,15) These reactions highlighted persistent conflicts between public mobilization and governmental authority, echoing previous governance systems in which discontent is controlled through control rather than participation.

The significance of Aragalaya is seen in how it reframed resistance in Sri Lanka after the conflict. The movement called for systemic political transformation, ethical governance, and accountability rather than violent conflict. But after the demonstrations, inequality, concentrated authority, and lax institutional accountability persisted, underscoring the limitations of peaceful opposition in the absence of fundamental reforms. (10)

6. Comparative Analysis - Continuities of Marginalization and Resistance

Despite notable variations in context, actors, and tactics of mobilization, a comparative analysis of the 2022 Aragalaya campaign and Sri Lanka's civil conflict indicates persistent continuities in the structural factors that produce resistance. Both resulted from long-standing patterns of marginalization, poor governance, and exclusion from meaningful political involvement, even though one developed as an armed ethno-political war and the other as a civic movement. (2,9)

6.1 Forms of Marginalization

Marginalization operates as a structural process engrained in governmental institutions and development strategies in both situations. Centralized government and unequal growth throughout the civil war fostered marginalization, which was mostly expressed along ethnic and regional lines. (4,5) Aragalaya, on the other hand, revealed the social repercussions of debt reliance, elite capture, and inadequate social protection as a result of widespread economic marginalization that cut across identity barriers. (10,11) Notwithstanding these variations, both incidents show a common feeling of disconnection in which people thought the government was inattentive and cut off from the actual world.

6.2 Modes of Resistance

Due to the historical background and political opportunity structures, resistance tactics varied significantly between the two eras. Armed resistance in a setting of constrained democratic space and systematic suppression of dissent were hallmarks of the civil war. (3,4) By contrast, Aragalaya mobilized non-violent, decentralized forms of civic resistance enabled by digital communication, urban public spaces, and cross-class alliances. (9) By contrast, Aragalaya mobilized non-violent, decentralized forms of civic resistance enabled by digital communication, urban public spaces, and cross-class alliances Rather than representing inherent impulses within oppressed populations, these distinctions show how repertoires of disagreement change in response to changing politi cal contexts. (12)

6.3 State Responses and Governance

Significant similarities between the two periods may be seen in state reactions to resista nce.The state frequently undermined civil freedoms and increased mistrust during the ci vil war by aggressively relying on military, emergency legislation, and monitoring to co ntrol opposition. (6) Aragalaya had less severe repression, but the state continued to used emergency powers, arrests, and securitization of protests. (14,15) These trends are indicative of long-standing governance strategies that place a premium on control over communication and inclusivity.

6.4 Continuity and Change

The contrast emphasizes the continued unsolved marginalization in Sri Lanka even if the modes of resistance changed from violent conflict to civic activism. Because structural inequality, accountability, and equitable involvement were not addressed by post-war governance reforms, new forms of resistance emerged during times of crisis. (2,10) Aragalaya is therefore a continuation of deeper structural dissatisfaction as well as a break in resistance tactics. This comparative study shows that Sri Lankan opposition is cyclical rather than episodic, characterized by persistent governance shortcomings and changing political chances. Changes in resistance tactics by themselves are unlikely to avert future crises if the underlying causes of marginalization are not addressed.

7. Implications for Sustainable and Inclusive Futures

A key finding is shown by the comparison of the 2022 Aragalaya movement and Sri Lanka's civil war: inclusive government and structural marginalization are essential to achieving sustainable futures. Both incidents demonstrate how social cohesiveness and political stability are threatened by ongoing exclusion, whether it takes the form of

economic instability or racial hierarchy. Resistance becomes an inherent aspect of political life rather than an exception when development models and governance frameworks fail to address the demands and voices of oppressed people.

Considering development beyond measures of economic growth is a key issue for sustainability. Both pre-war and post-war development methods in Sri Lanka placed a high priority on macroeconomic performance, large-scale infrastructure, and centralized decision-making, frequently at the price of social fairness, accountability, and participatory governance. These strategies made disadvantaged groups more susceptible to political and economic shocks by contributing to unequal growth and reinforcing already-existing disparities. The limitations of development theories that disregard inclusiveness as a fundamental concept are shown by the recurrence of resistance throughout various historical periods. A major change in power in politics and public perception may be seen in the shift from armed rebellion during the civil war to nonviolent citizen mobilization during Aragalaya. Aragalaya showed how demands for accountability and structural change may be articulated through collective, interethnic civic action. This change points to potential for democratic renewal and conflict transformation, especially when citizens can organize peacefully and actively. Securitized state responses, however, continue to exist, suggesting that institutional transformation has not kept up with changing forms of opposition.

The conclusions emphasize the significance of bolstering democratic institutions that are able to actively engage dissent from the standpoint of sustainable governance. This entails safeguarding free speech, maintaining civic space, and developing systems for significant public involvement in decision-making. Even nonviolent movements run the risk of being quelled or delegitimized in the absence of such reforms, which would prolong cycles of instability and dissent. As an essential component of sustainability, the study also emphasizes the necessity of socially equitable economic governance. The vulnerabilities of groups excluded from social protection and policy discussion were made clear by the economic crisis that spurred Aragalaya. Reorienting economic policy toward justice, transparency, and accountability is necessary to address these vulnerabilities, especially in environments characterized by debt dependency and pressures from the global economy. In the Global South, sustainable futures depend on how risk and opportunity are distributed throughout society in addition to economic resilience.

According to this study, unaddressed marginalization offers significant risks to development and peace. After the civil war, new forms of resistance emerged under diverse circumstances as a result of the inability to address systemic problems. Therefore, a transformational strategy that incorporates inclusive development, democratic change, and peacebuilding is necessary for sustainable futures. Sri Lanka's experience provides larger lessons for Global South contexts dealing with recurrent crises founded in

inequality and government failure by drawing lessons from both the civil war and Aragalaya.

8. Conclusion

In order to emphasize persistent patterns of marginalization and resistance, this study has compared the 2022 Aragalaya movement with the civil conflict in Sri Lanka. Both occurrences resulted from long-standing structural conditions marked by exclusionary governance, unequal growth, and the systematic marginalization of major sectors of the population, notwithstanding their variations in historical context, magnitude, and form. The study has shown that resistance in Sri Lanka is best understood as a recurrent response to unsolved structural grievances rather than as unique or exceptional events by placing armed conflict and civil protest under a same analytical framework.

According to the research, the restriction of democratic space combined with ethnic and regional marginalization formed the civil war and helped normalize armed resistance as a political tactic. The Aragalaya movement, on the other hand, was a broad-based, mostly peaceful civic revolt that sprang from widespread economic marginalization and waning state legitimacy. In situations when state institutions were seen as unresponsive and exclusive, both forms of resistance reflected attempts to recover political agency, despite their differences.

This paper's emphasis on continuity rather than rupture is one of its main contributions. Transformative governance measures that may address structural inequalities or promote broad political involvement did not follow the conclusion of armed conflict. Because of this, unresolved marginalization reappeared in new ways at times of crisis, most prominently during the 2022 financial crisis. This continuity highlights the shortcomings of post-conflict and development frameworks that put prosperity and stability ahead of more fundamental issues of justice, accountability, and representation.

The study supports the claim that sustainability goes beyond economic or environmental aspects by connecting marginalization and resistance to discussions on inclusive and sustainable futures. Political institutions that are responsive, participative, and able to handle disagreement democratically rather than by force are necessary for long-lasting peace and progress. The history of Sri Lanka serves as an example of how neglecting to address structural discrimination can jeopardize economic resilience and peacebuilding initiatives, raising the risk of future crises.

By providing a comparative viewpoint on how resistance changes in response to shifting political and economic circumstances, this work advances the field of Global South scholarship. It emphasizes the need for more studies to examine how governance,

inequality, and group action interact in post-conflict and crisis situations. It is still crucial to address the structural causes of marginalization in order to advance socially equitable and sustainable futures as well as to avoid future conflict.

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Chapter 10: Media, Marginality, and the Right to Health: Communication Inequalities in Sustainable Futures

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Abstract

The book chapter focuses on the influence of media systems on health politics by identifying how claims, vulnerabilities, and experiences are made public. It argues that health messaging operates within an unequal social structure in which class, caste, gender, and geographical marginality shape both representation and reception, going beyond theories that define communication as the passive transmission of information. This discussion reframes health communication as a matter of citizenship, legitimacy, and power by reflecting on communication research. The study is based on two Indian case studies. In the first, messaging on cleanliness under the Swachh Bharat Abhiyaan is reviewed, demonstrating how positive media coverage of infrastructural growth and behavioural engagement often disguises fundamental obstacles such as caste-based inequality, labour instability, and water shortages. The other one investigates how people communicated in Mumbai's slums during the COVID 19 pandemic. Though mass media had a large audience, local networks and community health workers fostered more trust and interpretative importance. These scenarios collectively focused on the limitations of universalised campaigns that ignore reality. According to the chapter, communication inequality not only involves media technologies accessibilities, but also determines which information is acceptable and which opinions are taken into account when formulating solutions. Participatory frameworks that acknowledge community understanding as well as integrate communication into larger social rights movements are required for sustainable and equitable health prospects. These kinds of media reform put representation at the centre of the reform of public health.

Keywords: health communication, marginality, media framing, citizenship, communication inequality

Introduction

From experts to the general public, health communication is the dissemination of accurate information. According to this point of view, better communication, enhanced transmission, and clearer persuasion could be the result of healthier behaviour and better outcomes. However, this viewpoint is ignored in the social contexts in which content is created and this motive limits communication to technology. The point also challenges the community, visibility, and authority of media platforms. In an extremely unequal society communication is always biased. It is controlled by the authorities that decide who has the right to communicate, what knowledge gets recognized, and who would be prioritized in a public discourse.

According to scholars in media studies and critical public health, realities are influenced by health issues. Regular news coverage of danger, illness, and responsibility are affected by competition, organization practices, state agendas, and news formats [1,2]. In this approach, the media has a contribution in making the actual structure that citizens use to comprehend their rights and outcomes. Participatory decisions, which are complex reflections of epidemiological facts, determine what is the actual definition of prevention, whose behaviour is analyzed, and which solutions are practical. With the persistent bias in nations, these dynamics became very much significant. In India's compelling environment, rapid economic growth and crucial disparities in housing, healthcare, literacy, and infrastructure cohabits. In communication contexts, Communities living in rural setup, informal environment, caste-based marginalization, are not included as valid knowledge providers or their lived experiences not represented properly. Thus, health related initiatives might affect people but not connect, or worse, they might continue criticism for unforeseen circumstances.

According to this chapter, the fulfillment of the right to health requires an understanding of communication discrimination. Accessibility of medical care and infrastructure is important along with the process of developing relevance. The media coverage sometimes shapes public policy in ways which reinforce inequality while highlighting the elite viewpoints. Hence, for a sustainable health future, focus must be given to representational justice also.

This chapter highlights health communication within deep discussions of citizenship, mediation, and power in order to develop this claim. It recommends that we shift away from behaviourist frameworks and towards strategies that are aware of communication engagement and structure. In subsequent sections of this chapter, these ideas will be guided by empirical case studies from India’s pandemic response and sanitation improvement. Before moving on to the explanation of those situations, it is important to make a clear theoretical framework which links media practices and political aspects of health.

From Information Transmission to Meaning and Power:

Public health engagement has long been impacted by the information deficit concept. The basic idea is that community people are neglected and mass media professionalism can eradicate these misconceptions. Though its natural appeal, this strategy also has some limitations. According to Airhihenbuwa, health behaviour, social context and cultural logic are the same [3]. Ignorance of local interpretations led to making messages unimportant. Lupton in his research work explains how health messages are interpreted through moral frameworks which stigmatize those who are unable to follow instructions and often emphasize responsibility [4]. These criticisms highlight the main reason for communication problems which is lack of clarity or exposure. On the other hand, they highlight power dynamics. Who decides what is valid knowledge? Which experiences are made invisible or anecdotal? The solutions have roots in historical marginalization patterns, professional hierarchies, and institutional systems. Briggs and Hallin emphasize on the boundaries around legitimacy which is reinforced by both of the news media and health public [1]. Repetition makes some actors become cliched spokesperson, while others find it difficult to get into frame. This strategy regulates it by presenting inequality as a common topic.

Framing, Visibility, and the Construction of Responsibility

Media framing research mainly focuses on approaches to analyse how interest affects comprehension. Certain elements of reality are highlighted more than others in frame. In health related media coverage, behavior based explanations are most common. News highlights personal health and hygiene, food habits, or compliance with treatment sometimes ignores crucial factors such as housing, working situations, or exposure to the environment [2]. Such frames align with self management focused governance structures. The public wants to consider health dedicated as well as private decisions. Language about empowerment also disguises systematic limitations though it has prominent uses. Individuals rather than institutions are held accountable when people don’t live up to expectations.

This change from collective support to personal responsibility is real. Political economies which prioritize concrete outcomes and economical interventions are in accordance with it. Compared to systematic reform, behavioral change is simpler to explain and measure. As a result, media narratives usually minimize inequality while emphasizing participation.

Communication Inequality as Structural Condition

For an engaging public discourse, both unequal media platforms access and differential capabilities are responsible for inequality in communication. Modern systems concentrate voice and authority in influential institutions while appropriating human experience, as

Couldry and Mejias explain [5]. marginalized communities, who are already facing discrimination or poverty suffer additional challenges when it comes to shaping perceptions of their own health.

According to Waisbord, the top-down approach treats communities as targets rather than collaborators and is commonly used in global health communication [6]. Participation becomes symbolic nowadays rather than being symbolic. Without communication platforms, campaigns run the risk of reinforcing authoritarian behaviour. The main reasons for these inequalities lie in language hierarchy, literacy gaps, and digital divides. Though if the messages are translated, they might not always convey everyday priorities or cultural differences. This leads to what some scholars refer to as "communicative mismatch", in which knowledge that is theoretically correct does not become knowledge that can be put to use.

Rethinking the Right to Health

Active Participation is a major component to well being in human right infrastructure. The right to health incorporates settings that allow individuals to have an input in decisions that impact their life along with the health care. According to this viewpoint, communication has become a privilege. Communities and individuals should raise their voices for demands, challenge stereotypes, and meaningful contribution to policy making. This concept is highlighted by Airhihenbuwa's argument for culturally grounded strategies: rights remain abstract if meaning is ignored [3]. The objectives of effective communication must be dignity, legacies of misunderstanding, and local epistemology. Otherwise, interventions run the danger of making marginalization worse.

Toward Sustainable and Just Futures

Sustainability discussion frequently focuses on funding, technology and infrastructure. Communicative engagement must be implemented properly, if not these expenses might be the reason of persistent disadvantages. The mass media decides where marginalized experiences become the part of the national consciousness or remain on the margin of the society. They decided also which approaches are accepted and which are rejected. In border to achieve justice, it is an essential transition from dissemination to dialogue. This idea requires institutional transition that prioritize both professional and community knowledge. Future sections of the chapter will demonstrate how these concepts are implemented in real world situations, observing communication during COVID 19 pandemic situation and sanitation efforts in structural vulnerable areas. This book chapter suggests a shift in priorities by placing health communication within the context of voice battles and representation. The goal is not only to convey better communications, but also to change the communicative order that determines who is heard.

Literature Review

Revisiting the Evolution of Health Communication Research

Health communication is blended with different fields such as mass communication, psychology, and public health. Different theories like diffusion of innovations, behaviour change model, and persuasion theory - all theories had a critical effect on previous studies because they placed a high value on concrete results like message memory or suggested behaviour adoption. Well crafted information could persuade people to act rationally according to the implicit assumption of these theories. For instance, Rogers' diffusion of innovation viewed change as a process that transfers innovations from authorities to adopters in communities of people [7]. The theory was helpful for identifying the ways of influence, but it emphasized the ways in which structural inequality challenges choice and tended to favor technology or biomedical remedies.

Culture, Meaning, and Interpretive Contexts

Research revealed from an anthropological perspective that health beliefs are not independent views but an important part of local cosmologies. Researchers are reminded that biological terminology may differ from lived experience by Kleinman's distinction between illness and disease, which continues to have an impact [8].To understand symptoms communities can use frameworks like spiritual, environmental, or rational which clearly fit into official categories. This perspective shows communication as an interpretation. If pre-existing interpretative frameworks are ignored as a result misunderstanding and resistance can arise. Cultural perspectives see these reactions as logical within specific social contexts rather than calling them irrational. Airhihenbuwa supported this argument by suggesting that culture should be viewed as a tool for creating solutions rather than a barrier to be overcome [3]. For the community's knowledge he established an intense emphasis on communication, involvement, and respect. These concepts are especially relevant in situations when previous instances of abuse or coercion have undermined public trust in the government.

Govern mentality and the Moralisation of Health

Foucault's concept of govern-mentality focused on another significant research area on how health communication promotes self regulation. Modern public health, according to Peterson and Lupton, depends on developing responsible individuals who keep an eye on their health and behaviors in accordance with professional recommendations [9]. Media disseminated these values widely, which portrays healthy living as morally required. This strategy can empower people, but it can also stigmatise those who can't follow through. Though there were some structural challenges like unstable housing or restricted access to clean water. As a result, communication may be perceived by marginalised communities as surveillance rather than assistance. In Neo liberal policy contexts when social programs are being stressed this tension is most noticeable.

Media Institutions and the Production of Health Knowledge

According to media sociology research, deadlines,organisational procedures, and dependence on official sources all influences news. As they are more reliable and accessible, journalists frequently choose government officials, medical professionals, and international organisations [1]. On the other hand, patience, trust and interpretative works are needed for community voices. There are consequences for this sourcing strategy. It can replicate elite viewpoints and limits discussion. Structural issues, including workplace dangers or hygienic framework, are sometimes presented as technical rather than political. Moreover, media coverage is influenced by business obligations. Slow moving crises are not as visible as dramatic incidents. Even when spectacular epidemics have a stronger long term effect, chronic under-nutrition or environmental exposure may not be able to challenge them.

Participation and the Turn Toward Community Engagement

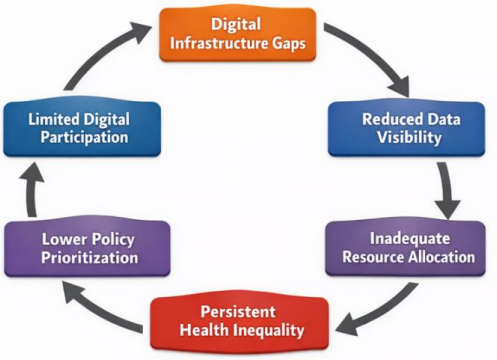
In response to these criticisms, participatory communication models developed prominence. Freire's dialogue pedagogy, sees communities as co-producers of knowledge rather than passive consumers [10]. Facilitators promote introspection on lived experiences and community problem solving rather than providing preset lessons. Participatory approaches have shown potential in fields like environmental sanitation, HIV prevention, and maternity health. They can promote locally relevant solutions, develop importance, and foster trust. However, scholars argued that engagement is occasionally institutionalized in a shallow manner. Meetings can be scheduled without really transferring decision-making authority. For true engagement, addressing disparities in authority and resources is necessary as stated by Waisbord [6]. otherwise, participatory rhetoric runs the risk of turning into just another management strategy.

Figure X. Layered Digital Divide Model in Health Communication.



Figure X. Layered Digital Divide Model in Health Communication.
Source: Author's conceptual synthesis.

Figure Y. Feedback Loop Between Digital Exclusion and Health Marginalization.



SOURCE: Fig. X & Y: author's conceptual analysis

To achieve universal access and efficiency, the growth of digital health infrastructure has often been presented as an important tool. But as per the **figure X,** digital divide works on several interconnected levels. Structural differences in infrastructure and regulatory consumption are results of unequal access to connectivity. Diverse abilities to use digital platforms result from the intersection of these access gaps with linguistic and educational disparities. In data- driven governance systems, where eligibility and targeting increasingly depends on algorithmic participation, low involvement consequently decreases visibility. Differential realization of health privileges rather than just informational disadvantage is the outcome, as research on digital inequality and health governance indicates [10,20,24,27]. the fact that exclusion is multi-layered emphasises the need for structural changes in addition to technology solutions if communication systems are to promote rather than prevent health.

Whereas, figure X focuses on a sequential progression, figure Y emphasises the recursive aspect of digital divide. Initial inequalities are likely to be reinforced because communities that are statistically invisible are less likely to draw ongoing infrastructure investment. In this feedback loop, broader theories of structural inequalities and communicative power are expressed [8,9,26]. merging both of the models increase analytical triangulation by offering both linear and cyclic perspectives.

Marginality, Voice, and Epistemic Justice

Some of the recent research highlights the idea of scientific injustice, which describes how some communities are repeatedly ignored as knowledge. In health contexts, patients and informal caregivers frequently have significant practical knowledge, but they may find it difficult to have it acknowledged. This hierarchy can be challenged by the media. Briggs and Hallin have strong emphasis on communicative tactics that are used to negotiate the boundaries between expert and common perspectives [1]. The public sphere is expanded when journalists allow community testimony. They narrow it when they just focus on the elite voices. Marginalized communities' opinions can enhance policy which is not just a moral gesture. Real world limitations are highlighted through experiences that planners might not be aware of.

Global Health, Development, and Postcolonial Critiques

According to the scholars of postcolonial traditions, international health communication occasionally promotes hierarchies acquired from colonial governments. In comparison to urban areas, local communities may be portrayed as lacking or backward by the initiatives developed in urban areas that are not widely adapted. Agency and integrity may be compromised by this framing. Decolonized perspectives urge more introspection on whose interests determine success and whose experience directs programs. Short term campaigns are often forbidden in favor of cooperation, reciprocity, and long term institutional collaborations.

Gaps in the Literature

Though there is increased awareness of inequality, large disparities still exist. Many researchers only evaluate effectiveness according to the parameters of human behaviour but analysis of structural change was not focused. Majority of the media representation studies concentrate rather than policy implications. Meanwhile, there are concerns over sustainability because participatory approaches are usually documented in small-scale operations. Moreover, communication and frameworks based on rights have minimal connection. The idea of participation is mentioned, but its legal and political issues are not fully explored.

Case Study 1: Sanitation, Media Narratives, and the Swachh Bharat Mission

Sanitation as Spectacle and National Development

In 2014, the Swachh Bharat Mission (SBM) campaign launched which quickly ascended to prominence as one of India's most important public health campaigns. This public health health campaign focused on national mobilization around cleanliness which was created by the convergence of political leadership, corporate players, celebrities and news organisations.

The SBM campaign provides a compelling example form the communication viewpoint of how media can transform constant infrastructure issue into an endeavour that is both noble and moral. In addition to being a health requirement, cleanliness was presented as a symbol of modern citizenship and aspirations for growth. Such framing created political strength and interested urgency. However, there was a chance that complex sanitation environments might be reduced to easily infectious indications.

International organizations praised the proposal. According to research, child mortality rate and diarrhea related illnesses significantly can be lowered through better sanitation [11]. The concept that fast change will result from infrastructure expansion was reinforced by these predictions, which also encouraged celebratory narratives. However, as the campaign developed, researchers started to record conflicts between official statements and typical behaviour.

Infrastructure Expansion versus Everyday Use

According to independent analyses, SBM significantly expanded the toilets construction. Though, a number of researches indicate that usage metrics did not always match with the coverage figures. On the basis of Coffey and researchers' study of sanitation behaviour in Northern India, even in the presence of toilets, decisions were still influenced by deeply rooted societal conventions; focuses on cleanliness, and a preference for open areas [12]. Practical challenges have been emphasized in other studies. Longevity of facilities lasted on the water availability, construction quality, and maintenance assistance. Individuals returned to their previous habits in areas where toilets were poorly constructed or lacked privacy. These outcomes put questions on arguments that link affect and infrastructure. A systematic evaluation of sanitation behaviour change initiatives found that during the SBM period, mobilization campaigns boost up awareness, community participation, follow-up, and attention to socioeconomic disparities were important for sustained adoption [13]. These complexities were not captured by fast measures.

Media Emphasis on Behavioural Responsibility

Mainstream media coverage often highlighted behavioural change. The media often complimented some areas free of defecation in the open from those who adopted toilets. These stories were suitable for visual media formats and provided captivating portrayals of achievement. Additionally, they were in keeping with more general governance tendencies that prioritize self-control.

As a result, institutional accountability may cause unintentional sufferings. Failure is not a sign of poor service delivery but rather of moral weakness if the main reason is a resistance to changing behaviors. Here Lupton's study on health moralisation is instructive: structural factors become less visible when blame is personalised [4].

Although this dynamic is not new to India, when inequality is visible it becomes more significant in situations. Participation may be impossible for families with unstable housing or without an adequate water supply. But the media often ignores this truth which makes the risk of stigma more worse.

Caste, Labour, and the Invisible Workforce

One of the most important blocks in SBM is sanitation labour. In India, caste hierarchy and waste management have long been interlinked, with Dalit populations carrying out hazardous and stigmatised professions at excessive rates. Despite legal limitations, manual scavenging continues in a different way. Researchers argue that national cleaning celebrations frequently take place without ongoing interaction with the lives of sanitation system operators [14].

Demands for mechanization, occupational dangers, and struggles for dignity often receive the same level of attention. Therefore, the perception of the public may separate the effort needed to handle waste from better facilities. From the communication standpoint the failure has significant implications. It chooses the experiences that are taken into consideration while defining what sanitation progress means.

Quantification, Governance, and Communication Politics in SBM

Quantitative goals were given priority as evidence of advancement by the SBM campaign. Administrators were able to prove their accomplishments and establish authenticity by utilising dashboards that tracked toilet construction and declaration free of open defecation. Media coverage frequently repeated these numbers, supporting a narrative of rapid achievement. However, scholars caution that strong target pressure could promote early certification and challenge implementation issues [15]. When success becomes required, communicative space becomes limited and unconventional voices run the risk of being marginalized when success becomes required. At the ground level, there was a more top-down communication approach. National message modified through some relational strategies like home visits, participatory engagements, ASHAs, teachers, and self help organizations. Changes was most pertinent when trust and verified reasons were taken into account. However, there was little consistent media coverage of this slower, dialogic labour.

The SBM campaign experienced a major challenge. Though mass media may legitimize public health agendas and mobilise transformation, dominant frames may obstruct whose information is used to influence policy. If the Right to Health includes both of the Persuasion and listening may be institutionalized in communication. Interactions between communities, professionals, and journalists co-produced health public as stated by Charles L. Briggs and Daniel C Hallin [1]. The co-production in sanitation governance has been unequal, giving elite narratives priority over those of the

community. For a more equitable public health future, it is important to acknowledge both accomplishments and limitations.

Case Study 2: Pandemic Communication, Informal Settlements, and Urban Precocity

Pandemic Visibility, Urban Inequality, and the Politics of Health Communication

The COVID 19 pandemic caused media agendas to shift, emphasising vaccine campaigns, fatality rates and infection curves worldwide. Congested areas like Dharavi, in Mumbai have come to represent vulnerability in India. Early media coverage mostly depended on dramatic imagery of compacted roads and shared toilets, which reduced complicated populations to contagion sites. According to Daniel C. Hallin and Charles L. Briggs, media coverage influences those interventions which are appropriate and shape public perceptions at crises [1]. National messaging encouraged universal preventive precautions like masking, distance, hand washing, and later immunization. Although high awareness was guaranteed by repetition, these recommendations frequently included the assumptions of water supply, stable home and steady income. Compliance was limited structurally in risky situations. Despite having limited capacity this interaction demonstrates how people are expected to handle risk that was argued by Deborah Lupton [4]. According to field research, reach always does not correspond to trust. Despite the widespread dissemination of information by the media, local physicians, pharmacists, and community leaders were often relied upon by people to interpret advice and counter rumors [16]. Relational communication, as opposed to impersonal authority, was the trust source. Participation became more difficult by stigma and false information. Fear of social isolation, financial crisis, and quarantine impact the behaviour as much as biological risk, supporting research on stigma and disclosure in crisis time [17]. Dharavi's containment approach gained international acclaim over time, which was based on intense tracing and community cooperation. Door to door outreach and bilingual messaging, municipal authorities collaborated with local networks pushed instruction into daily practices. Paulo Freire's concept of participatory approach was aligned with the dialog strategy which demonstrates that listening and negotiating were crucial to acceptance [10]. Government viewpoints were given priority while media narratives changed from one of disaster to one of success as case number stabilized. The media is less focused then on the issues like mental strain and disturbance of employment. Digital registration and alerting mechanisms increased efficiency but revealed access disparities, reinforcing Nick Couldry and Ulises A. Mejias's concerns on data driven governance and exclusion [5].

Thus, the pandemic situation focused a fundamental lesson for the right to health: for emergency communication broadcast authority alone is insufficient. For effective governance, communication, credibility, and tangible assistance were crucial. Hence, in a severe situation of urban inequalities, participation was ethical and practical in question of public health initiatives.

Table 1. Communication Politics and the Right to Health: A Comparative Analysis of the Swachh Bharat Mission and COVID-19 in Urban Informal Settlements

Analytical Dimension	**Swachh Bharat Mission (SBM)**	**COVID-19 in Urban Informal Settlements (e.g., Dharavi)**	**Implications for the Right to Health**
Normative Lesson for Health Communication	Behaviour change messaging must engage structural determinants and labour conditions	Crisis communication must integrate credibility, material support, and community participation	The right to health requires participatory, accountable communication alongside service delivery
Governance and Data Regime	Dashboard monitoring; target-driven certification; performance pressure	Digital tracing systems; app-based vaccine registration; containment mapping	Data-driven governance risks exclusion and premature success claims
Ground-Level Communication Practices	ASHAs, self-help groups, school teachers, and local mobilisers conducting interpersonal outreach	Door-to-door tracing, community health workers, local physicians, multilingual engagement	Dialogic communication enhanced trust and compliance
Media Narrative Over Time	From mobilisation and urgency to celebration of rapid achievement	From alarmist framing to international recognition of containment strategy	Media cycles privilege demonstrable "success"
Visual Narrative	Toilet construction drives, ODF declarations, celebrity participation	Infection curves, mortality figures, images of dense settlements, vaccination campaigns	Spectacle and visibility shape public legitimacy
Marginalised Populations Most Affected	Dalit sanitation workers; rural and peri-urban poor; women	Informal workers; migrant labourers; residents of informal settlements	Unequal visibility and limited narrative agency

Analytical Dimension	**Swachh Bharat Mission (SBM)**	**COVID-19 in Urban Informal Settlements (e.g., Dharavi)**	**Implications for the Right to Health**
Core Communication Tension	Infrastructure expansion versus sustained everyday use	Information dissemination versus feasible compliance under inequality	Broadcast authority alone insufficient
Behavioural Emphasis	Individual toilet adoption and abandonment of open defecation	Masking, distancing, testing, vaccination compliance	Risk and responsibility individualized
Structural Constraints	Water availability, maintenance gaps, caste-based sanitation labour, housing precarity	Overcrowding, informal employment, shared sanitation, limited water access	Structural inequalities insufficiently foregrounded in mainstream discourse
Dominant Media Frame	Cleanliness framed as nationalism, civic pride, and moral duty	Pandemic framed initially as contagion crisis, later as containment "success"	Health constructed as moral responsibility or emergency compliance
Policy Context	National sanitation campaign (launched 2014) aimed at eliminating open defecation and improving rural and urban sanitation	Public health emergency beginning in 2020, requiring rapid containment, treatment, and vaccination	Developmental governance contrasts with crisis governance, yet both rely heavily on communication
Primary Metrics of Success	Number of toilets constructed; Open Defecation Free (ODF) certification	Reduction in case numbers; recovery rates; vaccination coverage	Quantitative indicators substitute for lived experience

SOURCE: Table 1: author's comparative analysis

The table analyses comparative dimensions of governance, media framing, behavioural emphasis, and structural inequality to demonstrate how communication

practices shape the realisation of the right to health across developmental and emergency contexts.

Beyond Crisis: Durable Inclusion and the Politics of Communication

When emergency severity decreases, participatory strategy also reduces rather than institutionalizes. Dharavi's example signifies that community participation can be more successful but it is seen as an isolated incident without institutional integration rather than a governance reform model. Upon contrasting it with Swachh Bharat Mission (SBM), a consistent communication pattern becomes apparent. In all situations, the media needs financial support, administrative mobilisation, and urgency. Dharavi became an international headline in all forms of media, and sanitation became a national priority. Although media power was beneficial, representational equality was not ensured by prominence. Over the structural factors like caste based work, unstable housing, and uncertain livelihoods; official viewpoints, measurable achievements, and behavioral recommendations were prioritized. The framework limited the scope of interventions, by supporting awareness campaigns about redistribution or institutional transformation. Media coverage dominated by governmental officials and healthcare specialists reduced the analytical presence of community knowledge. Briggs and Hallin stated that health communication entails bridging the gap between the common and professional sectors [1]. Residents did not appear as co-authors of strategy, but rather as beneficiaries in pandemic and sanitation reporting. Though vaccination, mask use, and toilet use are important, focusing too much on compliance hides capacity disparities. According to Lupton, moralised narratives run the risk of placing blame on people whose structural circumstances limit their ability to make decisions [4].

marginal determinants were given priorities in digital governance, reflecting worries expressed by Couldry and Mejias that data-driven systems may exacerbate marginalization and abstract lived experiences [5]. Similarly, Waisbord argues that participation needs to address structural inequities [6]. when combined, the case studies demonstrates how unequal credibility, agenda setting authority, and interpretative authority all contribute to communication inequity. Instead of reserving involvement for crisis time, a right-based approach would institutionalise it and acknowledge voice as fundamental framework.

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Chapter 11: Indigenous Knowledge Systems and Sustainable Livelihood Practices among Tribal Communities in Northeast India

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Abstract

This study is all about relationships between indigenous knowledge systems and sustainable livelihood practices amongst the tribal communities of North East India. In this chapter, the focus is kept on how everyday ecological knowledge i.e. influenced by long-term interaction with land, forest and water and how these continue to affect agricultural practices and community-based resource management and local governance arrangements. Rather than viewing sustainability as a recently created policy, the chapter looks at practices such as shifting cultivation, collective forest stewardship, seed conservation and protection of culturally important landscapes as expressions of adaptive practices based on specific socio-ecological contexts. The basis of the chapter is a qualitative analysis of secondary sources based on interdisciplinary scholarship in human geography, environmental history and political ecology from Northeast India. Through this approach, it aims at understanding how indigenous forms of ecological reasoning operate in contemporary contexts characterised by infrastructural development, market integration and environmental change. The discussion is not romanticizing traditional systems and setting them apart from formal frameworks of development- it is examining areas of convergence, negotiation and adjustment between customary institutions and state-driven initiatives. This chapter attempts to present the argument that sustainable development efforts in the region can benefit from increased awareness of natural knowledge systems and community-based management systems of regulation. It recommends that policy frameworks should strive towards a more inclusive approach in which indigenous knowledge of ecology is taken on-board when planning policies and that cultural autonomy and regional diversity is respected. By foregrounding lived experience and place-based knowledge, the study adds to more general debates on inclusive and socially grounded pathways to sustainability in the Global South.

Keywords:
Indigenous knowledge; Sustainable livelihoods; Tribal communities; Northeast India; Human geography; Sustainable development.

1. Introduction

The North eastern region of India is the land of diverse ethnic communities and pristine natural landscapes, is most frequently used in the development discourses as an ecologically sensitive, culturally diverse and strategically important region of India. However, if we look beyond such formal descriptions, there are some complex sets of close relationships between communities and their landscapes. Across its hill ranges, valleys, forests and river systems, land is not understood as just a form of property, or a space of production. For the many tribal societies who live in the region, sustainable ecological involvement is part of their daily lives, and influences agricultural cycles, various forms of settlements, traditional ritual methods, and their social organization. Knowledge that is involved with soil, rainfall, vegetation and seasonal cycles is learned in the life practice and not in a formal institutional teaching set up. The concept of sustainability, which has been circulated extensively since the end of the 20th century, speaks of the importance of ensuring that current needs balance with future ecological stability [1]. However, long before the institutional terminology of sustainability was even invented, many indigenous communities had hit upon forms of livelihoods that were sensitive to ecological limits. "Traditional ecological knowledge" has been defined as a cumulative body of understanding, practices and beliefs that evolved through adaptive processes and that was passed down through the generations [2]. Such knowledge systems are not static but dynamic, and responsive to feedback from the environment and social changes.

The Environmental history in India have proved that community-environment relationships underwent great transformation especially during the period of forest administration under colonial rule [3]. Centralized forest policies often redefined normal access, as well as changing patterns of land use. Subsequent scholarship has focused on the issue that local communities historically evolved their own regulatory mechanisms in response to particular ecological circumstances, and that simple depictions of rural resource use as necessarily destructive have been challenged [4]. These historical perspectives become relevant in the context of interpretation of modern resource governance in Northeast India. One of the most talked about livelihood practices in the area is the shifting cultivation, commonly called "jhum". Earlier administrative accounts tended to present shifting or jhum cultivation as environmentally harmful in terms of the clearing of forests and their burning. However, interdisciplinary ecological research have shown that with fallow periods, shifting cultivation can keep the soil fertile and support biodiversity [5,6]. Different studies have also reported the crop diversity of jhum systems to be associated with nutritional security and risk management [7]. Rather than an absence of agricultural knowledge, such practices are based on careful observation of slope conditions, rainfall fluctuation, and regenerative cycles. In addition to agricultural systems there is also a significant community-based forest governance in parts of

Northeast India. Research on the sacred groves in Meghalaya has shown that protected patches of forests of cultural importance are usually cultural repositories of biodiversity that are maintained through customary land use regulations instead of legal enforcements [8]. Similar studies have been conducted in Nagaland and other hill regions of which it has been demonstrated that the allocation of land and extraction of forest resources from the forest are under the control of village institutions based on collective decision-making [9]. These arrangements do tell that ecological stewardship may happen through social institutions in local culture.

Political ecology is useful in providing a critical viewpoint in understanding the link of knowledge and power to resource governance [10]. Environmental practices are not merely technical activities and are influenced by the institutional frameworks and other political-economic situations. In parts of the country like Northeast India, customary tenure systems encounter formal state legislation and this creates a pattern of layered governance. It is in the understanding of these institutional dynamics that it is necessary to understand sustainability in this context. Development scholarship has therefore also questioned the universality of standardized planning models. Escobar has argued that development discourse tends to marginalise other ways of knowing and organising social life [11]. While such critiques stem from larger contexts of the Global South, the critique resonates in places where indigenous forms of ecological reasoning continue to inform the decision to choose a livelihood. Similarly, when we focus on biodiversity and agricultural modernization, we have focused on tensions between diversified local systems and monocultural production strategies [12]. The concept of environmental justice goes further to such a debate because it takes into consideration that ecological problems are inextricably linked to livelihoods and social equity [13]. In the places where the principles of subsistence and identity are still to be found in land and forest resources, the effects of environmental change are felt in tangible and real terms. Sustainability, therefore, cannot be understood in terms of conservation targets alone but also need to take into account socio-economic implications of governance decisions.

Recent research also has disclosed the adaptive capacity of indigenous people in relation to environmental variability and climate change [14]. Livelihood diversification, crop changes and changing land use strategies Steps to a 'draft' Livelihood Diversification Crop Changes and changing land use strategies displays how indigenous knowledge systems are not resistant to change but rather responsive. At the same time, demographic pressure and decline in the fallow cycle have caused challenges to traditional agricultural systems in some areas [6]. These developments show the need for moving beyond ideal or dismissive narratives. In Northeast India, it is seen that many scholars document the fragile nature of the region's ecology and cultural plurality, and have tried to show how the management of the environment is intertwined with customary institutions and identity formation [15]. Such work supports the significance of understanding indigenous

knowledge systems as not solely as an isolated tradition but a part of contemporary socio-ecological life.

2. Literature Review

The intellectual basis of this chapter is based on three interrelated components of scholarship on sustainability discourse, environmental history/political ecology, and region-specific studies on Northeast India. Rather than reading these as on their own body of literature, this section reads them together to learn how indigenous ecological knowledge has been interpreted cross-disciplinary.

The idea of sustainability has been incorporated into the field of world development in a formal manner, through the report Our Common Future [1]. The report defined sustainable development that meets the needs in a balanced way between the present and the future generations. This framework was developed mostly through institutional and policy discussions. But it seemed to fail to adequately incorporate knowledge systems that for decades were operating outside official development planning processes. In that sense the sustainability debate has helped to provide a language by which later scholars would be able to interpret indigenous practices, even though such practices existed much before the vocabulary to understand them was created.

The work of Berkes [2] is vital in understanding indigenous ecological knowledge as a system that is living and adaptive in nature. Rather than portraying indigenous knowledge as folklores or static traditions, Berkes portrays indigenous knowledge as cumulative, empirical, and socially embedded. Knowledge, in this view, cannot be devoid of practice and belief. This perspective allows coming to the point of the discussion from sentimentalization and begins logical recognition of community-based environmental reasoning.

Guha's historical study on forest governance [3] shows how colonial interventions re-wrote relationships between communities and forests. Restrictions on customary access altered the patterns of subsistence and sometimes created resistance. Gadgil and Guha [4] take this argument one step further by placing ecological change in a broader context of social and political change. Their work implies that ecological degradation is not graspable from institutional arrangements and power structures. These historical insights have special relevance in the case of Northeast India where the customary systems still coexist with the statutory frameworks.

The idea of shifting cultivation has produced long-term controversy in many academic literatures. Ramakrishnan's interdisciplinary study [5], was one of the earliest systematic studies to examine jhum or shifting cultivation from ecological, social and economical perspectives. He has shown that the sustainability of shifting cultivation depended too much on the length of fallow and the demographic pressure. Later on, Cairns [6] edited a

large format volume interrupting shifting cultivation to clarify a shifting cultivation method with ecological complexity, which was often ignored in the simplified narratives of destruction of the environment. A paper presented by Rerkasem and Rerkasem [7] describing upland agriculture in Southeast Asia further reinforces the view that it is important to understand shifting cultivation systems in their ecological and socio-economic context rather than to make judgements according to some uniform standards.

Community-based forest governance is also an important theme in the literature. Tiwari and colleagues [8] describe the role of the sacred groves in Meghalaya as some kind of conserved biodiversity patches, which were maintained by cultural norms. These findings indicate that conservation need not take place within the formal structure of the state. Jamir and Nongkynrih [9] point out the fact that forest resources in Nagaland are regulated at the village level by means of collective decision making. Their work suggests the embeddedness of environmental governance in social organisation. Political ecology provides a wider analytical framework for interpreting such cases.

Robbins [10] claims that environmental issues are also influenced by interaction between ecology and power. Resource use is determined not only by environmental factors but also by institutional arrangements and political priorities. Escobar [11], from the viewpoint of development studies, critiques the construction of dominant development discourse as marginalising other ways of knowing. Although his work is not region specific, it does offer conceptual tools for understanding why indigenous ecological reasoning is frequently ignored in formal planning or decision making processes.

Shiva's challenge of monocultural agricultural models [12] provides another strong point to this topic. She argues that biodiversity loss and loss of traditional knowledge are related to industrial or modernized ways of agriculture. While some of her arguments are normative, they raise significant awareness of the dangers of homogenised strategies for development especially in ecologically diverse regions. Martinez-Alier [13], in the light of environmental justice, highlights that there is a strong linkage between the ecological conflicts and the livelihood issues.

Adger's contribution to social and ecological resilience [14] reflects more closely on the issues and debates of today's sustainability. He has suggested that social institutions play a very important role in the development of ecological resilience. This is especially true of Northeast India since customary institutions facilitate land and forest use. Finally, Karlsson's political ecology of the region [15] places Northeast India in broader discussions on issues of identity, governance and resource management. His work underlines the fact that the question of environmental practices cannot be isolated from the questions of autonomy, community authority, and development planning.

3. Methodology

This study is based on qualitative analysis of secondary sources. It is not a study that involves primary field surveys, interviews, or statistical modelling. Instead, it is based on the close reading and interpretation of a selection of literature dealing with sustainability, and approaches addressing indigenous ecological knowledge systems, environmental histories, and political ecology, specifically in relation to Northeast India.

The study is based on an interpretive approach. The texts identified by the literature review were studied to understand the different ways in which the scholars have tried to explain the relation between communities and their environments. Rather than isolated statements, the approach was to read the arguments in their context and to pick out themes. These include indigenous ecological knowledge as an adaptive practice [2], changes of forest governance in India from historical times [3,4], and the ecological debates around shifting cultivation methods [5,6]. The analysis continues by use of thematic synthesis. This means that arguments of different works are put in discussion with each other. For example, discussions on resilience and sustainability [1,14] are taken along with region specific studies for the understanding of them within the wider concepts in the social and ecological settings of Northeast India. In this manner the chapter attempts to explore spaces where customary institutions and formal frameworks of development touch upon, overlap or adjust to one another. The entire study relies on published scholarship. The intention is however not to make generalizations outside the scope of literature available but to construct a careful interpretation based on established academic studies.

4. Limitations of the Study

1. The chapter relies primarily on secondary sources and published literatures rather than primary field based data.
2. Only a selected set of influential works were reviewed, so the discussion does not cover the entire range of studies available on Northeast India.
3. The region is socially and ecologically diverse, and the experiences of all communities cannot be fully represented within a single chapter.
4. The analysis of the study is explanatory in nature and does not include detailed quantitative environmental data.
5. Some of the situations described in earlier studies may have changed over time as development processes and local conditions continue to evolve.

5. Indigenous Ecological Knowledge and Lived Landscapes in Northeast India

In Northeast India ecological knowledge is difficult to separate from daily living. It is deeply embedded in the routines of cultivation, use of forests, seasonal mobility and village-level decision making of the people of the region. Rather than existing in its abstracted form i.e., the awareness of the environment, it works through practice. Fields

are cleared, crops are chosen, forests are accessed and water sources are protected through systems that are socially negotiated. In this sense, rather than being codified, ecological reasoning is lived. The broader debate on sustainability, as expressed in global policy discussions [1], tends to talk in universal terms like future generations, limits to resources and balanced development. While these principles are important, this is not always the way sustainability is perceived at local level.

In many of the tribal communities of Northeastern India, the concept of sustainability is not expressed in any formal ways as they are embedded in the routine practices built upon the experiences. This is what Berkes's analysis of indigenous ecological knowledge as cumulative and adaptive [2] helps to explain. Knowledge is gained through the multiple interactions with a particular landscape. It is adjusted when rainfall patterns are altered, soil fertility decreases or when there are more demographic pressures. One of the most debated examples is the practice of shifting cultivation which many people think it to be. Many narratives earlier tended to portray jhum cultivation as environmentally destructive, mainly due to the clearing and burning of the forests. However, it has been shown through ecological studies that shifting cultivation's sustainability is dependent on cycle length and regeneration time [5,6]. When there are sufficient fallow periods, the system allows the recovery of nutrients and helps to maintain biodiversity. Crop diversity in jhum plots is another form of risk buffering, wherein risk is distributed among numerous crops rather than possibly just one (or monocrop) [7]. In this way, changing cultivation is a revolved adaptation to the ecology of the hills. At the same time, it would be misleading to say of all traditional systems as thoroughly stable. Ramakrishnan [5] himself noted that shortened fallow cycles which are often associated with a population growth or pressure on land could place stress on ecological balance. Cairns [6] also laid emphasis on socio-economic change affecting conditions under which shifting cultivation is carried out. This means that indigenous knowledge systems are sensitive in responding but not immune to structural transformation.

Historical scholarship is useful for focussing these practices in longer tracks of governance. Guha's work on forest administration [3] appears to provide a good illustration of how colonial policies centralized authorities and redefined accesses to forests. Furthermore, Gadgil and Guha [4] argue that the ecological changes in India cannot be understood outside the institutional power relations. In Northeast India customary tenure systems have survived more successfully than in many other parts of India in the context of legal frameworks. This system of multiple governance determines the way ecological knowledge is acted on today. Community based forest governance is another such important example. Studies of sacred groves in Meghalaya have shown that cultural patterns of protecting forest patches do often preserve high levels of biodiversity [8]. These groves are not being managed under written legislation but instead are being managed through a belief/social obligation. Similarly, the use of forests is also regulated

by village institutions in Nagaland on collective basis depending upon the need of extraction and conservation [9]. Such arrangements imply that environmental stewardship may be put upon a base in social organisation and not imposed from without. Here political ecology has an important role of interpretation. Robbins [10] claims that environmental practices are impacted by the ecological conditions as well as the political structures. Escobar [11] also criticises the development discourse for not taking into account local knowledge systems. In Northeast India infrastructural expansion, integration of markets and administrative planning along with customary institutions interact. Indigenous ecological knowledge does not simply perish under the pressure of development, and finds itself in many cases either adapting, negotiating or repositioning itself in new frameworks. Concerns for biodiversity loss and uniform farming models have also been discussed in general debates [12].

While not all critiques are relevant in different contexts in so far as they are relevant in relation to universal validity, they do point to the risks of displacement against diversified local regimes to standardised modes of production. In the ecologically diverse areas in the hills monocultural methods may not necessarily be in tune with the landscape conditions. Environmental justice perspectives take another attempt at this point. Martinez-Alier [13] reminds us that often ecological conflicts are based on livelihood security. In Northeast India forests and agricultural lands are not only an asset in terms of ecology but also being with identity and subsistence. Decisions about land use therefore have social consequences. Adger's discussion of social and ecological resilience [14] goes on to suggest community institutions are large players in sustaining adaptive capacity. Where customary governance still works it can make a contribution to resilience through variability in the natural environment. Karlsson's political ecology of India's Northeast [15] emphasises the fact that questions of autonomy, authority and identity are very much on the table when it comes to environmental governance in this region. This is more important where customary law retains legitimacy. Taken together these strands of scholarship about an indigenous ecological knowledge in North East India would be a hand of a dynamic field. It is not an untrammelled relic of the past, or an unremovable boulder to the path ahead to modernization. It is a working system, which is responsive to the signals from ecology, demographic changes and the changing institution. The idea of sustainability in this regard is not a result of isolation of traditional systems from development, but rather an understanding of the interaction of customary reasoning on the one hand and formal policy-frameworks on the other hand. To be able to fully understand such lived landscapes, means breaking away from crisis stories. While stress to the environment and capacity of the land are realities, they exist along with adaptive practices and adjustments. Indigenous ecological knowledge is still used to help inform strategies for livelihood, even as roads are being built, markets developed and the forms of governance change. The relationship of community and environment, therefore, is better known as a continuous negotiation and not as fixed resistance.

6. Negotiating Development: Customary Institutions and State Frameworks

In Northeast India, the combination of local rules and state plans are an important aspect of life nowadays, whether it is construction of roads, improving schools, setting up hydropower projects, linking up markets, restructuring the state. The worldwide notion of sustainability usually describes that conservation of the environment could be controlled with formal rules, laws and strategies. But in places where people have land which they own together and making decisions for villages is different. In some parts of Northeast India, the rights of occupation of forest, water and farm land are determined by local rules followed by groups of the population by mutual agreement in place of records of title to such lands. These rules do not always come in tally against what the government does, but it puts these things into local customs. Historical analysis is useful for helping decipher the reason for these complex negotiations. Colonial forest rules which gave power to one place and made it difficult for local people to use the forest explained by Guha [3]. Gadgil and Guha [4] also show that change in nature is often connected with change of who has power, and how institutions work. In Northeast India local rules of the land were still far from being weaker compared to other places. Where new formal laws were introduced, it had multiple sets of rules. These multiple layers of rules still impact upon the way that projects are carried out. Political ecology provides one way of understanding how these things work together. According to Robbins [10], the set of rules about the environment are interlinked with the notions of who has the authority and power. Development projects whether it concerns forests, farms or buildings are always affected by the institutional and political factors. Escobar [11] says that common models of planning can overlook local ways of knowing as they are embedded in communities. In Northeast India, this struggle is not necessarily opposed but it manifests itself in the form of slow changes. For example, shifting forms of cultivation have been the focus of frequent policy attention. At different points of time there have been attempts at replacement or modification of jhum cultivation either in the shape of settled cultivation or plantation models. Yet ecological research has determined shifting cultivation's in-house logic and adaptive capacity under some circumstances [5,6]. As these ecological reasoning may not be took into consideration while development initiatives are being made, there will be a potential challenge on implementation of such initiatives. On the other hand, adaptation is more possible if the local knowledge is recognized. Community-based forest governance establishes a site of negotiation in another location. Sacred groves and collectively managed forests, known from Meghalaya and Nagaland [8,9] suggest conservation need not necessarily have its origins in formal environmental legislation. Where state conservation policies are combined with such customary systems, the results differ. In some cases there is reinforcement; while in some others there is friction over jurisdiction. The most important thing is not the protection of the environment so much, it was the recognition of authority.

The issue of biodiversity versus agricultural changes also enters into this debate. Shiva [12] reminds us of the ecological and social dangers of the monocultural development of agriculture. While she believes her arguments are general, she has made parallels they are justifiable in hill regions where agricultural diversity has been a form of risk management: Substitution of diversified systems with the uniform models may not always be appropriate to local ecological conditions. Environmental justice perspectives also lead our attention to the fact that development decisions have livelihood implications [13]. In where forest and land continue to be the key to subsistence and identity, access and/or regulation shifts affect not only economic production. The importance of institutional flexibility in adding to adaptive capacity is stressed by Adger [14]. Customary systems when they work well can put in place adjustment through incorporating new practices and still maintain social cohesion. Karlsson's political ecology analysis on Northeast India [15] highlights the association of environmental governance and identity. Development planning is not purely technical, it cuts across the issues of autonomy and cultural recognition but this does not mean that every community is anti-state in their initiatives. Rather, development is understood in terms of local histories and institutional memories. It is therefore more correct to describe the relationship of customary institutions to state frameworks in terms of negotiation, rather than opposition. In some cases, customary bodies do have some role of formal planning built in, such as the structured management of forests or interaction with conservation programmes. In other cases, they claim local jurisdiction over decisions involving land use. These types of interactions are on-going and contextual. To be able to understand this negotiation is important to the sustainability debates. If sustainability is considered solely a compliance method with law of projects implementation it may fail to cover the social process through which ecological decisions already get made. In Northeast India it is more likely that outcomes of development are sustained when development initiatives work with existing institutions, rather than avoid them. The more general implication is that there is no separation of domains between indigenous ecological knowledge and state-led development. They cross within the practices of everyday life of people. Roads are constructed through lands that are controlled by village councils. Agricultural programs take place in the context of changing landscapes of shifting cultivation cycles. Conservation policies interact with sacred forests. The landscape that results is one that is neither traditional nor modern. It is formed through dialogues, adjustments and compromises. As we see that the nature of this negotiation is so recognized, we can transcend mere binaries. Development does not have to be considered disruption only, nor can customary systems be considered themselves immovable. Both are evolving and the interaction of the two is still shaping the socio-ecological future of Northeast India.

7. Emerging Challenges: Market Integration, Demographic Pressure and Ecological Stress

The landscapes in Northeast India are not disconnected from wider economic changes. Over the last few decades, better connections, the growing road network, the development of small towns, and access to the markets have been slowly changing the patterns of livelihood. These changes have led to new opportunities of ecological systems and customary institutions being exposed to new pressures. Market integration changes the decision making processes of agriculture. In shifting cultivation systems, conservation of crop diversity was traditionally a strategy aimed at food security and the distribution of risk [5,7]. With more access to the market, however, there is often motivation to focus on crops that are commercially more valuable to the farmer. While such shifts might provide benefits to farmers in terms of cash income over the short period of time, they can lead to a loss in diversity in terms of cultivation cycles. Shiva's critique of monocultural practices [12] is applicable here, not in the form of a total criticism, but with a subtly different message about the ecological universalization of an area, and the long-term risks that it may pose in fragile hill areas. Demographic change increases another blend of beauty in the region. Earlier ecological studies emphasised that the sustainability of shifting cultivation is very much dependent on adequate fallow length [5,6]. As the population is more pressing or the availability of land is becoming less, fallow periods may become shorter. This reduced regeneration time may impact the soil fertility and the vegetation regeneration. It is important however, that ecological stress is not only attributed to local practices.

As the study of environmental history has made clear, the process of land-use change is often related to more general institutional and economic transformations [3,4]. Infrastructure works also affect the dynamics of the ecosystem. Road connectivity enhances access to markets and also enhances educational opportunities, as well as healthcare, but they can also enhance extractive pressures on forest and encourage land conversion. Political ecology broadens our awareness that environmental change is not often much of an ecological phenomenon and is influenced by structures of governance and power [10]. Decisions regarding the allocation of land, regulating forests and development planning influence the way resources are used and who benefits from them. Environmental justice perspectives can be useful as a source of interpretation in understanding these transitions. Martinez-Alier [13] states that the situation where ecological conflicts emerge is often where there is a challenge in terms of livelihood security. In the case of Northeast India forests of agricultural lands are not only economic entities but also social and cultural marks. Changes in land use regulation or access to resources thus have implications which go beyond income generation. Questions of fairness, recognition and participation form a part of the debates on sustainability. Variety of climate makes the picture more difficult. Although this study does not draw from any

new climate information, discussions on resilience broadly indicate that adaptive capacity depends on the institutional flexibility and social cohesion [14]. If the customary systems becomes responsive and inclusive, communities can help them adjust to changing environmental conditions. However, in the case of situations in which institutions are weakened by economic or political pressure, adaptive capacity can result in diminished capacity. It would be inaccurate to paint the region's narrative in terms of a purely crisis situation. Indigenous ecological knowledge sustained the modification to livelihood. Communities of the region adapt to changing and possess continuity and change in cropping patterns, community modifying rules for accessing resources and adapts engagement with development programs. Karlsson's work [15] therefore reminds us that environmental governance in the Northeast is strongly associated with issues of identity and autonomy.

Responses to ecological stress are thus not such an affliction by material conditions but also institutional legitimacy. The new challenges in the region are the forces of growing markets, demography, infrastructure and environmental fluctuation. These forces do not necessarily result in the deconstruction of traditional knowledge systems, rather changing the conditions within which indigenous knowledge systems can operate. Sustainability in this sense relies less on the intellectual retention of a fixed model for the past and so much more on the ability to negotiate and adapt. Understanding such pressures is a step forward to stop the discussion about traditions and development. The condition of things currently in Northeast India is hardly to be characterized otherwise than as at a state of transition. Ecological stress and an economic opportunity go hand in hand. Customary institutions continue to operate although frequently under stress. Development initiatives to grow but they still depend on local reactions.

8. Recommendations of the Study

Introduction in routine development planning, several concepts are highlighted due to their worth for development. Ecology is one of them, because it not only includes local regional ecology but also can be applied in various contexts. 'Ecological damages' in the area are a major concern. Many of the communities from the region already have practical solutions for the management of land, forests, and agriculture. Instead of ignoring these practices, policies and programmes should be created to learn from and work alongside these practices. This is not to say that traditional practices are not capable of change, but rather that change is more effective if local experience is taken seriously.

Role of community institutions also another important recommendation comes out of the In many areas village councils and customary bodies still have an impact on the use of land and forest resources. Building cooperation between these institutions and formal government agencies may help to develop more workable solutions. When communities feel included in decision making, development operations are usually easier to do and maintain.

The research further suggests that agricultural transitions must be handled carefully. So shifting cultivation and other local systems of farming have their own ecological logic. Rather than attempting to replace them entirely, it might be more helpful to assist enhancements are related to soil preservation, better fallow administration and maintenance of crop diversity. Small changes of this kind can help reinforce livelihoods - whilst at the same time reducing ecological pressure.

Finally, there is the need for further research and dialogues. Conditions in the region are changing with new roadways, markets coming up in the region causing environmental pressures. Field-based studies and human interactions with local communities can help scholars and policymakers understand these changes in a more comprehensible manner. Such efforts may contribute to both development approaches, which would be practical, respectful, and appropriate to the realities of the region.

9. Conclusion

This chapter is a study of the continuity of human-environment relationships established on indigenous ecological knowledge systems in Northeast India. By studying the state of scholarship and documented experiences of others in the world, the discussion sought to understand how communities manage land, forests and agricultural landscapes in addition to responding to the changing conditions of economies and development. The review of literature and thematic analysis demonstrate that the local ecological knowledge is not merely a relic of the past rather it is still part of the everyday decision-making in many rural settings of the region. The discussion on shifting cultivation, community forest management and customary institutions imply that in these systems there are forms of ecological reasoning which have been built up through constant engagement with particular environments over log period of time. Earlier debates in these differences have represented such practices in simplified ways, but later research has shown that in quite cases their outcomes depend upon such context as fallow cycles, demographic pressures, and governance arrangements. Seen from this perspective, indigenous practices are not necessarily durable, sustainable or destructive, but function in certain social and ecological circumstances. At the same time there is visible change in Northeast India. Expanding markets, infrastructure development and administrative interventions are impacting on the use of land and resources. Such developments do not merely destroy traditional systems. More typically they are creating scenarios where communities are adapting how they work, protecting their properties with external institutions or combining old knowledge with new possibilities. The interaction between the customary institutions and the formal governance are therefore an important part of the contemporary landscape in the region.

The chapter also relates the fact that sustainability in such contexts cannot be approached by uniform models. Environmental concerns are often close to livelihoods, identity and local authority. Approaches that are conscious of these connections have a

better chance of being meaningful on the ground. Working with community institutions and recognising local knowledge and flexibility of planning for development seem important elements of this process. Overall, the study suggests, the future of sustainability in Northeast India will focus on the degree of dialogue between different forms of knowledge and governance, which will continue. Indigenous ecological understanding, development initiatives and policy frameworks are indeed part of the same complex evolving landscape. Recognising their interaction enables a more balanced understanding of environmental change in the region and opens up space for approaches that are based on social grounds as well as ecologically sound approaches.

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Chapter 12: Fintech, Digital Credit, and Urban Governance: Reframing Financial Inclusion in India's Smart Cities

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Abstract

Over the past decade, India's urban transformation has been driven by rapid digitization, infrastructural modernization, and the consolidation of data-driven governance under initiatives such as the Smart Cities Mission and Digital India (3,4,29), which have reshaped urban administration through integrated command centers, real-time monitoring, digitized public services, and interoperable payment systems (30,31); yet, despite these technological advancements, financial exclusion continues to define the lived realities of informal workers, migrants, gig laborers, women entrepreneurs, and low-income households (6,7,22). In this context, digital lending platforms and fintech enterprises have emerged as alternative financial intermediaries promising fast, collateral-free credit through algorithmic scoring and alternative data (8,9,11,12), leveraging mobile connectivity, biometric identity, and digital payment infrastructures (13,37) to expand access and democratize participation; however, their rapid expansion has raised serious governance concerns, including opaque pricing, data extraction, algorithmic bias, coercive recovery practices, regulatory fragmentation, and rising risks of over-indebtedness among vulnerable borrowers (10,18,23,24,35). This chapter examines how lending systems using fintech can help people in India's new smart cities access financial services more easily (22,26). The chapter questions whether these systems might exclude some people or cause technology issues (23,24). By exploring city management, economics, regulations, and fairness in the digital world, the chapter argues that being skilled with technology is not enough to ensure everyone's inclusion (29,30). For people to truly benefit from services, these services must be part of a system that functions well, is honest, and responds to the people's needs (35,40). This requires rules, strong protection for people's information, understandable software, oversight to ensure everything is running smoothly. (1,2,38).

Keywords: Financial Inclusion, Digital Lending, Smart Cities Governance, Algorithmic Accountability, Data Protection and Digital Justice.

1. Introduction: Smart Urbanism and the Paradox of Financial Exclusion

Urban India plays a crucial role in the country's economy. Government decision-making impacts this. Cities contribute to the national economy by generating revenue from both domestic and international sources. They are also testing new digital governance methods (3,29,30). The Smart Cities Mission aims to improve urban areas with initiatives like smart roads and management systems that use sensors and data (3). The goal is to enhance efficiency, transparency, and sustainability through technology (31). However, the reality is more complex for many city residents. Behind all the technology and real-time monitoring many people have jobs that are not stable and do not have formal contracts. A lot of people in cities do not have jobs and struggle to find a good place to live. It is also hard for them to get loans from banks because they do not have an income (6,7). To make cities better for everyone modernization often happens alongside these problems (22).The people who work in these jobs are essential to making cities run. They are the street vendors, the people who clean the streets, the workers who build houses, the people who work in homes and the drivers who deliver food. These people, including gig workers like taxi drivers and food delivery agents often have jobs that are not clearly defined and can be unpredictable. Their income varies; they do not have job security. It is hard for them to prove that they have a steady income (6,22).

Banks have always had a time helping these people. They usually look for people with salaries, formal contracts and good credit histories before giving them loans. For people who get paid in cash every day these rules make it hard for them to get loans (6). Many people in cities still lack access to financial services, even in what appear to be modern areas. This issue has led to the rise of companies that provide loans through technology, known as fintech lending platforms. These companies use mobile apps and data-driven risk assessment to claim they can improve credit access by relying on alternative data and algorithmic profiling. The benefits are evident: faster approvals, less paperwork, and access for first-time borrowers who were previously deemed "unbankable." However, we need to examine the implications of these models. Complicated fee structures can obscure actual interest rates. Data collection may extend beyond financial information, and some recovery methods raise ethical and regulatory concerns.

This situation reveals a significant tension in contemporary smart urbanism. Cities invest in digital infrastructure to enhance inclusion and improve governance efficiency. Yet, these same digital systems can create new power imbalances, information gaps, and vulnerabilities. The question is not whether to accept or reject fintech. Instead, we must closely examine the institutional environments where digital lending takes place and the regulatory frameworks that shape its outcomes.

This chapter situates fintech lending within the context of broader changes in urban governance. It goes beyond merely viewing technology as the primary influence whether good or bad and investigates the conditions that enable digital financial systems to genuinely promote inclusion.Can algorithmically mediated credit infrastructures be embedded within equitable urban development strategies? Or, absent robust oversight and rights-based safeguards, do they risk encoding exclusion into the architecture of digital finance itself (23,24)? The analysis that follows engages these questions by foregrounding governance capacity, regulatory design, and distributive justice as central determinants of inclusive urbanization (22,34).

2. Methodology

This study uses a research method that looks at existing data to understand how fintech is changing the way people borrow money in cities. The goal is to see how fintech lending and city governance work together in Indias Smart Cities Mission. Of asking people questions directly the study looks at what institutions and governments are saying and doing about fintech lending. It wants to know if digital lending is really helping people get access to money or if it is making things worse for some people.

The study uses four types of information. First it looks at rules and reports from the Reserve Bank of India like the Digital Lending Guidelines and the RBI Ombudsman Scheme. (1,2,16,39), Second it looks at India's plans like the Smart Cities Mission and the Digital India programme. Third, it uses reports from organizations like the World Bank, IMF, OECD and the United Nations (6,34–36). Fourth it reads what other researchers have written about fintech, microfinance and city governance.

The study looks at fintech systems in three areas: how people get access to credit, how credit affects different groups of people and how governments regulate and protect data. This approach helps us understand not how many people are getting credit but also if the credit is fair and if the system is working well. Even though the study does not have data from interviews or surveys it is still strong because it combines different perspectives like regulatory analysis, urban governance and digital ethics. This method is good for understanding if policies are working together, if governments can supervise fintech and if digital lending is fair in India's fintech ecosystem. The study is about fintech and how it is changing the way people borrow money in cities so it looks at fintech and its impact on people. The main focus is on fintech and its relationship with city governance, in Indias Smart Cities Mission. (8–12,18–26,29–33).

3. Urban Governance in the Digital Age: From Infrastructure to Institutional Complexity

3.1 Evolution of Urban Governance Models

Urban governance in India has historically centered on municipal corporations operating under state supervision, with responsibilities focused on service delivery, infrastructure management, and statutory planning (3). Administrative authority followed relatively clear bureaucratic hierarchies, and accountability was formally embedded within representative institutions. In recent years, however, this framework has shifted toward more hybridized arrangements. Public–private partnerships, outsourced technical expertise, and digitally mediated service providers now play a prominent role in urban management (29,31). The Smart Cities Mission sped up this change by creating Special Purpose Vehicles (SPVs), which are semi-autonomous organizations responsible for designing and implementing projects (3,29). While these SPVs aim to improve efficiency and speed up decisions, they have also made traditional accountability more complex by spreading authority across different levels of institutions (29).

At the same time, governance practices have become more focused on data. Traffic monitoring systems, integrated command centers, and online platforms now influence administrative processes (30,31). As digital infrastructures grow, regulatory duties go beyond just providing physical services. They now include data management, cybersecurity, and oversight of algorithm-based decisions (27,33). Today, urban governance involves not just physical infrastructure but also managing digital systems that introduce new types of administrative power (28).

3.2 Financial Ecosystems as Urban Governance Domains

Urban economies are deeply dependent on financial circulation. Access to credit and the conditions attached to it shapes the survival of small enterprises, patterns of informal sector growth, housing opportunities, and everyday consumption decisions (6,7). As lending increasingly shifts from bank counters to mobile applications, financial transactions become embedded within the digital routines of urban life (8,36). This shift has policy implications at the municipal level, particularly regarding livelihoods and poverty alleviation (22). Yet regulatory authority over banks and non-banking financial institutions remains centralized, producing institutional fragmentation (1,2). While borrowing occurs within specific urban communities, oversight is exercised remotely, complicating alignment between digital finance and local development priorities (12).

3.3 The Governance Coordination Deficit

The rapid expansion of fintech highlights a coordination challenge within contemporary governance structures (12). Regulating lending involves several areas. These areas include supervision, data protection, cybersecurity and social policy (1,38). When these areas work separately oversight tends to be reactive. It often responds to issues after damage has occurred (16). Of preventing potential problems it deals with them

after they happen (35). This separation is especially noticeable in city settings. In these settings digital systems allow for platform growth (29). Fintech providers can expand in markets faster. They can expand faster than regulatory systems can keep up (12). Without coordinated agency structures and regular information sharing gaps in oversight become more obvious (1,16). Effective governance needs arrangements. These arrangements connect regulation with digital and urban policy goals (3,38). This ensures that innovation progresses alongside accountability (10). This way digital lending can be regulated in a way that balances innovation and protection (1,2). Financial supervision, data protection, cybersecurity and social policy must work together (38,40). They must work together to prevent problems. Regulating lending requires a coordinated approach. It requires an approach to ensure that digital lending is safe and secure (35).

4. Financial Inclusion: Access, Equity, and the Politics of Credit

4.1 Beyond Bank Account Ownership

India's financial inclusion drive has undeniably widened the reach of formal banking. Mass enrollment initiatives linked to welfare transfers and digital identification have significantly increased access to formal banking (13,14,15). However, simply having an account does not guarantee real financial involvement (6,7). For many recipients, these accounts mainly serve as channels for government payments, not as means for saving or borrowing (6). True inclusion depends on how well services fit people's real economic situations (22). Households with unstable incomes might need credit during tough times. However, the design of loans—such as interest rates, repayment plans, and penalties can either help them through difficulties or make their situation worse (18,19). Therefore, we should assess inclusion by its role in promoting lasting financial security, not just by how many people it reaches (7,22).

4.2 Credit: Opportunity and Constraint

Working capital is frequently the difference between continuity and closure for informal enterprises (18). Traders need inventory finance; gig workers must maintain vehicles or equipment. In such contexts, access to timely liquidity can preserve livelihoods (6,17). Digital lending platforms have lowered documentary thresholds and, in doing so, widened entry into formal credit channels (8,11). Yet design matters. Short repayment windows and escalating charges can convert small loans into sustained obligations (18,19). Borrowers may cycle through debt in an effort to remain solvent (20,21). The critical issue is thus qualitative: does credit expand room for economic maneuver, or does it entrench dependency within digitally mediated lending structures (22)?

5. Rise of Fintech and the Architecture of Digital Lending

5.1 Technological Enablers

The expansion of fintech in India did not emerge in isolation; it rests on a digital backbone assembled over the past decade (4). Systems for checking who people are paying bills and using services are now all connected, which makes it possible to lend money to people from far away (37). We can use machines to check peoples identities with Aadhaar and it is easier to verify who people are online (13). We can also send money to people away using the Unified Payments Interface (4). More people have smartphones now (8). We can store lots of information on big computers that we can access from anywhere (36). All of these things have changed the way we get customers (9). We used to have to go to the bank in person to verify who we are. Now we can do it on our phones in just a few minutes (13). All of our information like our identities, bank statements and payment records are connected (37). It is easy to share with others. This makes it easy for lenders to work with lots of people without having to have a lot of offices and buildings (12). Checking peoples credit is now often done by looking at information on computers instead of by talking to people in person (23).

5.2 Alternative Data and Predictive Modelling

Digital lenders depart from traditional banking models by shifting emphasis away from collateral and formal credit records (8). Contemporary credit assessment increasingly relies on behavioral data from digital activity (12). Indicators such as transaction patterns, device information, online purchasing habits, and geolocation consistency can inform risk evaluation (23, 24). Sometimes, this is supplemented by a broader digital footprint (26). Machine learning techniques analyze these inputs to identify statistical links connected to repayment probability (12). This method is mainly predictive. Instead of securing loans with tangible assets, platforms assess creditworthiness based on behavioral signals (9). While this model has improved access for people without traditional credit histories (11), it also creates a lack of transparency (33). Borrowers often do not know which factors influence decisions, and historical biases in the data may be reflected in the algorithms (23, 24, 25).

6. Data Ethics, Algorithmic Bias, and Digital Power

Automated scoring systems are now a key part of digital lending (12). However, applicants rarely receive detailed reasons for their loan rejections or the interest rates for approved loans. When they do get explanations, those reasons are often brief. This lack of clarity makes it hard to challenge mistakes and lowers transparency in the process (33). Power shifts from clear decision-makers to technical systems, whose methods mostly

remain hidden from those affected (23, 33). The data that drives these models connects to social context. Historical patterns of credit distribution come from unequal access to income, assets, and opportunities. These patterns can be embedded in training data (23, 24). Factors such as geolocation stability or transaction habits can reflect existing inequalities (25). As a result, risk evaluations can reproduce disadvantage even without clear discrimination (23, 25). Moreover, loan applications often request extensive permissions for personal data. While consent is formally given, understanding may be limited. In the broader digital market, personal information holds economic value, linking access to financial services with ongoing data collection and monitoring (26, 27, 28). Concerns about privacy and data protection therefore become very important (40).

7. Regulatory Framework and Institutional Limitations

7.1 RBI Interventions

The rapid growth of app-based lending prompted regulatory attention at the national level. The Reserve Bank of India has assumed a central role in responding to concerns surrounding digital lending practices, including pricing transparency, data governance, coercive recovery methods, and the ambiguous status of intermediary platforms (1,2). Through its regulatory guidance on digital lending, the institution has sought to clarify lines of responsibility by situating accountability firmly within licensed and supervised entities (1). Under this framework, lending operations must be conducted through regulated actors such as banks and non-banking financial companies—thereby narrowing the operational space for standalone, unregistered applications (2). These interventions represent a recalibration rather than a retreat from fintech innovation (16). Technological experimentation remains permissible, but it is expected to function within defined supervisory boundaries (1). The effectiveness of this approach, however, will depend less on formal regulatory articulation than on the consistency and rigor of its enforcement (16).

7.2 Enforcement Challenges

Implementation presents more difficulty than rule design. The digital lending ecosystem remains highly dynamic, characterized by applications that frequently modify ownership arrangements, branding identities, and technical infrastructures (12). Operational structures often involve layered collaborations among technology providers, marketing intermediaries, and licensed financial institutions (12). Such distributed arrangements can blur the locus of responsibility, making accountability difficult to pinpoint when disputes or misconduct arise (33). Supervisory challenges are compounded by regulatory arbitrage (12). Certain actors position themselves as technological service providers rather than lenders, thereby distancing formal liability while retaining influence over credit assessment, pricing structures, and recovery processes (12). Cross-border data

hosting and the use of complex corporate entities further complicate jurisdictional clarity (35). Simultaneously, rapid market entry by new applications strains existing monitoring capacities (16).

Oversight of algorithmically mediated lending introduces additional demands. Assessing machine learning models, tracing data governance practices, and identifying cybersecurity vulnerabilities require technical competencies that financial regulators have only gradually begun to institutionalize (12,16). Absent sustained investment in expertise and infrastructure, supervision risks remaining reactive—addressing emergent harms rather than proactively mitigating systemic exposure (16,35).

7.3 Data Protection Gaps

Alongside financial regulation, data governance frameworks attempt to address the extensive personal information collected by digital lenders (38). Statutory principles consent, purpose limitation, minimization, and correction rights—are now formally articulated (38). Yet operationalizing these rights poses practical challenges (35). Effective enforcement depends on investigative authority, inter-agency coordination, and technical literacy (38). Delays in institutional strengthening or overlapping mandates can dilute oversight (35). For many borrowers, formal rights remain distant from daily experience. Legal recourse may be available in theory but difficult to navigate in practice, particularly for individuals with limited digital familiarity or constrained resources (40). Consequently, the gap between normative standards and routine compliance persists. Data protection risks becoming declaratory rather than transformative unless enforcement mechanisms mature alongside technological systems (38,40).

7.4 Consumer Grievance Mechanisms

Complaint mechanisms form an essential, though often overlooked, component of digital financial governance. Ombudsman schemes and institutional grievance portals exist (39), yet their accessibility varies. Awareness is uneven, and procedural complexity may discourage use (35). Informal workers and migrant populations, already managing unstable livelihoods, may hesitate to engage with formal complaint channels (22). Jurisdictional fragmentation compounds the problem. A borrower encountering harassment or data misuse may be uncertain whether to approach financial regulators, consumer courts, police authorities, or data protection bodies (1,38). This diffusion of authority can weaken practical accountability (35).

Strengthening grievance systems requires more than statutory provision. Simplified procedures, multilingual communication, time-bound resolution processes, and proactive public outreach are necessary if formal protections are to translate into tangible remedies

(39). Regulatory progress has been notable, but institutional capacity and coordination remain decisive variables in shaping outcomes within India's evolving digital credit landscape (16).

8. Socio-Economic Impacts on Urban Marginalized Groups

8.1 Informal Workers

A large share of India's urban workforce operates outside formal employment structures (6). Street vendors, construction laborers, domestic workers, delivery personnel, and app-based drivers typically navigate fluctuating earnings and limited social protection (22). Income instability shapes everyday financial decision-making. In the absence of predictable wages or safety nets, short-term credit often becomes a mechanism for managing rent, healthcare expenses, school fees, or work-related costs (18,19). Digital lending platforms have entered this space with speed and minimal documentation requirements (8,11). For workers excluded from conventional banking channels, such accessibility can appear transformative. Yet dependence on short-duration loans introduces a different set of pressures. Repayment cycles are frequently fixed, while incomes are not (18). When earnings fall short, borrowers may resort to additional loans to bridge the gap (20). Over time, accumulated fees and penalties can erode already thin margins (21).

Without unemployment insurance or meaningful income stabilization policies, debt functions as a substitute safety net (20,21). This substitution carries consequences. Persistent indebtedness may narrow occupational choices, reduce bargaining leverage, and intensify psychological strain (22). What begins as liquidity support can gradually reinforce structural precarity within urban labor markets (20).

8.2 Women Entrepreneurs

Women operating small urban enterprises often confront layered constraints. Asset ownership may be limited, mobility restricted, and caregiving responsibilities substantial (17). These factors affect access to collateral-based lending and influence engagement with formal financial institutions (6). App-based credit, by removing in-person interactions and documentation hurdles, seems to bypass some traditional barriers (8). However, digital mediation does not automatically neutralize inequality. Credit scoring systems trained on historical financial data may reflect gendered income patterns or interrupted employment histories (23,24). Risk assessments that treat irregular earnings as instability may disproportionately disadvantage women whose economic participation is shaped by unpaid care work (17). Bias need not be explicit to produce unequal outcomes (25).

Loan design also matters. Fixed repayment schedules that disregard seasonal or caregiving-related fluctuations can create stress rather than support enterprise growth (18,19). Ensuring equitable access therefore requires more than digital reach; it calls for scrutiny of algorithmic inputs, pricing transparency, and flexibility in repayment structures (1,23). Financial inclusion for women depends on whether credit products accommodate lived economic realities rather than abstract risk models (22).

8.3 Migrant Workers

Urban migrants frequently occupy informal jobs while navigating temporary housing and fragmented documentation (22). Address instability and limited local credit histories complicate entry into formal financial systems (6). Although digital platforms reduce geographic barriers, algorithmic assessments may interpret mobility as inconsistency or risk (23). Language compounds this challenge. Loan agreements, consent forms, and customer interfaces are often presented in dominant languages that do not reflect the diversity of migrant communities (35). Limited comprehension heightens exposure to unfavorable terms or hidden charges (35). Furthermore, unfamiliarity with complaint procedures may deter migrants from seeking redress when disputes arise (39).

The result is a combination of economic fragility and informational asymmetry. Digital access alone does not eliminate vulnerability; in some instances, it relocates risk into less visible contractual and data-driven domains (26,33).

8.4 Youth and First-Time Borrowers

Young urban consumers are a quickly growing group interested in digital credit products (32). Marketers often promote digital lending through social media, gaming, and lifestyle apps (32). They make borrowing appear easy and immediate. For students and young professionals with unpredictable incomes, this access may seem practical for handling short-term expenses (8). However, financial literacy levels vary greatly (35). People often engage in short-term borrowing without fully understanding the total interest costs or penalties (18). Platforms that prioritize speed and simplicity might limit opportunities for careful decision-making, obscuring long-term financial effects (33). Taking out small loans repeatedly, especially in cultures focused on aspirational spending, can lead to early debt issues (20,21). As a result, the consequences differ for everyone. The impact of digital credit depends on income stability, how products are designed, regulatory oversight, and the availability of broader social support (1,22). While access to credit can help individuals become more resilient and mobile, a lack of protections can worsen existing economic inequalities (10,26). Sustainable financial inclusion requires governance strategies that pay attention to varying vulnerabilities, rather than relying solely on technological standardization (22,34).

9. Comparative Lessons from Global Contexts

Countries like Kenya and Indonesia have set up centralized app licensing systems and limits on interest rates (35,36). China's tightening of regulations on online microlending shows the dangers of quick fintech growth without protections (36). India can learn from this about centralized oversight, requirements for transparency, and campaigns to educate borrowers (1,35).

10. Integrating Fintech into Accountable Urban Governance

Incorporating fintech into urban governance cannot focus only on regulation after the fact. As digital lending integrates with payment systems, identity infrastructures, and service delivery platforms (4,13), oversight must change accordingly (1,38). Credit technologies connect with welfare systems, labor markets, and data architectures (22,27). Making sure these connections do not increase inequality needs institutional reflexivity and coordination (29,30).

10.1 Algorithmic Audits

Credit allocation is now frequently shaped by automated scoring systems (12). Given the distributive implications of these tools, periodic and independent scrutiny is necessary (23,33). Embedding audit mechanisms within supervisory frameworks ensures structural accountability (1,33).

10.2 Municipal Collaboration

Municipal bodies often observe distress patterns first (29). Structured information-sharing between regulators and city administrations may strengthen preventive oversight (1,16). Integrating digital finance monitoring with urban policy planning situates credit within livelihood ecosystems (30,34).

10.3 Participatory Governance

Community organizations frequently encounter borrower grievances before regulators (22). Institutional dialogue can surface emerging risks earlier (35). Participatory governance enhances legitimacy and inclusiveness (31,34).

10.4 Financial Literacy Initiatives

Borrowers must understand interest, penalties, and data sharing implications (35). Digital finance education aligned with rights-based data awareness strengthens informed consent (38,40).

10.5 Grievance Redress

Accessible and time-bound grievance mechanisms enhance trust (39). Coordination between financial regulators, consumer protection bodies, and data authorities reduces fragmentation (1,38). Effective enforcement determines whether protections are real or merely declaratory (35).

11. Conclusion: Smart Cities Require Smart Governance

Fintech-enabled lending has changed credit markets in India (8,11). These platforms have expanded access for groups traditionally excluded by banks (6,7). However, rapid technological expansion without safeguards introduces systemic risks (10,23). Issues like excessive data extraction and inconsistent enforcement can transform digital access into vulnerability (26,35). True financial inclusion in cities requires governance frameworks that ensure accountability, transparency, and rights protection (1,38,40). Sustainable urbanization depends on strong institutions that embed fairness and distributive justice within digital economies (3,29,34). Without regulatory coherence and enforcement, fintech growth may fail to produce transformative inclusion (22).

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Chapter 13: From Pavement to Platform: Smart Technology Integration Strategies for Street Vendors in Marginalized Urban Quarters of the Global South

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Abstract

This paper examines how platform technologies can empower rather than displace street vendors in Global South cities, challenging dominant smart city narratives that systematically exclude informal economic actors from digital urban transformation. Drawing on urban informality literature, platform economy scholarship, and spatial justice frameworks, this viewpoint synthesizes evidence from vendor communities across Mumbai, Lagos, and Bangkok, analyzing technology appropriation strategies within resource-constrained environments. Street vendors develop sophisticated counter-platform strategies when given agency over technology design. Cooperative digital ownership models demonstrably outperform externally-imposed solutions, improving vendor resilience, spatial security, and collective bargaining capacity against displacement pressures. No existing research integrates platform economics, vendor-led cooperative technology design, and anti-displacement urbanism within a unified Global South framework. Empirical validation across diverse cultural contexts remains necessary. Future research must prioritize vendor-led co-design methodologies. Urban planners gain actionable frameworks for inclusive digital economic zoning and vendor-protective smart city policies. Marginalized vendors, predominantly women, achieve genuine digital economic sovereignty within increasingly surveilled urban environments.

Keywords: Platform technologies, informal street vendors, digital inclusion, spatial justice, cooperative urbanism

1. Introduction

The pavement serves as a work site for street vendors who operate their businesses throughout the Global South's megacities and secondary urban areas. Street vendors operate their businesses through daily battles for space and their right to work in urban areas that smart city projects have created without recognizing their existence. The vendors in Mumbai's main roads and Lagos's unregulated markets and Bangkok's famous night markets create economic systems which support their communities while absorbing extra workforce members. The ecosystems face multiple threats because of municipal eviction operations and climate changes and economic disruptions and the rising impact of digital urban governance together with platform capitalism [1,5].

The Global South metropolises have launched smart city initiatives which create a permanent conflict between two opposing forces. Digital technology implementation serves as the solution which governments and development agencies use to achieve urban efficiency and formal economic growth and create opportunities for all citizens. The smart city programs use technological infrastructure which delivers surveillance systems and cashless payment requirements and digital market systems and sensor-based area management tools that benefit formal business partners and technology companies and city governments instead of the 2.5 billion informal workers who depend on street economic activities through their business operations [12,14]. Street vendors represent the most visible and least protected group within this workforce because they must pay for all costs that digital urban development creates yet they receive only a small portion of its advantages [3,7].

This paper argues that this outcome is neither technologically inevitable nor economically necessary. The research shows that platform technologies which developers create for their vendor communities will deliver actual benefits to vendors through enhanced work opportunities and their ability to establish shared control over informal economic activities. The research synthesizes evidence from vendor communities in three Global South cities Mumbai, Lagos, and Bangkok through the analytical lenses of urban informality theory, platform economy scholarship, and spatial justice frameworks.[10,25] The central thesis advanced is that cooperative digital ownership models, grounded in vendor agency and co-design methodology, systematically outperform externally imposed technological interventions in generating durable improvements to vendor resilience and spatial security.

The paper begins with a literature review which studies smart urbanization and vendor vulnerability. The research then investigates platform technology development in informal economic systems. The research uses spatial justice as a framework to analyze digital policies which protect vendors. The research presents technology models which cooperative organizations develop in the studied cities. The discussion combines all

elements into a comprehensive Global South framework. The study results show how they affect urban planning work and point to upcoming research areas.

2. Smart Urbanization and the Structural Exclusion of Informal Vendors

2.1 The Smart City Paradigm and Its Silences

The Global South has adopted smart city discourse into its urban governance system with great speed. The Smart Cities Mission in India and the Smart City Blueprint in Bangkok and the digital infrastructure projects in Lagos demonstrate how municipal governments use technology-based urban development to achieve modernization goals and boost their economic competitiveness and deliver better services to citizens. Yet a growing body of critical urban scholarship identifies these programmes as reproducing, and in certain configurations intensifying, longstanding patterns of spatial exclusion and socioeconomic inequality [12,13].

The smart city imaginary assesses cities through two main categories which include formal business operations and taxable business activities and data records of their residents and their actual operational status and it treats informal activities as an essential street which needs to be handled and solved through street maintenance operations [14,15]. Street vendors whose economic activities spread across multiple locations and whose transactions remain hidden from digital systems and whose legal status exists in most city jurisdictions as undefined face two different kinds of invisibility Street vendors face two different types of invisibility because smart city platforms do not include their data and the physical and legal changes that these platforms created on streetscapes serve to exclude them from public view [4,5].

Research from African urban contexts demonstrates how smart city rationales have been deployed to legitimize vendor displacement campaigns which operate under the guise of urban modernization. The Nigerian cities face increasing street vending dangers because municipal authorities use street vendor prohibition as a method to maintain public cleanliness and social order while creating an environment suitable for business through the application of smart city design standards [5,6]. The operational framework of street vendors in East African cities renders them unable to engage with political decision-making processes even though they serve as essential components for maintaining urban food security [7]. The observed patterns demonstrate that technological advancements which lack intentionality for inclusive participation create conditions that exclude vendor communities from accessing potential benefits.

2.2 Vendor Vulnerability in the Context of Digital Transformation

Street vendors face multiple vulnerabilities which the digital transformation of cities creates and which it might lessen under specific circumstances. The documentation of physical vulnerability shows how people become vulnerable to weather and pollution and

health risks at their workplaces [8,9]. Informal tenure arrangements and the lack of vendor-protective zoning frameworks create structural economic vulnerabilities which lead to income instability and capital restrictions and displacement from their homes [4]. The social vulnerability of women vendors who experience market space sanitation shortages and harassment and who work as caregivers creates an intersection with all three vulnerability dimensions [3,19].

Digital transformation creates additional vendor vulnerabilities while it brings in elements that can protect against those vulnerabilities. The requirements for cashless payments prevent vendors from reaching customers who lack digital payment skills and necessary equipment. The food delivery systems which operate on platforms create unbalanced dependencies that enable vendors to produce value while they receive no protection for their operational spaces or their ability to speak as a group. Smart public space surveillance systems create additional enforcement challenges for vendors who already face conflicts over their right to use urban spaces [16,17]. Digital technologies provide vendors with new opportunities to expand their market presence and collaborate with others and secure their payments and track their physical activities to help them negotiate better deals with city officials [11,21].

The critical question is not whether platform technologies will enter the street vending economy they already have but who designs them, who owns their governance structures and whose interests they serve during the inevitable conflicts between vendor livelihoods and urban formalization agendas [10,22].

3. Platform Technologies: From Extraction to Emancipation

3.1 The Political Economy of Platform Design

The platform technologies function as non-neutral system components because they implement specific governance frameworks and ownership models together with value extraction methods which define operational benefits and associated expenses[10] Main digital platforms used in urban informal markets through their ride-hailing and food delivery services and e-commerce platforms demonstrate a pattern of creating unstable work conditions through their use of algorithms and their disruption of physical spaces across both Brazilian urban areas and South Asian street food markets [11].

The critical political economy of platform design establishes two platform categories through which mainstream platforms create digital versions of capitalist property rights while cooperative platforms share their ownership and governance and surplus distribution with all members of their community [10]. The street vendor community receives two major benefits from the distinction between these two platforms. Vendors who use externally owned platforms gain more market access but they lose their business control because they must pay fees and rely on corporate algorithms to make decisions.

Vendors who use cooperatively owned platforms keep their governance rights and share in collective surplus benefits while they create institutional capacity which helps them negotiate better with municipal authorities.[29].

The study from Brazil's informal economy shows that community digital organizations are transforming economic systems through their creation of online platforms which serve social justice goals instead of commercial purposes [11]. The research shows that technologies which extract resources for platform economies can be transformed into tools for liberation when vendor communities control their development instead of external funders [30].

3.2 Technology Appropriation in Resource-Constrained Environments

Street vendor communities demonstrate active engagement with technological advancements. The Global South vendor communities demonstrate advanced technology usage through their ability to modify existing digital tools for unpredicted uses which enable them to create collective partnerships while obtaining market knowledge [1,6]. The messaging groups establish two functions which include serving as unregulated marketplaces and providing advance notice of upcoming enforcement operations. QR payment codes create digital footprints that support spatial rights documentation. Social media platforms operate as three distinct functions which include marketing, advocacy, and community organizing [20,22].

The appropriation practices show that vendors face digital challenges because of structural barriers which prevent them from using digital tools. The institutional framework exists to control vendor access to their transaction data and market entry which they lack direct control over and judicial power to advocate for their shared digital capabilities. The existing structural problems demand institutions to provide better solutions than delivering more modern technology systems to vendors. The existing structural problems require institutional systems that provide vendors with real control over their technology development and administrative decision-making process.

4. Spatial Justice as a Framework for Vendor-Protective Digital Policy

4.1 Theorizing Spatial Justice in Urban Informality

As a theory, spatial justice places prominence on the geographical aspects of inequality, stating that the geographic dispensation of urban resources, opportunities, and risks is not territorial; rather, its spatial allotment is bestowed upon political management, which generates and reproduces uneven spatial advantages and disadvantages throughout the city.[25,27] Spatial justice works at several levels concomitantly for street vendor communities: microscale seller spatial rights in life as related to stall locations and customer traffic flows;[1,4] meso-scale spatial rights in relation to physical planning and the network of market streets or street vendor hubs;[24,28] and macro-scale structural

rights vested in vendors vis-a-vis right to the city in Thailand and the future smart city planning policies[12,15].

The nexus between digital technologies and the livelihoods of vendors, as informed through the lens of spatial justice, is analytically potent, precisely because the framework insists on interrogating not only whether vendors have access to the technology (a rather standard framework in discussions around digital inclusion) but also concomitantly, how digital technologies ruin the spatial ambience within which vendors actively exercise their livelihood rights. This shows that the operation of smart city sensor [3,26] networks generating information regarding the locations of vendors is a spatial justice issue due to the continuing application of anti-vending ordinances and when digests platforms create records of the transactions that track the economic contributions of vendors within the city governance, this shows a spatial justice issue on the other side [16,23].

4.2 Digital Inclusion as Spatial Empowerment

Digital inclusion frameworks as typically conceived emphasize just physical access to ensure marginalized populations can use digital technologies, without sufficiently addressing the conditions of use that allow for digital access to be translated into empowerment rather than further exposure to surveillance and exploitation [16 17, 22]. Such a distinction is central in the case of street vendor communities; universal phone ownership for all vendors, without any control on vendors, however, over the data their devices generate or about the platform governance structures, regulating their economic activity, could mean increasing vulnerability, rather than justice, to displacement [14,20].

A grounded spatial inclusion framework for street vendors in the digital realm would address four interlinked dimensions, which are access-providing reliable and affordable connectivity to vendors; capacity-building for vendor digital literacy to serve for vendor-defined purposes, rather than vendor training for corporate onboarding [18,19]; governance-allowing vendors to have significant control over platforms and data systems mediating their economic activity; and spatial rights-that the digital recording of vendor activity must enhance (rather than compromise) the security of the vendor's space within the city [24,25]. These dimensions and their interrelationships are represented in Figure 1, and beyond that, technology models are compared across these dimensions in Table 1 (Section 6.1).

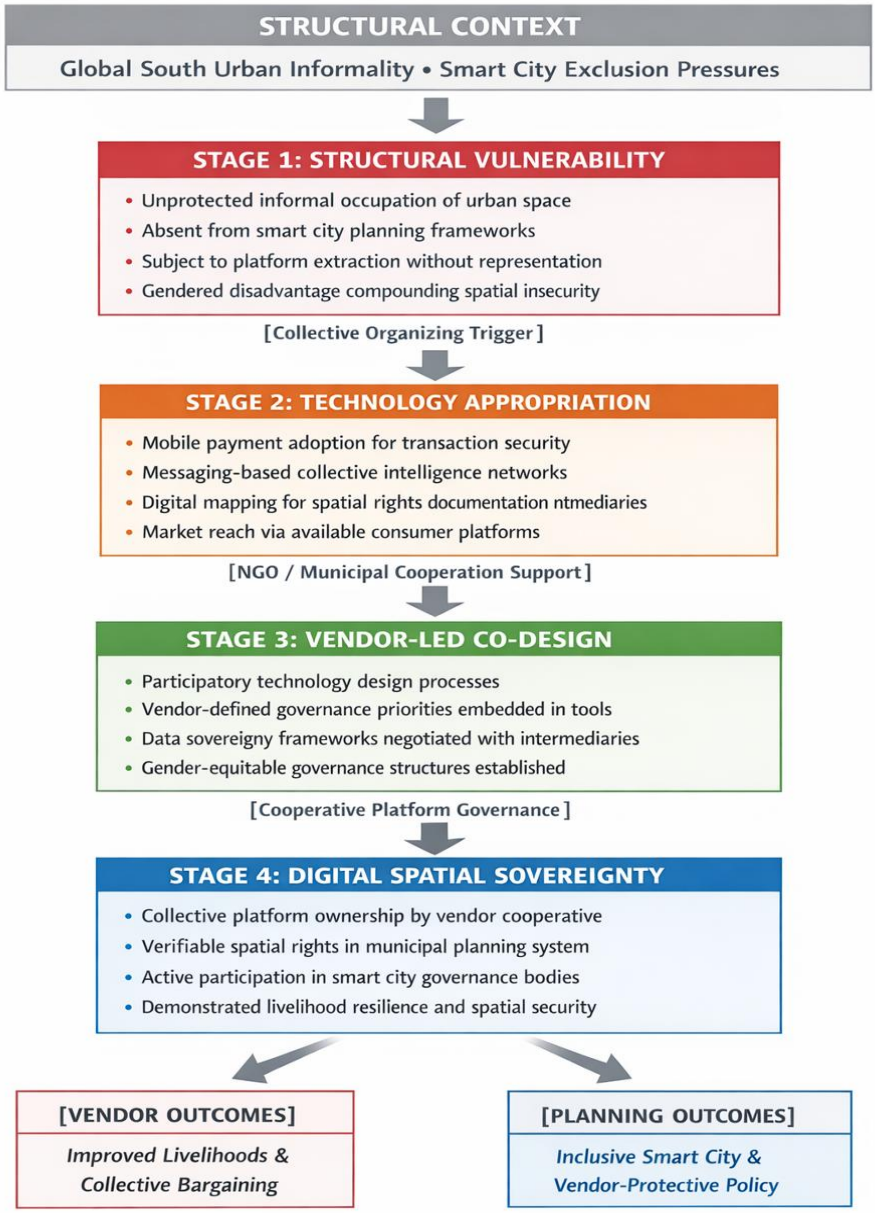


Figure 1: Conceptual Framework from Pavement to Platform: Vendor-Centred Digital Empowerment Pathways

Source: Authors Creation

Note: All stages are interacting, reflecting non-linear progress shaped by city-specific institutional, political, and economic contexts (Mumbai, Lagos, Bangkok).

Figure 1 illustrates there is a four-stage pathway to empowerment by which street vendors in the Global South cities could move away from being passive subjects of smart digital urban transition to being cooperative agents of platform governance. Structural Vulnerability (1st stage) is the baseline condition of these unprotected vendors who stand in the way of being displaced and who have been excluded from the plans of the smart city. The phase of Technology Appropriation (2nd Stage) is one in which vendors start using existing digital tools for collective purposes, a purpose for which these technologies were never created by the design teams. During this time, social networks of informal solidarity are established. The third stage, Cooperative Platform Design, is indicative of the transition to vendor-design of digital tools, facilitated by institutional intermediaries. Finally, the fourth stage, in Digital Spatial Sovereignty, starts to suggest the digital communalism among vendors, symbolized by collective ownership of platform, spatial rights, and visibility for the modern world to understand whether livelihood resilience is progressing. The course structure is in a non-linear sequence given the fact that the pace of change differs markedly across the three study cities.

5. Evidence from Mumbai, Lagos, and Bangkok

5.1 Mumbai: Between Formalization Pressures and Mobile Payment Adoption

The streets of Mumbai-the vending ecosystem-have been operational within a set of national level legislative framework, in which the Town Vending Committees (TVC) intervene into the vendor spatial rights as a participatory body. Although this was institutional architecture, implementations more often became one-sided and got subordinated to infrastructure development requirements, where for the smart city corridor intervention's sake, vendor clusters were displaced without compensation and proper relocation, with or without TVC intervention [12,28]. Digitalization run its work on two parallel lines: one from the government or city up to the municipal level coming with compulsion for all the vendors to adopt them, while mobile-money-apps available in the realm that vendors themselves adopt them in large numbers, relatively expanding their patron base and reducing handling of cash float.

The very rift between these streams reflects the structural tension that threads through the wider arguments made in this paper. City digital infrastructure is grounded on governance and revenue collection; vendor-assembled mobile payments are fixed on commerce dictated by vendors. Wherever vendors have coordinated their functions through women's groups and hawker unions, vendors negotiated better the deployment of digital infrastructure securing some payment terminals aligned with their spatial patterns rather than municipal aesthetic preferences [3,19].

5.2 Lagos: Informal Market Intelligence and Collective Technology

Lagos presents an interesting example in which the relative weakness of formal governance institutions is ironically creating a space for autonomous innovation stimulated in part by vendors and their networks. The evidence also holds that informality is casting its long shadow over Lagos' informal markets, giving rise to highly sophisticated collective intelligence systems existing alongside layered digital information messaging networks through which vendors share enforcement intelligence, commodity price data, and customer referrals in real time across market clusters covering multiple urban neighborhoods [5,6].

Available consumer technologies form the base hardware and software infrastructure of these systems, exhibiting high levels of vendor-designed purpose alignment and governance at a collective level. The only issue is that these systems are fragile, registered under the terms of service of external platform companies, and unable to issue persistent spatial rights documentation. Lagos now calls for institutional intermediaries to formalize and strengthen these already equipped with vendor-driven architectures instead of the imposition of externally designed technological solutions [7,11].

5.3 Bangkok: Tourism-Integrated Vending and Platform Dependency

Rolls-out of all the three cities featured in the study, Bangkok has developed the most intricate interface with platform technologies, driven heavily by its incorporation in the tourism economy. Food delivery apps and tourist-oriented digital platforms have evidently captured a significant slice of the pie by rendering increased market reach at the expense of fee extraction, platform dependence, and the privileges given to vendors whose items are in line with aesthetic standards-matches proposed by the algorithms [4,8].

In this case, Bangkok is a textbook example of the "platform trap" facing street vendor communities worldwide: digital connectivity can widen the market, but it also introduces further dependencies that would eat up vendor autonomy, create value for the platform owners and divert economic surplus upwards. The most vulnerable vendors to the trap are individual operators without any membership to any vending associations, meaning they have no say or voice, against all terms imposed by the platform [10,17]. The antithesis in Bangkok's vendor cooperative sector is an argument put forth that suggests that through the alliance with vending associations, members have effectively negotiated better terms with the platform. This, in turn, has, by some chance, led to the creation of jointly medium-sized markets, collectively governed by local vendors.

6. A Unified Framework for Vendor-Protective Smart City Policy

6.1 Cooperative Digital Ownership: Core Principles

Drawing from Mumbai, Lagos, and Bangkok, with the theoretical frame of cooperative urbanism, spatial justice, and platform economics, this paper suggests an inclusive and cohesive conceptual framework for vendor-protective smart city policies based on four primary principles [10,29].

The first principle is digital co-design, which asserts that the technological solutions for vendor communities must be mostly designed in their interest, whereby they participate at the center of vendor-defined priorities and governance [21,23]. The second principle, cooperative data sovereignty, stands for the idea that the vendor community must co-own all data produced by vendor economic activities, rather than being the sole property of platform companies or municipal authorities [11,16].

The third principle is *Spatial Rights Digitization*: Digital tools must be employed to enhance and not to infringe upon vendor rights, through the organization of mapping and transaction documentation to support vendor involvement in urban planning [24,26]. The fourth fundamental principle is participatory governance: vendor digital platforms must harness governance mechanisms ensuring ongoing vendor community involvement in the evolution of the platform and that external interests do not capture or influence the regulatory [13,15].

Table 1: Comparative Framework of Technology Integration Models for Street Vendors in Global South Cities

Dimension	**Externally Imposed Model**	**Vendor Co-Design Model**	**Cooperative Ownership Model**
Design Authority	Municipal/Corporate	Shared: vendors + intermediaries	Vendor community primary
Data Ownership	Platform/Municipality	Negotiated	Vendor cooperative
Spatial Rights Impact	Often negative (enables displacement)	Neutral to positive	Positive (rights documentation)
Livelihood Resilience	Low creates new dependencies	Moderate	High collective risk distribution
Collective Bargaining	Undermines (individual dependency)	Partial	Strong (institutional platform)
Gender Equity Integration	Typically, absent	Variable	Explicit women vendor governance

Evidence Base (City)	Bangkok platform apps	Mumbai TVC integration	Lagos collective intelligence
Scalability	High (corporate infrastructure)	Medium (requires intermediary capacity)	Medium-High (federation models)
Sustainability	Dependent on platform company	Institutionally supported	Highest community self-governance
Smart City Compatibility	High (aligns with surveillance logic)	Moderate	Conditional on rights framework

Table 1 presents a comparative analysis of technology integration models based on relevance and indicates that cooperative ownership is a superior option in terms of livelihood, spatial rights, and collective bargaining. The co-designing option is a viable interim solution in case full cooperative ownership is not yet institutionally feasible. The model which is externally imposed is scalable but tends to create dependencies on the platform and reduces spatial rights on such a large scale. The longtime resilience of vendors will be diminished.

6.2 Institutional Preconditions for Vendor Digital Empowerment

On the other hand, the cooperative digital ownership model does not just appear spontaneously within such kinds of vendor communities or even if they are very sophisticated in the current paradigms of technology appropriation; it needs institutional support that urban planners and policymakers can actively nurture [13,29]. These include the following: legal recognition of vendor associations as legitimate stakeholders in smart city governance processes; city data-sharing frameworks in so far as they provide data to coop vendors to support their spatial rights claims; funding schemes to facilitate vendor co-design processes that avoid NGO or corporate dependence; and regulatory frameworks to stipulate minimum transparency requirements and set the standards against which coop ventures independently govern their own platforms commercially [23,30].

The cities that are leading the way in this regard and concentrating most on aligning themselves with vendors are incredible evidence of what one can aim for, and these help to engage with the vested interests and barriers on the way as with evidence [28,29]. Nowadays, it has thus become an issue to convert proof of vendor cooperation technology

effectiveness into political interest, thus generating the urge to effect the change in smart city governance that is dominated by vendor interests and urban modernization.

7. Discussion and Implications

Assembled evidence in the text underlines a clear conclusion that street vendors are kept out of smart city digital transformation not for a lack of technology, but due to policy choices. There is every possibility that vendors, when given the structural opportunities, engage in the appropriation, co-designing, and collective governance of digital technologies that enhance their livelihoods and spatial rights. It is not the vendor but the architecture where the barrier lies. There is an absence of governance frameworks recognizing vendors as rightful digital stakeholders [10,12,16].

This reveals a need for inclusive digital economic zoning frameworks targeted at urban planners that explicitly respect vendors' spatial rights as rights qualified in various smart city planning instruments and require the planned city procurement to enforce a release requirement on vendor-community participation [4, 24]. Similarly, for individual platform developers, more cooperative forms of ownership provide higher gains than those within extractive platform models in the informal economy [11, 29]. For organizations working alongside informal workers in vendor communities, tech co-design and collective governance capacity-building are recognized as key areas requiring investment in support-for-vendor programming [19, 21].

There is a need to really lift the feminist dimension. In most Southern urban centers, street vending is the occupation of mostly women and yet, women are hardly among those represented on the technology governance structures that rule over the very physical spaces they occupy in the city [3, 19]. For the effective emergence of a vendor-centric smart city policy, gender should be factored into it to make sure that cooperative digital ownership structures, similarly, are built to be avenues, as opposed to perpetual reformers, of governance that excludes women from decision making [8, 27].

This paper's limitations acknowledge that evidence synthesis relies mostly on published research outputs rather than based on original fieldwork. While the three cities of the study represent great diversity within the Global South, they cannot completely fit in with existing factors of institutional, cultural, and economic contexts campaigning on street vending. More empirical validation of this element on more diverse city settings using a co-research vendor-led approach is next in the research agenda [22,25].

8. Conclusion

Street vendors in Global South cities seem to be at a very incongruous standpoint in the urban governance agendas that reside on technical improvement. These vendors are amongst the most economically important yet institutionally marginalized players in informal urban economic settings, yet they are not and are rarely expected to fit into the

calculative approach of smart city designs. Their exclusion from these digital infrastructures of the smart cities is simultaneously unfair; these high-cost, precisely crafted technologies could have thus far been used in such manners that may have resulted in hurting them. I contend in this paper that programmable technologies, imbued with cooperative governance schemes and co-designed with vendor communities as genuinely empowering tools, can bring power to build survival incomes, rights to space-saving protection, and bargaining possibilities against the operations of displacement heavily accentuated by smart-city-led changes.

The framework brings together platform economics, vendor-led cooperative technology design, and spatial justice theory within Global South analytical architecture. This provides a conceptual springboard for urban planners, technology designers, and citizen activism aiming at equitable digital urban shifts. Realizing this would require innovation at the institutional level: governance frameworks that represent the communities of vendors as digital stakeholders, data sovereignty arrangements for information ownership vested in vendor cooperatives, and participatory co-design methods placing vendor agency at the heart of technology development.

There is no need for a walk of displacement of persons from their stores to meet the demands of other streets. A much more worthwhile walk-a walk of digital economic sovereignty-may be underwritten lots of deliberation by institutional policy envisaged for sustaining millions of vendors who run the informal urban economies of cities from the Global South. Such considerations make it evident here: their bridging from the margins toward the core of smart city governance is a demand of justice in relation to smart city presents for the inclusiveness, resilience, and justice sought after.

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Chapter 14: Smart Crowd Management and the Politics of Public Space in Emerging Cities

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Abstract

In this paper, Tejas Dixit, Ritik Kumar, and Indhumathi Raman, shall examine the 2025 Maha Kumbh Mela as a critical case study in Global South AI surveillance, arguing that the AI-based crowd control system incorporated reveals the goals of smart city technologies. We analyze Kumbh's AI architecture: the 550 cameras enabling crowd estimation at 90–95% accuracy, facial recognition systems that reunited over 250 missing persons within 24 hours, and behavior detection algorithms trained specifically on Indian crowd dynamics using training data from 2024. While a surface level outlook on these activities showcase these technologies as unbiased tools for pilgrim safety and stampede prevention, this chapter explores how constant public surveillance at gatherings harbours prejudice and opens doors to misinterpretations. Expert human analysis is needed to dodge these fallacies and to prevent misconceptions. Hence they are not a magical pill that can readily solve all our problems without equivalent costs associated. In this paper, we shall look at the case of Maha Kumbh Mela. We shall also explore the dynamics of facial recognition, the metrics involved in their accuracy and their potential downfalls. In the end we find that the 33 million misidentified people disproportionately belong to marginalised groups such as rural or religious minorities populations. Concerns over philosophy of consent adopted by the state are also raised as we see that most users were not aware of the system's methodology. Secondly, consent in public space seems to be structurally impossible for populations whose safety depends on state visibility; and third, how data extracted from Global South public to be fed into AI supply chains replicates British Colonialisms and the concept of rule without representation.

Keywords: AI surveillance, Kumbh Mela, digital colonialism, political ecology, Global South, facial recognition, smart city governance, decolonial ethics

1. Introduction

Crowd control and management has been a requirement in every establishment for a

long time. It is quite unthinkable to even go somewhere without any security of guides or maps or marked paths. Indeed, crowd control is essential for ensuring a smooth experience and reducing the chances of a crime or mishap to take place[1]. Traditionally, crowd control has required several trained staff and law enforcement, who quickly get overwhelmed when the scale is increased. First responders and emergency services also struggle to work, and everyone is left feeling quite tense not knowing when and where the next stampede will take place. Overcrowding at public events is a problem that eats people worldwide, only to be exemplified in cases of South Asia. Reports of injuries, unruly behaviour, fights and heat strokes are common, as well as people going missing, possessions being stolen and people getting harassed[1].

The Maha Kumbh Mela is one of the largest religious festivals in the world, offering many challenges as a temporary city of faith is constructed for the event. The event is hosted every 12 years on the riverbanks of the Prayagraj River, drawing a large crowd of devotees[2]. In 2025, over 660 million pilgrims pooled at the union confluence point of Ganga, Yamuna, and the mythical river Saraswati: 'sangam.' [2] For over forty five days, a single nomadic city consisting of tents hosted a population greater than some countries. The movement to the ‘sangam’ permits very little delay and strong haste in every traveler. As such, festivals like Kumbh become focal points for various accidents, overcrowding, and emergency cases, which are often difficult to manage by human resources alone. These problems are exacerbated by the untrained staff, who are oftentimes shorthanded to manage the various problems that can occur.

It is difficult to gather a group of specialized volunteers or personnel, and an overreliance on police leads to blind spots in their perimeters. Such events, hence, become a breeding ground for criminals like petty thieves or harassers, with the hand of law so occupied in trying to guide a crowd in the correct direction or verifying the faces of everyone.[3]

Therefore, Kumnh was the perfect opportunity to use AI and its various capabilities in managing and controlling crowds.About 550 AI enabled cameras and a specialized, task oriented integrated command and control center allowed processing of video data from all over the festival in real time.[3]Computer vision models trained specifically on Indian crowds were able to, with high accuracy, do the following:

1. Detect and recognize faces
2. Count the size of crowds.
3. Predict abnormal behavior like fights or stampedes.

By having the assistance of the AI facial recognition technology, the staff was able to cross reference video footage with descriptions given of lost and missing people in the

crowd. Hence, uniting over 250 families on the first day alone.[4]

The models also calculated crowd density at every spot, creating maps that allowed them to see the flow of people. Unexpected behaviors can be raised as an alert to check for illegal behaviors such as breaking traffic rules, barricade jumping, and violating public property.[5] The chief minister of Uttar Pradesh hailed the Digital Maha Kumbh as proof that modernity and tradition could harmoniously coexist. The implementing vendors celebrated technical milestones: 95% accuracy.[5]

However, questions must be raised regarding the accountability and neutrality of such intelligent models. As trials get underway regarding their reliability as court evidence, we must look into what bias affects their judgement.[5] For example, we must check if the model is able to recognize faces of all ethnicities and doesn't favor any particular social group by hammering on some people harder than it does on others. A lack of a public vote also raises concerns, as no consent was taken from pilgrims or anyone regarding the use and testing of artificial intelligence models on a holy occasion meant to represent faith in people and invoke safety in their hearts. However, it is difficult to remain peaceful during what is meant to be a monumentally sacred occasion when you know your behavior is being turned into a number by an AI model.[6] This number will then be compared to a threshold to decide if a given person should be regarded as suspicious or not.

The reported accuracy of over 95%, while being very impressive, leaves the error margin at 5%. When applied to an audience of over 600 million people, that means over 30,000,000 people were either not identified or wrongly identified[6]. A lack of accountability from AI means there is no one to blame for such mistakes, and no responsibility is taken. No action is taken to compensate for the damages done, and it is instead treated as an accident instead of something that could have been prevented.With the infrastructure for the surveillance still remaining permanently in Prayagraj, we can expect AI to enter the field of social justice.

2. AI Architecture at the Kumbh

2.1 AI as a tool

The 2025 Maha Kumbh Mela was the hotspot for the most large-scale implementation of AI-based crowd control in history. Yet for all the investments and computational power put into the project, the officers consistently state that AI did not replace human judgment; it merely supports the human inspector[6]. With more sensitive parameters, it is able to detect things the human eye often misses. This largely reduces the room for error and also serves to give a platform for the data to be supported on.

As Superintendent Amit Kumar, the officer in charge of the Integrated Command and

Control Center (ICCC), explained, the technology left little to guesswork, only realtime data to ensure objective decisions towards human safety. The use of that data and decisions regarding it were under human hands. The AI does not replace ground personnel, as guided signs and officers manning posts are still needed. Clearly marked exits, safety precautions such as installations of fire extinguishers are still needed. The AI does however reduce the pressure on human hands by handling what it can. In times of short staff, it can be a boon. After all there are things money cannot buy.

2.2 Role of the Integrated Command and Control Center

At the base of the operation sat the Integrated Command and Control Center (ICCC) in Prayagraj, a 24/7 nerve center complemented by a disaster recovery hub in Bangalore. Staffed by over 400 personnel across four command centers, including police officers, technical staff from implementing agencies, and civil administrators.

The ICCC's structure reflected an ideology which was implemented with effort: technology serves human coordination, not the reverse. Multiple workstations enabled management of the crowd without interfering with their activities. This allows different departments to view the same data simultaneously while bringing their distinct expertise to bear on interpretation. A police officer reading a crowd density alert brings different knowledge than a civil administrator or a technical specialist does. Critically, the ICCC was supported by an extensive ground presence of 60,000 police officers and security personnel deployed across the festival grounds. Every alert raised was immediately allotted to a staff member to check.

2.3 The Camera Network Eyes Feeding Human Judgment

We see a great amount of planning when it comes to the placement of the over 500 AIenabled cameras. They are placed around entrances and exits, allowing monitoring of most people's dense areas in the entirety of the 10acre land. Moreover, data was supplied using drone footage. These multiple eyes calculated the number of people in a crowd to a very high accuracy. All this means to say that while we saw a dip in human contribution initially during the rise of AI globally; we can predict that more jobs will open up as projects that were considered impossible before can be brought to reality. This employs many people as supervisors and experts to consult for every step. However, this does bring a sense of distrust which makes people wonder if all this is really worth it.

2.5 Training and Customization: Human Expertise in Model Development

The AI models deployed by Vehant Technologies, the vendor responsible for the full scale deployment of the crowd management system, worked with a custom approach because "various models available... being used by various technology providers across

the globe" were inadequate for the Kumbh's unique conditions. Human expertise drove the innovation needed to handle grand scale. Models trained on small bar crowds are not suitable for the needs of the Global South.

Training began nearly a year before the main event, using footage from the 2024 Magh Mela, a smaller but similar gathering, to teach the models that they need to understand human behavior under similar circumstances. A combined team of staff personnel and programmers cooperated to gather and pre-process training data, which involves cleaning the data by removing distractions and removing the missing data. A lot of work also goes into fully labelling the data points to finally prepare a stable ecosystem. Every annotation, every refinement, every threshold adjustment was a human decision which formed the machine behavior and its mind.

This ongoing training continued through the Kumbh itself. As Shailendra Kumar Singh of Vehant Technologies claimed that their team scanned the ground and communicated with the researchers on the command center at Prayagraj who dedicated hours to training of the model and annotation of data in real time. The annotations result in faster learning in these models by labelling everything the model sees. The models learn by humans training them on data prepared for them.

Over 60,000 staff members and police officers were the key in making this all come together, being the first responders to every alert and analyzing the data presented by the various video feeds set up throughout the event.

2.7 Beyond Crowd Counting: Additional AI Applications with Human Oversight

The same human decision centric concept extended to other applications of AI for crowd control, as we saw in Kumbh Mela:

A. Oneway movement monitoring detected individuals moving against designated crowd flow: using heat maps for detecting crowd density, we can see where a crowd moves and can even draw vector arrows. If the crowd moves in illegal ways, such as on the wrong path or in the wrong direction, then an alert can be raised for a human to confirm.
B. Barricade jumping detection alerted officers about the offenders: By installing cameras near barricades, a very simple and novel method can be used to see if someone fences over a barricade. By checking on the color value of the fence, we can know when someone or something obstructs the view and can raise an alert. We can assume that any object not part of the fence is a cause of concern for a human to verify.
C. Vehicle tracking and parking management tracked car license plates, preventing

stolen vehicles from leaving the premise and also tracking the movement of the cars. This also informed the users about any empty parking spaces available.

D. Underwater drones provided 24/7 surveillance of river depths during holy dips and aided in rescues.
E. Solid waste detection identified garbage accumulation and sent reports to the special cleanliness target unit for dirty spots.

3: The Technology Stack: Systems, Functions, and Critical Assessment

The way Pyagraj managed to keep track of every person involves undisclosed technology; however, we can infer some technology stacks from what we saw. Using training data from the 2024 Magh Mela, models were custom built for calculating the number of heads per frame, calculating crowd size using it. By knowing a crowd density in a frame, we can apply it to the whole area to estimate the size of the crowd. This also allowed detection of areas prone to overcrowding and stampedes. Using regression modeling, cameras at entry and exit points[1] were able to register individual faces[1] and track them, creating a flow map that taught us how a crowd moves.

These models plot the characteristics of human faces and body on a multidimensional graph and try to find patterns which connect all the dots. For example such models can be used to predict how far away a person is based on how many pixels their body is taking. Regression models are useful when it comes to static cameras as they are able to differentiate between foreground and background very well. These are some things that Vedhant cooperations had to consider while developing their tools as they could not rely on other 3rd party services available in market like YOLO which are not specialised in Pyagraj geography and topology.

Traditionally, such jobs were done by people simply estimating by looking at the crowd. Which left the metric and final result error prone.

Officials reported that this integrated facial recognition AI system was able to locate missing individuals with up to 95% accuracy. Moreover, scanning of car number plates allowed for tracking lost cars and also detecting open parking lots for people having difficulty finding a parking space.

Facial recognition software used in Kumbh is likely similar to InsightFace, where the model detects 5 key points (eyes, nose tip, and mouth corners) to create a map of every face registered, which can then be compared to faces detected in CCTV cameras. However, we can expect that a hybrid approach was taken when applying the model to a large crowd. A density-based regression can be used to scan the vast areas and detect critical points where then a more expensive model can be run. This allows us to cut the hassle of running a time expensive model for the entire frame captured.

This technology, however, comes with several limitations. The biggest limiting factor is the low quality CCTV cameras, which take pictures in low resolutions and have trouble focusing. The separate pipeline needed for face detection also adds to the delay and processing costs of the feed. The limited data gathered during the 2024 Magh Mela and the large amount of time and dedication needed to preprocess it by humans also stands as a challenge.

Therefore, the event demonstrated that when the principles of AI, realtime data analysis, and automated alerts are applied, we can successfully achieve crowd management at large scales that have traditionally required huge manpower. This is a major step towards public safety and smart cities. With integration of low level sensors like vibration and temperature; we can expect more accurate results at less computational time due to less dependence on processed video footage. For example, a fire detection model which only utilises video feed can have millions of parameters, analysing colour of every pixel, the texture of smoke and foreground. However with a temperature sensor, we can reduce these to merely a handful of parameters of 3-9. Similar experiments using vibration sensors on football stadiums or train stations have been done to estimate crowd size.

3.1 Consent as a Foundation to Ethical Data Processing

All major data protection frameworks[13], from the EU's General Data Protection Regulation (GDPR) to the OECD Privacy Guidelines, treat consent as a foundational principle for legitimate data processing. The GDPR requires that consent should be a part of right to freedom, and consumers should be given the option to deny it as well as be informed of all the ramifications. Moreover nothing about the process should be left unambiguous.[14] The Canadian privacy commissioner's guidance on biometrics insists that "express consent is always preferred,"[14] meaning "biometric information is not used or disclosed without an individual's explicit knowledge and agreement."[14]

At the Kumbh, none of these conditions were met. Not only were the contestants not informed of the constant intelligent eye surveilling them, they were also not made aware of the scope of the project. Without having an option of consent, the people have no choice but to accept the consequences of bad actors claiming their data. Research shows that such AI models can extract physical features and unique characteristics as well as private demographic information that every citizen should have a right to protect.

We therefore, wish to push for laws to be made to advocate for more ethical use of data, and acknowledge that a non human bypassing one’s personal space should not be a loophole of privacy laws.

4. The Bias Against Marginalized Communities

The 33 million people misidentified are an ethical concern hiding behind the small error margin claim. NIH experts state on the matter, "AI models have poor accuracy when deployed outside of controlled environments, risking misjudgments or even wrongful decisions that result in unfair treatment of certain individuals."[7]

Due to the preexisting prejudice in the police database on which the AI was trained, the models learn to disproportionately and unfairly mark members of certain groups as suspicious. We see most of these 33 million people were darker skinned people, the elderly, or people bearing disabilities. This results in the model being biased against Muslim women in burqa or niqab, as well as rural communities, who are usually averse to getting photographed. The Dalit community, which has been disproportionately represented as criminals, also suffers from discrimination.

Due to the claimed neutrality of AI models, such communities experience greater discrimination, having no one to hold responsible for the hate crimes performed against them. As we expect more from these models to look for patterns in data, it is likely they are to fall for bias instilled by humans. After all, they learn from training data prepared by humans[14]. With increasing expectations for these AI models to detect faces hidden by cloth, we can expect more false positives to pop up against members of marginalized communities, especially those who do not wish for their facial features to be recorded.

5. Conclusion

The Maha Kumbh Mela portrays the high dimensionality of AI models and AIbased tools. They certainly offer many lucrative opportunities, and as more previously impossible ideas become actualized, we can expect more jobs to also be created from this wave.

As an infant, in reference to other technologies, AI models show great promise despite coming with some shortcomings presently. While the high costs can be a problem, we see small quality of life betterments made that help the staff involved quite a lot. The final decision being in human hands allows for accountability and responsibility while taking advantage of the low error rate the models offer. The tragedy of January 29th, where nearly 40 people died, shall forever be etched into our hearts. It is truly a grievous incident that shows the limitations of AI solutions. Smart solutions can often appear inappropriate to the context of South Asia, with our high populations, narrow streets, and understaffed enforcement force. However, once we do catch up, this will act as leverage against the international market. For this to happen, we must solve the problem of high GPU costs

and processing time. As other countries compete, the prices of RAM also increase.

A two pronged limitation arises from this approach, where some argue the costs are not worth the lack of information extracted by the models. The models are as of right now not very good at extracting physical information such as age, gender, skin color, etc. As such, many sponsors who wish to use this technology for targeted ads are not happy. On the other hand, the little information that is extracted, such as shape of nose, distance between eyes, and presence of scars, while it may seem meaningless, is still a topic of concern over privacy.

In conclusion, the challenges can easily be turned into opportunities, and the large amount of data we process every second can be used to train our models to be more powerful. Ethical ramifications of breach of privacy have yet to be answered, and whether an AI should be artificially given bias to counter the bias formed towards marginalized groups is debatable. However, we can agree that communities must be informed how their data will be used and be given an option to opt out of this service. Moreover, they must be offered alternatives so they can choose, and these alternatives should not hinder their activities.

Communities should also have power and voice over where their data will be used and should benefit from any progress made.

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Chapter 15: A Hub of Eco-adventure Heritage, Wildlife Tourism and Community Based Sustainable Development; Nameri National Park, Assam

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Abstract

A 200 sq. km area in the northern bank of River Brahmaputra in Assam's Sonitpur district is protected as Nameri National Park which is bordered by Arunachal Pradesh along the Eastern Himalayan foothills. Along its Southern Boundary the River named Jia-Bhoroli flows. It was established as a sanctuary in 1985 later in 1998 designated as National Park and in 2000 declared as second tiger reserve in Assam dominated by tropical evergreen, semi-evergreen and moist deciduous forest with a humid subtropical climate. It is a stronghold for the critically endangered White winged wood Duck of population 424 approximately according to 2024-25 report, Golden Mahseer, Asian Elephant and the pivotal species Royal Bengal Tiger. The paper explores Nameri national park as a hub of eco-adventure heritage, wildlife tourism, and community-based sustainable development. Alongside, Nameri has gained prominence for eco-adventure activities such as river rafting, trekking, bird watching, and nature camping, which attract both domestic and international tourists. It also explores the role of wildlife tourism in promoting conservation awareness and supporting the livelihoods of surrounding communities. This chapter also discusses the integration of indigenous Mising Tribe along with Bodo Tribe community participation in sustainable tourism practices. Addressing key environmental and management challenges, it highlights Nameri National Park as a potential model for sustainable tourism development in ecologically sensitive regions.

Keywords: Communities, Conservation, Development, Eco-adventure, Endangered, Management, Sustainable

Introduction

The Nameri National Park is situated in the foothills of the Eastern Himalayas. It is a protected area of 200 km² , followed by hilly terrain and alluvial plain with a rich biodiversity and landscapes. The Nameri National Park features a sub-tropical monsoon climate with alluvial soil suitable for forest patches and it mixes riverine grasslands with dense evergreen forests which acts as a crucial Tiger Reserve and it support various flora including 600 varieties of medicinal plants and fauna including 300 plus bird species. It is a crucial biodiversity hotspot that hosts over 40 mammal species, some rare reptiles, endangered species like White – winged wood duck, Golden Mahseer and has recorded over 227 butterflies species that indicates a healthy ecosystem. So, here community people like the Mishing, Bodo and Garo tribe engage through eco-tourism and make efforts for it's conservation. These community peoples engage in handicraft production, cultural performances and local food for tourists and the ecotourism revenue helps fund local projects including community houses, roads and school construction. The local people mainly here focuses on sustainable eco-tourism along with biodiversity conservation and visitor engagement through birding ,river rafting and trekking. It has become the second most popular place after Kaziranga National Park for the local and foreign visitors as it offers adventure tourism.

Study Area : The Nameri National Park is located in the Northern part of Sonitpur district of Assam near Tezpur which is situated between (27◦35' to 26◦50'N latitude 92◦39' to 93◦ E longitude) and bounded by Pakke Tiger Reserve of Arunachal to the North, The Jia Bhoroli River to the South and West and to the East it is bounded by Bor – Dikorai river (a tributary of Jia Bhoroli). The park is surrounded by reserve forests like Chariduar and Balipara.

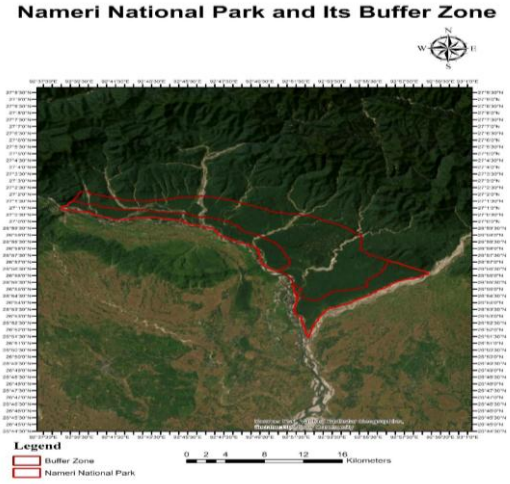


Fig: 1 Showing the study area map

Objectives

1) To analyse the ecological significance and biodiversity profile of Nameri National Park.

2) To assess the scope and management of eco-adventure tourism activities in relation to environmental carrying capacity.

3) To analyse the role of eco-tourism as a tool for environmental education and conservation awareness

Methodology

The data that has been collected regarding the research problem are tabulated in order to arrange it for further analysis. However, the understanding of classification, interpretation, delineation, fieldwork, final mapping and area tabulation to facilitate this study is carried out in the following stages, which are as follows:

A) Pre-Lab work

B) Lab Work

C) Post –Lab work

A) Pre- Lab work

1. Literature Review.

2. Collection of data.

B) Lab work:

[1] Vectorization

C) Post- Lab work

1.Dissertation writing- (I) Processing and analysis
(ii) Representation of data
(iii)Analysis of results
(iv) Final report writing

The required vector layers have been digitized and features such as Nameri National Park and its Buffer zone have been prepared. Image tone, texture, shape, size, pattern, association along with the local references of the area are taken as the key features for the interpretation of the image. Detailed methodology is shown in Fig.2

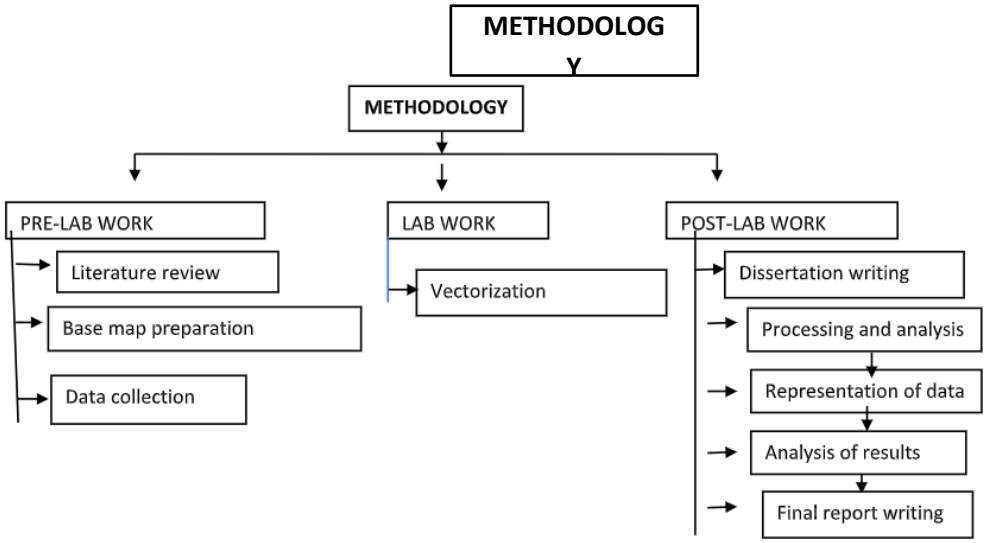


Fig : 2: Flow chart showing the methodology used in the study

The ecological significance and biodiversity of Nameri National Park ;

The ecological importance includes –

1. Habitat importance;

i. **Riverine Ecosystem** - The river Jia Bhoroli plays a crucial role in the riverine ecosystem of Nameri National Park. It is fast flowing with crystal – clear oxygen rich water and alluvial grasslands on the bank that supports bird species like Ibis Bill, Merganser, various Kingfisher, golden mahseer and vibrant habitats.This river is joined by some tributaries like Diji, Dinai, Khari and Upper Dikiri.The river is eco-friendly for fishing and rafting .

ii. **Forest Types** - The Nameri National park is dominated by a diverse mix of forests like tropical semi - evergreen forest that includes Mesua ferrea (nahor),Michelia champaca (tita sopa), Amoora wallichii (amari), Duabanga (thora) and Moist Deciduous forest that include Bombax ceiba (Simul),Terminalia myriocarpa (holokh),Sterculia

hamiltoni (odal) and the rest area of forest includes scrublands,degraded forest and miscellaneous forest that serves over 600 medicinal plants along with timber wood. The park is therefore recognised for its high biodiversity.

2. Ecological functions ;

i**. Climate –** Nameri National Park experiences a subtropical monsoon climate with dry winters and hot humid summers. There the average a rainfall is around 2200mm and the ideal time to visit is from(November to April) , temperature ranges from (10℃ - 25℃) . In the monsoon the region faces heavy rain making it unsuitable for tourism.

ii. **Water conservation –** The river Jia-bhoroli plays a crucial role in the protection of the aquatic habitats and endangered species like White - winged wood duck .This river serve as essential feeding and breeding grounds ensuring aquatic biodiversity . The local people there build dams for the storage of water. The monitoring of the water quality ,ph level, temperature checks are done regularly for the good health of the aquatic ecosystem.

iii. **Soil protection and management –** Soil protection in Nameri National park focuses mainly on preventing deforestation, illegal encroachment and manage soil degradation. Measures are taken to minimize soil pollution from tourist and it manages infrastructure.The Assam Forest Department there work for the curbing of deforestation.

3. Wildlife Corridors and connectivity ;

i. **Movement of Elephants ,Tigers and other species –**The Elephants of Nameri National Park in Assam engage in seasonal migrations, moving from the Himalayan foothills to the islands of Brahmaputra river during winter which cover roughly 40km.The herds of elephants up to 90 number of individuals migrate between the foothills and the riverine islands annually.They rest in the tea gardens or in the forest patches to avoid interaction with human beings. The movement of elephants is often obstructed by human through agricultural growth, tea-estate expansion etc which leads to elephant – human conflict. As the Nameri serve a critical corridor of Tiger movement characterized by the connectivity with Pakke Tiger Reserve in Arunachal Pradesh as a part of the Brahmaputra Valley landscape. The Royal Bengal tigers often move through the dense and shrubby vegetation and some other species also frequently move along the banks of the Jia Bhoroli river along with its surroundings.

4. Conservation value ;

i**. Role in protecting endangered species –**The endangered species like Royal Bengal Tiger, white-winged wood duck, and Asian elephant are protected through some anti-poaching camps to curb illegal activities, management of grassland habitat, connectivity of habitat and the local community people specially engage in conservation that significantly enhance the survival of vulnerable fauna. The park also has habitat like clouded leopards , the capped langurs and a high diversity of reptiles and birds including the snake King Cobra.The Nameri host a pre-release facility for the endangered Pygmy Hog.

ii. Buffer against habitat fragmentation –The buffers against fragmentation of habitat are the strategies, elements of structural landscape or managed zones that has been designed to minimize the negative impacts of splitting of large continuous habitats into the smaller and isolated patches.These focus on act against biodiversity reduction caused by limited resource and genetic isolation by allowing species to move freely and migrate maintaining the genetic diversity. The Increase in total area of habitats by repairing the degraded areas and creating new green spaces.

The Biodiversity of Nameri National Park ;

The Flora (plant diversity) includes –

i. Important tree species ;

The Nameri National Park is dominated by over 600 flora species . The important tree species are –

Lagerstroemia speciosa (Ajar), *Gmelina arborea* (Bhelu), *Mesua ferrea* (Nahor) , *Terminalia myriocarpa* (Hollock) , *Michelia Champaca* (Champa) , *Bombax ceiba* (Shimul) , *Aquilaria malaccensis* (Agaru) , *Bischofia javanica* (Urium) , *Dalbergia sissoo* (Sisam) , *Dysoxylum procerum* (Banderdima) , *Dipterocarpus retusus* (Hollong) , *Hatipolia akhakan* etc.

ii. Some climbers of Nameri National Park are ;

Delima sarmentosa (ow –lota) , *Stephania harnondifolia* (Tubuki lota) , *Illegeria khasiana* (Kerkeri lota) , *Dioscorea hamilttoni* (Bonoria alu) , *Pothos cathcartii* (Hati – poita) , *P. scandens* (Kawri Lata) etc.

iii.There are some medicinal plants like ;

Elaeocarpus ganitrus (Rudraksha) ,*Bonjolokia* (Bhut jolokia) , Wild Ginger , Agarwood , *Gmelina arborea* (Gomari) , *Patchouli* , Curry leaf etc. Some plant species are rare and

endemic in the Nameri National park like *Agarwood , Rudraksha , Mesua ferrea* , these species are fewer in percentage comparing to the other plant species .

The Fauna (Animal diversity) includes –

i. Mammals – There are almost 54 species of mammalian fauna recorded in the Nameri National Park where the larger population is of Asian Elephant . The table below shows the scientific name of the species along with its present percentage .

Name of Mammal	Scientific Name
Slow Loris	Nycticebus bengalensis
Rehesus Macaque	Macaca mulatta
Assamese Macaque	Macaca assamensis
Capped Langur	Trachypithrcus pileatus
Royal Bengal Tiger	Panthera tigris
Leopard	Panthera pardus
Clouded cat	Neofelis nebulosa
Jungle cat	Felis chaus
Leopard cat	Felis bengalensis
Golden cat	Felis temminckki
Golden jackal	Canis aureus
Bengal Fox	Vulpes bengalensis
Wild dog	Cuon alpinus
Large Indian civet	Vivera zibetha
Small Indian civet	Viverricula indica
Binturang	Arctictis binturang
Common Palm civet	Paradoxurus
Masked Palm civet	Paguma larvata
Spotted Linsang	Prinodon
Indian Grey Mongoose	Herpestes edwardsi
Crab eating Mongoose	Herpestis urva
Small Asian Mongoose	Herpestis javanicus
Common Otter	Lutra linnaeus
Smooth Indian Ottar	Lutrogale
Himalayan Yellow Throated Martin	Martes flavigula
Himalayan Black bear	Selenarctos thibetanus
Sloth Bear	Ursus ursinus
Asiatic Elephant	Elephas maximus

Wild boar	Sus scrofa
Pygmy hog	Sus salvanius
Sambar	Cervus unicolor
Indian Muntjak	Muntiacus
Hog Deer	Axis porcinus
Indian Bison	Bos gaurus
Chinese Porcupine	Hystrix brachyuran
Common flying squirrel	Petaurista
Particoloured flying Squirrel	Hylopetes
Malayan Giant Squirrel	Ratufa bicolor
Himalayan Hoary bellied Squirrel	Callosciurus pygerythrus
Pallas Squirrel	Callosciurus erythraeus
Himalayan Stripped Sqirrel	Dremomys lokriah
Himalayan Stripped Squirrel	Tamiops
Lesser bamboo rat	Cannoys badius
Indian Mole rat	Bandicota bengalensis
Large Bandicoot rat	Bandicota indica
Chinese Pengolin	Manis pentadactyla
Hispid Hare	Caprologus hispidus
Indian Hare	Lepus nigricollis
Eastern Mole	Tapla micruva
House Shrew	Suncus murinus
Mole Shrew	Anourosorex
Northern Tree Shrew	Tupaia belangeri
Indian flying fox	Pteropus giganteus
Least pipistrelle	Pipistrellus tenuis

Source; Primary Data, Nameri National Park , 2026

ii. Birds – The Nameri National Park is a renowned birdwatcher's paradise hosting above 370 bird species. The endangered *White winged wood duck, Rufous necked hornbill,Wreathed hornbill, Great hornbill, White – rumped vulture* etc.The month from(November to April) is ideal for Birding as the winter migrants found. This park plays a crucial role in spotting water-dependent birds.

iii. Reptiles and Amphibians – Nameri National Park has a diverse range of reptile species including ; *King cobra, Python, Pit viper, Assam Roof Turtle and Malayan Box Turtle* . There is also *Monitor Lizard, Water Monitor* and *Crocodile* exist in few percent. There are very less amount of amphibians seen in the Park that include *Frogs* and *Toads.*

iv. Fish Biodiversity – The Nameri National Park recorded with 77-79 variety of fish in the river Jia-Bhoroli and associated wetland . Here the aquatic environment serves as a

crucial habitat . The Park harbors for instance endangered species such as *Clarias magur, Golden mahseer* and the larger population of *Cypriniformes (Bahu)* fish is found. The diversity of fishes are highest in pre-monsoon season. Some other prominent species are ; *Rou (Labeo Rohita), Kandhuli (Notopterus) , Bato (Apocryptes) , Ari (Sperata Seenghala), Borali (Wallago Attu) , Xol (Channa Striata) ,Xingi (Heteropneustes fossilis) , Kawoi (Anabas testudineus) ,Kholihona (Trichogaster fasciata)*.

Scope of Eco-Adventure Tourism in Nameri National park

As an Eco-adventure tourism, Nameri National Park boasts high potential due to its rich biodiversity. It includes different types of amusement facilities like angling, river rafting, birding and jungle trekking. Local homestays provide sustainable accommodation with different ethnic foods, boasting up the local employment opportunities and community-based conservation.

River rafting in Jia Bhoroli River

River rafting on the Jia Bhoroli River specially is a popular, beginner-friendly activity of 18-19 km long trails, it used to be of 3–4-hour journey through scenic beauty with gentle rapids on the river. Rafting is organized with professional guides both from local people and under Forest department and it is mandatory to wear safety gear. River rafting may cost from 3000-3500 per persons. November to March is the best time to visit Nameri National Park for River rafting.



Fig: 3 River Rafting in Jia Bhoroli

Capacity Rates	**Rates**
6 (4 Guest, 2 boatsman)	3500/-
4 (2 Guests, 2 boatsman)	2300/-
Inclusions	
National Park Entry (Inbound)	500/-
National Park Entry (Domestic)	50/-

Govt. Toll	300/-

Birdwatching

Nameri National Park is a unique birdwatching destination, with more then 300-400 species, including the rare White-winged Wood Duck (state bird) and various hornbills. November to March in the best month to visit, it provides walking trails River to spot endangered species and migratory birds in its dense evergreen forests. Endangered/Rare Species: White-winged Wood Duck, Ibisbill, Rufous-necked Hornbill, and Wreathed Hornbill. Kingfishers: Large numbers of species, including the Ruddy, Blue-eared, and Oriental Dwarf Kingfisher.



White-winged Wood Duck



Great Hornbill

Fig 4: Showing some Bird species of Nameri National Park Camping

Camping in Nameri National Park offers visitors to encounter with the natural environment of Assam. In the dense forest cover, the camping experience enables close observation of the park's rich plant and animal life in a peaceful manner. Participation in activities such as guided nature walks, birdwatching, and river-based adventures helps visitors develop a better understanding of the park's ecological value. Camping in Nameri National Park contributes to eco-tourism growth while fostering environmental awareness and responsible behavior toward nature.

Wildlife viewing

Wildlife viewing in Nameri National Park offers a good experience for visitors seeking to observe fauna in a largely undisturbed natural setting. The park's varied habitats, includes tropical forests, and wetlands, support a wide range of animal and bird species. Guided forest walks activities allow visitors to encounter wildlife such as elephants, deer, and diverse species while maintaining safety and conservation protocols. Unlike conventional

wildlife tourism, viewing in Nameri emphasizes quiet observation and minimal human interference, which enhances the authenticity of the experience.



Fig 5: Wild life View Point

Tourism potential

Nameri National Park, has appeared to be an important destination for nature-based and sustainable tourism. Combination of rich biodiversity and forest ecosystems offers wide variety of scope for the development of eco-friendly tourism.

Present Tourism Opportunities

The park attracts birdwatchers, wildlife supporters, researchers, and students due to its diverse varieties of flora and fauna. Guided nature walks and trekking through selected areas allow visitors to experience the park closely while following conservation guidelines. The Jia Bhoroli River supports controlled river rafting activities, adding an adventure component to the tourism experience. Camps areas , Prashanti lodge provide basic explore the forest stays for visitors seeking a natural environment.

Future Possibilities for Eco-Adventure Tourism

It has got strong potential to expand the eco adventure tourism in sustainable way. The future initiatives may include to enhance the river-based activities such as river Trials along with the interpretive trekking routes mainly focusing on forest ecology. Community based tourism that includes homestays, local guide services and other cultural programs can be used to strengthen local livelihood while promoting conservation awareness to the people. Nameri National Park also act as a hub to the educational tourism and research-oriented visits. With efficient planning the development can be used to increase the visitor's engagement without harming the ecosystem.

Management of Eco-Adventure Tourism

Valid entry permit is required to along with an officially recognize photo identification document while accessing the Protected area. Authorized Guide is compulsory with every

vehicle. Tourist must strictly follow up the instruction given by the Guide and should remain in the vehicle while going to the protected area. Entry to the Nameri National Park with tobacco, weapons, inflammable substances and littering and use of polyethene in the protected area is strictly prohibited. Visitors should avoid disturbing the wild life. Off road driving and over speeding is totally illegal in the protected area. The removal of forest products, plant materials, or any wildlife-related articles is strictly prohibited. All visitors should enter the restricted area with their own risk. The purchase, collection of wildlife products is illegal and punishable under applicable laws.

Visitor Interpretation Centers

Visitor interpretation centers plays a very vital role in Nameri national Park before exploring the forest. These centers are designed to introduce visitors to the park's ecological richness, wildlife diversity, and conservation.



Fig 6: Interpretation Centre

Tourist Profile - Tourism in Nameri is highly season-dependent. The peak tourist season generally extends from November to April, when weather conditions are favorable and wildlife visibility is higher. The Tourist in Nameri visited for purposes like educational tour from the schools- colleges (students) and researchers. There seen 200 (approx.) tourists each day out of which 110 are for educational purpose, 46 are adventure tourist, 23 are nature tourist and the rest are eco-travelers. Approximately (59-66%) of tourists (both domestic and foreign) are of age group (22-44) with a high percentage of solo travelers.

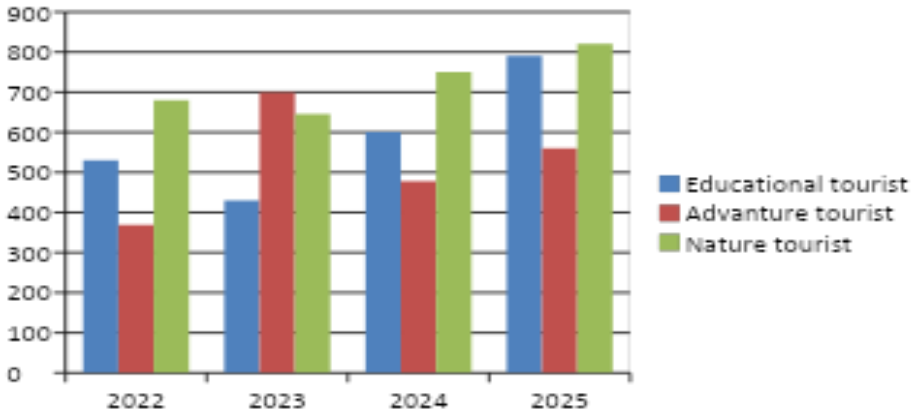


Fig 7; Tourist Flow in Nameri National Park of last 4 years (Primary source)

Orientation at Forest Range Office

At the entry gate or forest range office, visitors are often given basic information regarding park rules, wildlife viewing ethics, and conservation measures. Informational boards and species lists displayed in these areas prepare tourists for a more informed and responsible visit.

Importance of Interpretation Centres

- Promote environmental education and conservation awareness
- Provide scientific information about flora and fauna
- Encourage sustainable tourism practices
- Prepare visitors for safe and ethical wildlife observation

These interpretation facilities enhance the overall visitor experience while supporting long-term conservation goals within Nameri National Park.

Community Involvement in Nameri National Park

Community participation has become an essential component of conservation management in Nameri National Park. Located in the Sonitpur district of Assam, the park covers approximately **200 km²** and is surrounded by several fringe villages whose livelihoods are closely linked to forest resources. To reduce anthropogenic pressure and promote sustainable development, eco-tourism and community-based conservation initiatives have been introduced.

Role of Local Communities

The formation of Eco-Development Committees under the Assam Project on Forest and Biodiversity Conservation has encouraged structured community participation.

According to regional forest department records:

- Multiple fringe villages have active Eco-Development Committees linked with the park management.
- People of the village participate in eco-tourism operations, awareness drives, and conservation activities.
- Local residents also assist forest officials in monitoring illegal activities and reporting wildlife movement near settlements.

Employment in Tourism Sector

Eco-tourism in Nameri generates both direct and indirect employment. It includes:

- Certified local guides
- River rafting crew members on the Jia Bhoroli River
- Eco-camp staff
- Drivers and transport operators

Visitor statistics from Assam tourism reports show that Nameri receives several thousand domestic and international tourists annually (pre-COVID estimates ranged between 20,000–25,000 visitors per year). Increased tourist inflow directly expands service demand, thereby creating seasonal and regular employment opportunities for local youth.

Community-managed eco-camps such as Potasali provide daily wage-based employment to the people working there. Studies of eco-tourism prototype in Assam indicate that tourism participation can increase household income by 25–35% compared to households dependent solely on agriculture or forest resource exploitation.

Benefit-Sharing Mechanisms

Revenue generated from eco-tourism activities—entry fees, camping charges, river rafting fees, and guiding services through the forest—contributes to local economic upgradation. Benefit-sharing occurs through:

1. Giving wages to guides and also to the camp workers

2. Payments for local services such as boats and rental cars.
3. For the development of the Community.

Training : Training programmes have been conducted under APFBC along with forest department. Training typically include:

1. Wildlife identification
2. Tourist management and communication skills
3. Safety training
4. Conservation awareness

The role of eco-tourism as a tool for environmental education and conservation awareness;

- Eco-tourism as a tool for Environmental Education – The Nameri National Park plays a crucial role in eco-tourism by Promoting sustainable livelihoods to the local people and it also provide awareness among the tourists. The local people there also participate actively and takes initiatives like ; protecting endangered species and wildlife conservation. Local people they are active stakeholders with a income from tourism, they also help in to move away from resource intensive activities that threaten the park such as poaching or over livestock grazing.

- Eco-tourism and conservation Awareness –

  i) Awareness among tourist; The Tourist awareness in Nameri National Park focuses on eco-friendly and regulated tourism to protect their wildlife. The practices include using authorized guides for trekking, wearing neutral clothes, minimizing noises, prohibiting littering. Some of their regulations include-

  - Entry into the inner forest areas requires authorized guides and should be booked through official counters.

1. There no night safaris are permitted.
2. Fishing is prohibited in the Jia Bhorali River which is habitat for migrating waterfowl and White-winged Wood Duck.
3. A strong emphasis is given on maintaining a plastic-free, quiet environment in the region.

Hence,The Nature Interpretation Centre near the entrance provides insights into the park's biodiversity and the ongoing conservation efforts. The management along with the local people to promote sustainable eco-tourism to minimize pollution and to protect the ecosystem.

Conclusion

Nameri National Park justify as an important example of how biodiversity conservation, eco-adventure tourism, and community participation can work together. It is global likeness for the endangered species like; White-winged wood duck and Golden Mahseer. It has become Assam's tourist destination to offers activities like; trekking, rafting, birdwatching. Its rich ecosystems, regulate the tourism activities, and active involvement of local people support both environmental protection with sustainable livelihoods.

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Chapter 16: Gender and Climate Change through Northeastern Indians lens

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Abstract

Northeast India comprises eight states which are connected with mainland India through the chicken neck corridor. The region has a diverse population with different communities, tribes, culture, traditions and customs. The paper examines gender and climate change through the intersectional lens of Northeastern people and highlights how gender, caste, ethnicity and socio-political identities shape vulnerability and resilience. With qualitative approaches the study focuses on women, indigenous groups and marginalized communities who are experiencing unbalanced environmental risks because of the existing inequalities and limited access to adaptive resources. It also reveals the importance of eco feminism by integrating gender sensitivity techniques in water management, livelihood development and conservation efforts. By centralizing the lived experiences and voices of people from this region, it tries to offer vital insights into complexities of climate vulnerability and adaptation in ecologically sensitive and socio-culturally diverse landscapes. The findings have broader implications for advancing gender justice, environmental sustainability and social equity in other similarly diverse contexts.

Keywords: Gender, Intersectionality, Northeast, Ecofeminism, Inequalities, Sustainability

Introduction

Nature is always synonymous to tribal women in India as Pakriti; it acts as caregiver, nurturer, creator of the entire universe just like a mother who gave birth to a child takes care of him/her, nurtures them, protects them and is always with her child like a shadow. In Assam, Ambubachi Mela is celebrated usually June 22-26 at Kamakhya Temple in Guwahati, Assam. A four day, Hindu festival depicting the celebration of the menstruation cycle of Goddess Shakti. During these days the doors of the temple are closed as Mother Nature is believed to undergo her menstrual cycle. It's a gathering of millions of devotees and tourists in and around the globe, just to take the blessings from Maa and purify their sins and fulfill their wishes. Ironically these same groups regarded the bleeding of other girls as impure and avoided any contact with her during her menstrual period. People

believed if they take anything from such girls they need to be purifying themselves as she is now impure! Likewise Mother Nature too faces such kind of discrimination although in other ways. In the advent of Globalization and Urbanization people in the name of development are destroying forests to build big buildings for inhabitants. If it's free you won't take it seriously; the same happens with humans. They are given an ultimate plate of natural resources and with massive utilization caused global warming in return.

Gender a socially determined term that explicitly divides man and tribal women according to their physical appearance; for instant men are always linked with masculinity and woman with femininity. This paper studies how tribal women and nature are interlinked and how she can save the Mother Nature with their decade knowledge over sustainability and techniques of using one thing multiple times. The paper specifically deals with tribal women of Northeastern India; how in the journey of saving or using the nature she faces exploitation in one or the other way. Northeastern India is connected with mainland India with a Chicken Neck corridor or Siliguri Corridor; comprising eight states. The region is popularly known as land of Seven sisters (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura) with Sikkim as Brother State. The region is rich in its biodiversity with homes for number of flora and fauna. Like the environment its people are also diverse in their culture, tradition, customs, lifestyle and foods. It has over 200 tribal groups with different languages, festivals, food habits and many more. From Matrilineal Khasi land inheritance to Naga warrior traditions, land is full of diversity that depicts the picturesque of unity in diversity. Tribal women work in every field from weaving clothes to growing rice to collecting fodders from forests; even though she faces the climate vulnerabilities aiming floods, landslides, deforestation and uncertain monsoons. These kinds of danger affect everyone, but not in same manner. A tribal women suffer more not just as tribal women but first as tribal, then as poor, then as widow and then as homeless. She walks miles with babies in her back, thus all together referred as intersectionality in political science. The paper uses two terms Intersectionality means who suffers most from nature and Ecofeminism which showcases how tribal women know nature more but ignored most of the time. It tries to give a light to stories that work better in saving nature then seeing from one perspective by sitting in an air conditioned room. By specifically pointing to the Northeasterns, the study offers insights to gender-climate action across different regions around the globe.

Theoretical Framework

Before going deep into discussion we need to be very clear with two terms or concepts that is Intersectionality and Ecofeminism, as both together give wholesome ideas to understand gender and climate change through the lens of Northeastern perspective.

Intersectionality simply means everyone has their own unique experiences of oppression. The face of a white American woman is different from that of black African

woman. It describes overlapping identities creating different kinds of discrimination in the society like race, gender, class, disability and sexual orientation. When a Manipuri Woman faces floods, she needs to overcome many obstacles at once. She being a mother needs to carry her child back to the relief camps, even in such a disaster situation she can sleep empty stomach but her family and children can't. If she is a widow and poor situation will worsen. It's termed as double inequality as nature destroys homes and tribal women are always treated subordinate to men. In Tripura forest tribal women lose their jobs in the advent of deforestation and globalization. Her tribe norms stop her from going outside the home for new jobs but men on the other hand can get new jobs easily without any barriers. If she is a widow she needs to starve for food and living. Thus climate change for few tribal women is cursed.

Ecofeminism is a political movement and a theoretical concept that talks about historical connections of tribal women with nature by devaluing the shared relation to male dominated culture. An Ecofeminist believes that in a patriarchal society tribal women and nature both are subordinated by men. In the context of Assam, Purnima Devi, biologist and Ecofeminist led The Hargila Army (Greater Adjutant Stork Conservation) a community based conservation to protect endangered Greater Adjutant Stork which is locally known as Hargila. This tribal women led movement engages local communities' especially rural tribal women in habitat restoration, awareness programs and sustainable conservation efforts transforming the bird from a social stigma to a cultural icon. In Meghalaya Khasi tribal women guard the forest as they know which trees survive landslides. Mizo tribal women can find hidden springs in a dry river. All these can give a clear view of how tribal women can protect the climate more than those degree holders in the cities who execute heavy budget plans in the sustainability.

Both the concepts give a clear view if the government collaborates with tribal women then we can pave the way to a more sustainable and clear environment. And choosing Northeast because of its geographical feature as if surrounded by nature from all sides with tribal population one can get a clear cut idea of how gender and climate change are affecting one another. If one causes trouble, the other gives a solution to survive such a disaster situation.

Regional Climate Vulnerabilities

Due to its natural richness, the Northeastern region faces different kind of climate dangers. With that tribal women often being the worst sufferer every time intermixing societal restrictions and sudden outburst of nature. In Arunachal Pradesh because of heavy rainfall; landslides are a common phenomena there and all these resulted in buries of several villages. People lose their farming lands and need to live in poverty for several months. No roads reach hilly villages during monsoons which create obstacles for tribal

women to fetch water, collect fodder, sell their products in markets and multiple problems occur one after another. A tribal woman depends on nature either for food or for economic terms with such a situation they felt helpless. The flood causes 40% destruction of crops every year in Assam because of the Brahmaputra River. Majuli shrinks from 1250 km^2 to 350 km^2. Tribal women farm alone and men go to cities for a little better life for their family. Flood makes people homeless and pushes them deeper into poverty deeper. When a woman is a widow, she faces the worst situation most of the time. The relief camps arrive late, people sleep in nearby schools in empty stomachs. A Manipuri woman suffers double inequality with no land rights and climate change. In Meghalaya because of landslides more than 50+ people are killed every year. Khasi tribal women lose their betel fields and wet rice fields turn salty because of floods. Mizoram faces drought for 4 to 7 months which requires tribal women to go 5 km daily to fetch water from streams. Tribal women here sell jewelry for survival as seeds don't grow in Mizo soil because of drought and no irrigation. Naga tribal women need to travel miles for fodder as trees die in Nagaland because of its extreme weather conditions. Naga widows face violence due to crossing rival lands for water. The main cash crop of Sikkim is cardamom which get destroyed due to melting glaciers at faster rate. Tista River causes floods that break bridges which are the roots for communication for the people. Tribal women need to become daily labourers carrying stones for living. In Tripura rapid disappearing of forest and failing jhum cultivation results in massive deforestation, reducing soil fertility, soil erosion and widespread poverty among indigenous communities. Tribal women here were largely excluded from decision making in issues of forest management and they left with works of travelling miles for collecting water, fodder and firewood. So, it depicts that everywhere tribal women are seen as the worse sufferer. They farm on 80% of the field and own 10% of land only. Men in search of jobs went to cities and tribal women stayed in villages to protect her farm and family. A tribal woman speaks different languages which are not understood by outsiders and resulted in negligence and ignorance. Assam floods displace 5 million tribal women and children yearly. 20,000 hectares of farmlands are destroyed every year in Manipur. In Meghalaya landslides kill 100+ tribal women every year. Nagaland extreme weather conditions increased TB among Naga tribal women by 30%. All the states togetherly have lost 15-25 % of forest cover since 2000.Climate hits the remote areas first and tribal women stay there as caregivers. They lose sources for water, forest for firewood and fodder, farming lands for living. The government reaches hilly areas a little later. So we can say that every state is telling the same story: tribal women are facing dangers from climate alone without external help.

Intersectional Analysis: Manipur

Manipur is reflecting the actual picture of how climate change is affecting tribal women the most. The state is situated between hills and valleys. The former belongs to tribes of Naga, Kuki and Zo and the latter belongs to the tribes of Meitei communities. Climate

doesn’t care about boundaries but people do. Imagine the situation of tribal women now, what kind of intersectionality they are facing here; as being a woman then as a tribe, then as inhabitant to the region she lives, adding being living as poor and finally the clash between different communities. The level of oppression one woman is facing beyond one's imagination here.

Flood and erosion in Manipur is destroying everything; monsoon is transforming the Imphal River and its tributaries into destructive forces. Tribal women are losing their maize, millet and potato crops which are their only source of income. The 2023 flood vanishes 15,000 hectares of farmland causing large-scale loss of families and pushing them to poverty and long term food insecurity. The wash away of hillside soil into valleys turning into severe soil erosion and environmental degradation is reducing the soil fertility and causing siltation in rivers; making flood occurrence more frequent and severe. Tribal women are affected disproportionately as they are the primary caretaker of those farmland and family. She is forced to clear the debris from farmlands with bare hands indicating absence of government disaster relief. Further, children are suffering from snake bites without having access to hospitals in such hilly areas.

The triple inequality is making the scenario worse. Firstly, climate change is resulting in floods that are destroying homes and farmlands. Secondly, the system of no land rights among the tribal communities is hitting hardest. The colonial law system gave land rights to Meitei communities. Tribal women are farming in government so called community lands with no ownership, thus when floods arrive only landowners get compensation and they left empty handed after hours of hardships. Lastly, the ethnic conflicts are blocking all the possible aids to reach the actual victims of such natural calamities. Government relief trucks are stopped in Imphal valleys to reach the actual areas of sufferings. Letting the tribal women to travel three long days for food and end up with starvation, as they are stopped at checkpoints by soldiers because of no ID proof which were lost in the tragic incident

Manipur floods displaces 1, 00,000 people yearly among which 70% are tribal women and children. Among tribal women, only 20% get the aids. Meitei valley tribal women get aids like tarpaulin sheets, cash and boats; while the hilly area tribal women need to sleep on school roofs with empty stomachs and zero security. Relief aids drop food packets, valleys and hills remain hungry. Tribal women need to travel miles for food and water after the flood. They have to carry 20 liter cans in their heads through muddy roadways. Floods cause diarrhea, malaria and snake biting common among the victims. Due to lack of hospital communication in these hilly regions, she acts as doctor and treats the wounds with the help of leaves from forests as medicine. For instance, a woman is pregnant and she needs to travel miles to collect firewood as wet woods are of no use. She needs to build new toilets as floodwater contaminated the old one. She is washing clothes in dirty

streams, all the harmful particles going inside her body in such a situation. She wouldn't get time for rest while rest is most important during those days. That's the life of a tribal woman facing the trauma of being just a woman, tribal clashes, poverty, flood victim, landless, pregnant and widow; all telling us how intersectionality and climate change going hand in hand.

Livelihood & Conservation Conflicts

Tribal women of the Northeastern region depend on forests for survival, so when forest shrinks tribal women suffer first. Tribal women of Tripura traditionally sell forest products like bamboo and fruits for survival. However, in the advent of climate change and drying forests destroys parts of the environment and results in finding new alternatives for survival. Even the failure of jhum cultivation results in massive deforestation, losing fertility, soil erosion and pushing people of the region deeper into poverty. Forest of Tripura losses 18% of forest cover in 2010-2020. Tribal women there are collecting 70% of forest products and getting 10% of forest income in return. The forest department often recruits only men for the jobs of guards in forest, thus less job opportunities for tribal women. With no alternative tribal women are seen in roads as beggars in cities for the sake of one time meal.

In some parts tribal women are trapped into double exclusion; even after age old knowledge about nature she being treated as criminals in their own lands. Government puts forest restriction in order of saving greenery and bans tribal women from collecting fodder and firewoods from place that's belong to them for decades. But the rich contractors are allowed to collect timber from those forests. She is bound to pay fines for picking fallen branches of trees while men went to cities for jobs like construction in cities for survival. With shrinking forests letting wildlife invade villages. Elephants are often seen in paddy lands or people houses in search of food. All these are creating a dreadful cycle of dead for the tribal women of these regions. In Goalpara district of Assam more than 20 tribal women are often dying every year by elephants in protecting their paths. Tribal women went in search of firewood at dawn time which is the exact time for elephants to come for food. Tiger attacks rise to 30% by disappearing of deer in forests. She went to collect firewoods in the path of tiger. In Nagaland, three tribal women are reportedly mauled every year and even tiger attacks are tripled since 2015. Forest guards always arrive late when already the damage is being caused. So, loss of forest means she is now in a dangerous war with nature at frontlines.

When the government is replacing jhum cultivation with scientific forestry, tribal women are losing their traditional rice varieties which could survive in droughts. The government put more emphasis on cultivating teak that grows timber which gives profits but no food or medicine in return. Even in village councils which are led by men; males

rule for forests with zero participation of tribal women who have decades of knowledge about forest. Conservation failure is a new form of colonial control where trees are protected but ignored the voices of tribal women who know her surroundings the best! The real power lies in her in order to have a sustainable and greenery future, indigenous tribal women are shifting from victims to leaders of conservation with her deep generational knowledge proving to be better guardians of nature than men. In Meghalaya, Khasi tribal women are guarding Mawphlang Scared Forest and other groves with their strict protection; they are preserving rare species and water resources for years and those natural barriers act as a respectful gesture for wildlife creatures. Naga tribal women know the paths of elephants, and thus acting as today's GPS to navigate the paths through which one can safely go and collect fodders and food. It also reported that emphasis being made to formally include them in village councils as essential for flexible forest governance. When government departments are emphasizing on cultivation of teak, Tripura tribal women are driving Bamboo Mission by replanting native species which supports both nature and their families. Thus, to protect and have a greenery future government should listen to forest mothers rather than those degree holders with no practical knowledge.

Caste & Flood Impacts: Assam

Assam is facing floods every year losing 40% of farmlands millions becoming homeless every year. The Brahmaputra River swells every monsoon and destroys everything in minutes. Majuli has been shrinking from 1,250 km^2 to 350 km^2 since the 1890s. Tribal women first save their children, then cook pots and watch their stored food being washed away in no minutes. The flash of water washed away everything, no harvest means no income and left with poverty and starvation. For everyone, floods bring different kinds of situations, especially caste make situation worse. The upper caste villages get all facilities first like embankments and boats. While Dalit tribal women need to stay on char islands (unstable sand islands) which vanish yearly. During floods, people from lower caste are more likely to be homeless than one from upper caste. Government aids being stopped in the midst and rarely reaches the remote islands. The high caste landlords have their land papers but lower caste tribal women being working as sharecroppers so when floods take their crops; they can't demand compensation from the government as they don't own any land. Lower castes tribal women demanded clean drinking water, funds being provided by the government to clean the Brahmaputra River that's being polluted by tea factory waste. But upper caste leaders took away the funds for their own expenses. As per the study in 202 due to extreme weather, 40% of crop lost with constant flooding and tea mosquito bugs are killing the bushes of tea garden areas of Barak valley. Tea Garden tribal women labourers who works hardest by plucking and carrying heavy baskets of tea leaves getting low wages around Rs. 210 per day causing to fall in high debt traps. For repaying debts their children are often dropping schools and consequently

highest dropout rates increases in tea garden areas. The combination of climate change and debt traps forcing the future generation to remain in the same cycle of poverty.

Despite all the obstacles tribal women are finding several ways for survival like smart farming; a floating vegetable gardens which is rise by floodwaters particularly in flood-prone areas Assam like Majuli to combat monsoon induced crop losses. It's an eco-friendly method that uses locally available biodegradable materials to form the beds. They dig small ponds to store rainwater which will ensure future consumption in drought periods. In Barak Valley tribal women save ancient rice seeds which are naturally flood-prone seeds that ensures food security and financial stability for long term goals of survival. The studies found that Dalit tribal women use their hands and traditional tools to clean river water in more effective and cost friendly manners than government's expensive tools.

Tribal Women's Climate Solutions

Northeastern tribal women are fighting with climate change every day and they know the tricks to tackle such obstacles that have been ignored by the government for a long time. Tribal women know the climate survival approaches; Khasi tribal women grow 15 types of rice for surviving in landslides, Naga tribal women plants millets to overcome drought days, Mizo tribal women are building bamboo water channels which are lasting for 20 years and Garo tribal women can the arrival of floods by watching the ants in hills. These tricks came from generations after generations that live close to nature, one seed is surviving and a hill spring is saving a village. Old methods of cropping beat the new high yielding crops which don't survive in floods, but mixed cropping methods of tribal communities survive. The expensive cement dams cause cracks in one rain while the bamboo dams built by tribal women are easy to repair, flexible and can last five years long. The invasive species like Eucalyptus can drain and damage the soil, so tribal women are planting broom grass that helps to bring back soil fertility and prevents soil erosion on steep slopes. It seems that tribal women of these regions can replant forest three times faster than forest department forest department as she knows which trees grow in which soil. The Self-Help Groups (SHGs) are building ponds to store rainwater in order to ensure families have water supplies during drought times. In Assam Dalit tribal women are pioneering approaches to convert tea factory waste into organic fertilizer and cleaning Local Rivers for having clean drinking water. The SHGs are offering loans at 1% interest by saving tribal women from moneylenders who charge 10% monthly. Now, she can save enough to send her child to school. The weather forecast broadcasts in languages which are not understood by one who is working in the paddy fields. As these regions have more than 200 tribes with different dialects it's impossible to translate in every language and dialects, thus creating communication gaps and get trapped by climate dangers. But the tribal women have some traditional techniques to convey such messages to alert the

village people of the upcoming dangers like using smoke signals, drum beating or runner networks (one runs from door to door to send the message) works further and better in saving millions of lives.

The government should give 50% leadership to tribal women in participating in matters of forest management as they know what's good for nature and how to use nature in an easy-affordable manner. They should use traditional methods or local tribal languages to spread climate dangers news to save millions of lives. They should also give tribal women forest rights papers to have free access to forest so that no one treats them as outsiders or take fines on cutting branches of trees. Another step is giving the relief funds and farming aids directly to the women bank accounts; to cut down the middle man corruption. Even promoting indigenous techniques of cultivation like floating gardens or mixed cropping led to no one to starve in natural calamity times. They are finding solutions to tackle climate change but forest mothers already have answers; so they should take the middle way by adopting both traditional and modern in a manner that nature wouldn't get hurt and humans benefitted in multiple ways.

Conclusion

To conclude; climate change hits women hardest , but they know alternative ways to survive in such natural calamity times. With traditional knowledge about nature being passed generation after generation, tribal women create ways to use nature without causing any harm to it and produce eco-friendly products for ensuring their food security and financial stability. Northeastern women are not victims; they are protectors of nature. The government should collaborate with them to have a clean and greenery future.

"When you are doing the right thing for the earth, she gives you great company."
~ Vandana Shiva

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Chapter 17: Chemical Perspectives on Waste Management and Circular Economy in Informal Urban Settlements of the Global South

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Abstract

Informal urban settlements in the Global South experience severe difficulties with waste management because their waste problems affect three areas: environmental chemistry, public health, and social justice. The chapter investigates the chemical makeup of waste produced by urban areas through its research on polluted waste in underdeveloped areas which includes analysis of polymer materials (polyethylene, polypropylene, polyvinyl chloride, polyethylene terephthalate) and hazardous metal pollutants (lead, cadmium, mercury, chromium) and the creation of permanent organic pollutants through unregulated heat treatments. The study examines how open burning and landfill leachate produce environmental pollution and toxicological damage by tracking chemicals which lead to soil and water and air contamination through multiple environmental routes. The study assesses chemical recycling technologies which include pyrolysis and depolymerization and green chemistry methods to determine their effectiveness as recycling solutions for waste materials that contain multiple types of contamination. Waste pickers in India, Ghana and Vietnam demonstrate how their work combines two fields: resource recovery and exposure to dangerous workplace conditions. The study shows that to achieve sustainable waste management in informal settlements we need to combine chemical innovation with environmental justice principles which will protect disadvantaged communities from toxic waste costs that come with circular economy changes. The chapter presents policy recommendations which use green chemistry principles and participatory design methods to promote affordable safe technologies that create both environmental advantages and social benefits. The chapter establishes a scientific base which helps develop fair waste management solutions through molecular waste chemistry research at the disposal process and the breakdown process and the waste transformation process.

Keywords: waste chemistry, circular economy, informal settlements, chemical recycling, environmental justice, pyrolysis, heavy metals

1. Introduction

Rapid urbanization across the Global South has created an exceptional amount of municipal solid waste which mostly ends up in informal settlements because the area lacks proper waste management systems and existing systems are not sufficient [9]. The informal urban areas which more than one billion people inhabit throughout the world experience multiple environmental and health emergencies because people dispose of waste improperly and set fires and conduct unregulated recycling operations in those areas [10]. Informal waste pickers establish hidden circular economies through their work which enables them to recover valuable materials yet they face extreme danger because they must handle hazardous waste materials which contain dangerous chemicals without any safety gear or official supervision [6], [7].

Chemical analysis serves as the essential method to comprehend waste management practices within informal settlements [1]. The management of urban waste presents more than physical and operational difficulties because it consists of multiple waste components that include polymers and metals and organic materials and chemical additives whose environmental impact and harmfulness and recyclability depend on their chemical characteristics [4]. The plastic waste stream contains polyethylene (PE) and polypropylene (PP) as the main plastic materials while polyvinyl chloride (PVC) contributes halogenated compounds that create dioxins during burning [2]. Electronic waste releases lead (Pb) and cadmium (Cd) and mercury (Hg) and chromium (Cr) which travel through both leaching processes and atmospheric deposition methods [3]. The actual chemical substances present in an environment determine how people will encounter chemicals and how living organisms will store chemicals and how circular economy solutions will operate in practice [5].

The chemistry of waste transformation operates as the core element which creates both the waste problem and its corresponding solution [1], [4]. The thermal degradation of plastics through open fire combustion produces hazardous byproducts which include free-radical mechanisms that create polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) and halogenated persistent organic pollutants (POPs) that remain in the environment and build up in living organisms [2]. The chemical recycling methods of pyrolysis and depolymerization operate as controlled processes because they use specific reaction pathways to produce both fuels and monomers and valuable chemicals [4], [5]. The distinction between hazardous waste combustion and productive chemical recycling lies in reaction control, temperature management, and emission mitigation all fundamentally chemical engineering challenges [1].

The chapter connects environmental chemistry with social justice to investigate waste management problems and solutions which exist in informal urban settlements throughout

the Global South. Our research starts with waste material analysis to identify its chemical elements which include polymer components and metal contaminants and the chemical processes which occur during open burning and landfill disposal [1], [2]. We evaluate environmental and health effects by studying toxicology and biogeochemistry to track how contaminants move through soil and water and air systems [3]. The third section evaluates chemical recycling technologies pyrolysis, solvolysis, enzymatic degradation, and metal recovery as potential circular economy pathways suited to the technical and economic constraints of informal settlements [4], [5]. The analysis uses case studies from India Ghana and Vietnam to explore actual situations while the last sections focus on policy structures and upcoming paths toward fair waste management which uses chemistry-based solutions [6], [8].

2. Chemical Composition of Waste Streams

2.1 Polymer Types and Structures

Waste materials from informal urban areas contain plastic waste which consists of four major polymer types that have unique chemical compositions and thermal properties [1], [4]. Polyethylene (PE) and polypropylene (PP) represent saturated hydrocarbon polyolefins which have basic chemical structures that follow the patterns of $–(CH_2–CH_2)_n–$ and $–(CH_2–CH(CH_3))_n–$ respectively [1]. The non-polar polymers demonstrate strong thermal resistance while their pyrolysis process leads to free-radical chain scission which produces a mixture of alkanes and alkenes and aromatic hydrocarbons [4]. The initiation process starts with C–C bond homolytic cleavage which occurs at high temperatures exceeding 350°C and produces alkyl radicals that move through β-scission and hydrogen abstraction reactions [1]. The open burning combustion process produces incomplete combustion results which make PE and PP emit soot together with polycyclic aromatic hydrocarbons (PAHs) and carbon monoxide [2].

Polyvinyl chloride (PVC), with the repeating unit $–(CH_2–CHCl)_n–$, contains covalently bound chlorine that fundamentally alters its thermal chemistry [2]. Upon heating above 200°C, PVC undergoes dehydrochlorination, releasing hydrogen chloride (HCl) gas according to the reaction:

$$–(CH_2–CHCl)_n– \longrightarrow –(CH=CH)_n– + n\ HCl$$

This process creates conjugated polyene sequences that further degrade, and the liberated chlorine facilitates the formation of polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) through radical-mediated coupling reactions during low-temperature combustion [2]. The general pathway for dioxin formation can be represented as:

$$2\ C_6H_4Cl_2O\ (\text{chlorinated phenol}) + O_2 \longrightarrow C_{12}H_4Cl_4O_2\ (\text{PCDD}) + 2\ H_2O$$

The specific congener distribution depends on temperature, oxygen availability, and the presence of metal catalysts such as copper, which lower activation energies for chlorination and coupling reactions [2]. Dioxins and furans are among the most toxic anthropogenic compounds, with 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) exhibiting femtomolar binding affinity to the aryl hydrocarbon receptor and causing endocrine disruption, immunotoxicity, and carcinogenesis [2].

Polyethylene terephthalate (PET), a condensation polymer with the structure $–[O–CH_2–CH_2–O–CO–C_6H_4–CO]_n–$, contains ester linkages susceptible to hydrolytic and solvolytic cleavage [5]. This chemical feature makes PET amenable to depolymerization via glycolysis, methanolysis, or hydrolysis, distinguishing it from the addition polymers PE, PP, and PVC [4], [5]. The ester bonds in PET are nucleophilic sites that can be attacked by alcohols, water, or amines under appropriate conditions of temperature, pressure, and catalysis [5].

2.2 Heavy Metals in Electronic Waste

Electronic waste (e-waste) introduces a suite of toxic metals into informal waste streams [3]. Lead is present in cathode ray tube glass (up to 25% by weight), solder alloys (typically 60% Sn, 40% Pb), and lead-acid batteries; cadmium in nickel-cadmium rechargeable batteries and as a pigment stabilizer in plastics; mercury in fluorescent lamps, LCD backlights, switches, and flat-panel displays; and chromium in stainless steel housings, decorative platings, and corrosion-resistant coatings [3]. During informal dismantling and open burning, these metals volatilize, sorb to particulate matter, or leach into soil and groundwater [2], [3].

Lead can exist in multiple oxidation states (Pb^{2+}, Pb^{4+}) and forms stable complexes with organic ligands in leachate, enhancing mobility [3]. In acidic environments typical of landfill leachate, lead sulfide minerals dissolve according to:

$$PbS\ (s) + 2\ H^+\ (aq) \longrightarrow Pb^{2+}\ (aq) + H_2S\ (g)$$

The released Pb^{2+} ions can then complex with dissolved organic matter (DOM), forming soluble Pb-DOM complexes that migrate through soil profiles and contaminate groundwater [3]. Chromium speciation is particularly important: Cr(III) is relatively immobile, forms insoluble hydroxides at neutral pH, and is an essential micronutrient at trace levels, while Cr(VI) exists as chromate (CrO_4^{2-}) or dichromate ($Cr_2O_7^{2-}$) anions, is highly mobile in aqueous systems, readily crosses biological membranes, and is classified

as a Group 1 human carcinogen [3]. The reduction of Cr(VI) to Cr(III) by organic matter or ferrous iron is a key detoxification pathway:

$$Cr_2O_7^{2-} + 14\ H^+ + 6\ e^- \longrightarrow 2\ Cr^{3+} + 7\ H_2O$$

However, this reaction is reversible under oxidizing conditions, creating dynamic contamination patterns in heterogeneous subsurface environments [3].

2.3 Landfill Leachate Chemistry

Leachate from uncontrolled waste disposal sites is a complex aqueous matrix containing dissolved organic matter, inorganic salts, and mobilized metals [3]. Organic acids—including acetic, propionic, and butyric acids—produced during anaerobic decomposition of biodegradable waste lower pH to values as low as 4.5–5.5, enhancing metal solubility through protonation and complexation reactions [3]. For example, cadmium mobilization from sulfide minerals can be represented as:

$$CdS\ (solid) + 2\ H^+ \longrightarrow Cd^{2+}\ (aq) + H_2S\ (g)$$

Dissolved organic matter (DOM) forms soluble complexes with metals, further increasing mobility:

$$Cd^{2+} + DOM\text{–}COO^- \longrightarrow [Cd\text{–}DOM]^+$$

The stability of these complexes depends on the functional group composition of DOM (carboxyl, phenolic, amino groups) and solution chemistry (pH, ionic strength, competing cations) [3]. Redox gradients within landfills drive transformations of redox-sensitive metals [3]. Under anaerobic conditions in the interior of waste masses, sulfate-reducing bacteria generate sulfide, which precipitates metals as insoluble sulfides (e.g., CdS, PbS, ZnS), temporarily immobilizing them [3]. However, at the aerobic-anaerobic interface and in oxygenated leachate plumes, these sulfides oxidize, releasing metals back into solution [3].

Ammonia, produced from protein degradation, can reach concentrations exceeding 1000 mg/L in mature leachates and forms stable complexes with transition metals such as copper and nickel, enhancing their solubility and transport [3]. The overall chemical composition of leachate evolves over time, transitioning from an acidic, high-BOD (biological oxygen demand) "young" leachate dominated by volatile fatty acids to a neutral-to-alkaline, low-BOD "mature" leachate enriched in humic substances and recalcitrant organics [3].

3. Environmental and Health Impacts

3.1 Bioaccumulation Mechanisms

Persistent organic pollutants (POPs) generated during open burning including PCDD/Fs, PAHs, polybrominated diphenyl ethers (PBDEs), and polychlorinated biphenyls (PCBs) are lipophilic and resistant to metabolic degradation, leading to bioaccumulation in fatty tissues and biomagnification through food webs [2]. The octanol-water partition coefficient (K_ow) for many dioxin congeners exceeds 10^6, indicating strong partitioning into lipid compartments [2]. Once absorbed, these compounds distribute preferentially to adipose tissue, liver, and brain, where they can persist for years to decades [2].

Waste pickers and residents of informal settlements face direct dermal contact, inhalation of contaminated particulates, and dietary exposure through locally grown vegetables and livestock that graze on contaminated soils [2], [6]. Biomonitoring studies in e-waste recycling communities have documented elevated serum concentrations of PBDEs (flame retardants used in electronics) and PCDD/Fs in exposed workers compared to reference populations, with concentrations correlating with duration and intensity of occupational exposure [2]. Children are particularly vulnerable due to higher respiratory rates, hand-to-mouth behaviors, and developmental sensitivity to neurotoxic and endocrine-disrupting chemicals [2].

Heavy metals bioaccumulate through distinct mechanisms [3]. Lead substitutes for calcium in bone tissue due to similar ionic radii and charge, with a biological half-life exceeding 20 years in skeletal reservoirs [3]. During periods of bone resorption (pregnancy, lactation, osteoporosis), sequestered lead is remobilized into blood, causing delayed toxicity [3]. Cadmium binds to metallothionein proteins in the kidney and liver, causing chronic nephrotoxicity manifested as tubular dysfunction and proteinuria [3]. The cadmium-metallothionein complex has a biological half-life of 10–30 years, resulting in cumulative lifetime exposure [3].

Mercury, particularly in its methylated form (CH_3Hg^+), crosses the blood-brain barrier and accumulates in the central nervous system, causing neurodevelopmental deficits in children and neurological impairment in adults [3]. Methylmercury is produced by anaerobic bacteria in aquatic sediments and bioaccumulates through aquatic food chains, with top predators (fish, birds) exhibiting concentrations 10^5–10^6 times higher than ambient water [3]. These metals enter the body through inhalation of fumes and dusts during e-waste processing, ingestion of contaminated food and water, and dermal absorption during manual sorting [2], [3].

3.2 Soil and Water Contamination Pathways

Atmospheric deposition of combustion-derived particulates introduces POPs and metals to surface soils, where they sorb to organic matter and clay minerals [2], [3]. The distribution coefficient (Kd) for PAHs in soil typically ranges from 10^2 to 10^4 L/kg, indicating strong retention in the solid phase [2]. However, dissolved organic carbon (DOC) in infiltrating rainwater can mobilize sorbed contaminants through formation of DOC-contaminant complexes, facilitating vertical transport to groundwater [3]. This process is particularly important for hydrophobic organic compounds that would otherwise be immobile [3].

Direct contamination occurs at e-waste dismantling sites, where acid leaching of circuit boards releases copper, lead, tin, and other metals into soil pore water [3]. Informal recyclers often use concentrated nitric or sulfuric acid to dissolve metals from electronic components, and improper disposal of spent acid solutions results in localized soil acidification and metal contamination [3]. Field studies at informal e-waste sites in Accra, Ghana, have documented soil lead concentrations exceeding 18,000 mg/kg—more than 100 times natural background levels—and elevated concentrations of copper (up to 15,000 mg/kg), zinc (up to 8,000 mg/kg), and antimony (up to 500 mg/kg) [3].

Surface water contamination results from runoff carrying suspended sediments laden with sorbed pollutants and from direct discharge of leachate [3]. In aquatic systems, metals undergo speciation changes driven by pH, redox potential, and complexation with natural organic matter [3]. Methylation of inorganic mercury by sulfate-reducing bacteria (Desulfovibrio, Geobacter) in anaerobic sediments produces the highly bioavailable methylmercury:

$$Hg^{2+} + CH_3^- \text{ (from bacterial methyltransferase)} \rightarrow CH_3Hg^+$$

This transformation amplifies mercury toxicity and bioaccumulation potential in aquatic food webs [3]. Groundwater contamination plumes from informal waste sites can extend hundreds of meters downgradient, threatening drinking water supplies for surrounding communities [3].

3.3 Atmospheric Chemical Transformations

Open burning generates a complex mixture of gas-phase and particulate emissions [2]. Incomplete combustion produces carbon monoxide, volatile organic compounds (VOCs) such as benzene and toluene, and semivolatile organic compounds (SVOCs) including PAHs that partition between gas and particle phases according to their vapor pressures [2]. Secondary atmospheric reactions of VOCs with hydroxyl radicals ($OH\cdot$), ozone (O_3),

and nitrogen oxides (NO_x) produce oxidized derivatives that can be more toxic or persistent than parent compounds [2].

For example, PAHs undergo nitration in the presence of nitrogen dioxide and hydroxyl radicals, forming nitro-PAHs with enhanced mutagenicity:

$$\text{Pyrene} + NO_2 + OH\cdot \longrightarrow \text{1-Nitropyrene} + H_2O$$

Nitro-PAHs such as 1-nitropyrene and 3-nitrofluoranthene are direct-acting mutagens that do not require metabolic activation and are more potent carcinogens than their parent PAHs [2]. Photochemical oxidation of PAHs by ozone produces quinones and other oxygenated derivatives that generate reactive oxygen species (ROS) in biological systems, causing oxidative stress and DNA damage [2].

Fine particulate matter ($PM_{2.5}$) carries adsorbed POPs and metals deep into the respiratory tract, where they deposit in alveolar regions and translocate to the bloodstream [2]. Ultrafine particles (<0.1 μm) can cross the alveolar-capillary barrier and enter systemic circulation, distributing to organs including the brain, liver, and heart [2]. Systematic reviews document elevated concentrations of dioxins, furans, and PAHs in air samples from informal e-waste recycling sites, with waste pickers experiencing occupational exposures orders of magnitude above background levels [2], [6]. Personal air sampling studies have measured PCDD/F concentrations of 10–100 pg TEQ/m³ (toxic equivalents per cubic meter) in the breathing zones of workers engaged in cable burning, compared to typical urban background levels of 0.01–0.1 pg TEQ/m³ [2].

4. Circular Economy and Chemical Recycling Technologies

4.1 Pyrolysis and Thermal Cracking

Pyrolysis—thermal decomposition in the absence of oxygen—converts mixed plastic waste into liquid fuels, gases, and solid char [4], [5]. The process involves free-radical chain scission of C–C and C–H bonds, producing a distribution of hydrocarbons dependent on temperature, residence time, catalyst presence, and feedstock composition [4]. For polyethylene, the generalized reaction is:

$$-(CH_2-CH_2)_n- \longrightarrow C_mH_{2m+2} + C_mH_{2m} + H_2 + \text{char}$$

At temperatures of 400–500°C, PE and PP yield liquid fractions rich in C_5–C_{20} hydrocarbons suitable as diesel or gasoline blendstocks [4]. The liquid product, often called pyrolysis oil or plastic-derived fuel, has a heating value of 40–44 MJ/kg, comparable to conventional petroleum fuels [4]. Higher temperatures (>700°C) favor gas

production (H_2, CH_4, C_2H_4, C_3H_6) and aromatic compounds (benzene, toluene, xylene) through secondary cracking and aromatization reactions [4].

Catalytic pyrolysis employs zeolites, silica-alumina, or fluid catalytic cracking (FCC) catalysts to enhance product selectivity and reduce reaction temperatures [4]. Zeolite catalysts with appropriate pore sizes (e.g., ZSM-5, Y-zeolite) promote cracking of long-chain hydrocarbons to gasoline-range products and increase aromatic content through cyclization and dehydrogenation reactions [4]. The use of catalysts can reduce pyrolysis temperatures from 500–600°C to 350–450°C, improving energy efficiency and reducing equipment costs [4].

Pyrolysis offers advantages for informal settlements: it handles mixed, contaminated feedstocks that mechanical recycling cannot process, and simple batch reactors can be constructed at low cost using locally available materials [5], [8]. However, careful control of temperature and oxygen ingress is essential to minimize formation of PAHs and other toxic byproducts [2], [4]. Incomplete pyrolysis or air infiltration can lead to partial combustion, generating the same hazardous emissions as open burning [2]. Proper reactor design includes oxygen-free atmospheres (nitrogen or argon purge), temperature monitoring and control, and condensation systems to capture liquid products and prevent vapor release [4].

4.2 Depolymerization and Solvolysis

Chemical depolymerization selectively cleaves polymer bonds to recover monomers or oligomers for repolymerization [5]. PET glycolysis, the most commercially advanced solvolysis route, employs excess ethylene glycol and a transesterification catalyst (e.g., zinc acetate, manganese acetate, or ionic liquids) to break ester linkages:

$$–[O–CH_2–CH_2–O–CO–C_6H_4–CO]_n– + (n+1)\ HOCH_2CH_2OH \rightarrow n\ HOCH_2CH_2–O–CO–C_6H_4–CO–O–CH_2CH_2OH + HOCH_2CH_2OH$$

The primary product, bis(2-hydroxyethyl) terephthalate (BHET), can be purified by crystallization or distillation and repolymerized to virgin-quality PET [5]. Glycolysis tolerates colored, multilayer, and contaminated PET feedstocks, making it suitable for post-consumer waste streams that cannot be mechanically recycled [5]. Reaction conditions are relatively mild (180–240°C, atmospheric pressure), and excess ethylene glycol can be recovered and recycled [5].

Methanolysis and hydrolysis are alternative depolymerization routes yielding dimethyl terephthalate (DMT) or terephthalic acid (TPA), respectively [5]. Methanolysis requires higher temperatures (180–280°C) and pressures (2–4 MPa) but produces DMT, a volatile

monomer that can be purified by distillation [5]. Hydrolysis, conducted under alkaline (NaOH) or acidic (H_2SO_4) conditions at 200–300°C and elevated pressure, yields TPA, the primary monomer for PET synthesis [5]. The hydrolysis reaction is:

$$–[O–CH_2–CH_2–O–CO–C_6H_4–CO]_n– + (n+1)\ H_2O \rightarrow n\ HOOC–C_6H_4–COOH + (n+1)\ HOCH_2CH_2OH$$

Alkaline hydrolysis is faster and more selective than acidic hydrolysis, but requires neutralization and generates salt byproducts [5]. Solvolysis of polyolefins remains challenging due to the absence of heteroatoms and the high stability of C–C bonds [4]. Emerging approaches include catalytic hydrocracking using bifunctional metal-acid catalysts and oxidative degradation using peroxides or ozone, but these require harsh conditions (high temperature, high pressure, strong oxidants) and are not yet economically viable for informal settings [4], [5].

4.3 Green Chemistry and Enzymatic Approaches

Green chemistry principles—including use of renewable feedstocks, benign solvents, catalytic processes, and design for degradation—guide the development of sustainable recycling technologies [8]. Enzymatic depolymerization of PET using cutinase, esterase, and lipase enzymes offers a low-temperature, selective alternative to chemical solvolysis [5]. Engineered enzymes, such as the thermostable PETase from *Ideonella sakaiensis* and its optimized variants, can hydrolyze PET to terephthalic acid and ethylene glycol under mild conditions (30–70°C, neutral pH):

$$PET + H_2O\ (\text{enzyme-catalyzed}) \rightarrow \text{terephthalic acid} + \text{ethylene glycol}$$

Enzyme-catalyzed depolymerization proceeds through a two-step mechanism: (1) esterase-catalyzed hydrolysis of ester bonds to produce BHET and oligomers, and (2) further hydrolysis of BHET to TPA and ethylene glycol [5]. The reaction is highly selective, producing minimal side products, and operates under ambient pressure without organic solvents [5]. However, enzymatic routes face challenges of slow reaction rates (hours to days for complete depolymerization), high enzyme production costs, and sensitivity to feedstock contaminants (dyes, additives, non-PET polymers) that inhibit enzyme activity [5]. Current research focuses on enzyme engineering to improve thermostability, activity, and tolerance to impurities, and on process intensification through immobilized enzyme reactors and continuous-flow systems [5].

4.4 Metal Recovery and Biochar Production

Hydrometallurgical and pyrometallurgical processes recover valuable metals from e-waste [3]. Acid leaching dissolves metals from crushed circuit boards, followed by selective precipitation, solvent extraction, or electrowinning [3]. For example, copper recovery via sulfuric acid leaching:

$$\text{Cu (metallic)} + 2\ H_2SO_4 + O_2 \rightarrow CuSO_4 + 2\ H_2O + SO_2$$

Electrowinning then reduces Cu^{2+} to metallic copper at the cathode:

$$Cu^{2+} + 2\ e^- \rightarrow Cu\ (s)$$

Precious metals (gold, silver, palladium) are recovered by aqua regia digestion or cyanide leaching, followed by precipitation with reducing agents or electrowinning [3]. These processes generate acidic, metal-laden effluents that require neutralization and metal precipitation before discharge, posing challenges for informal operators lacking wastewater treatment infrastructure [3]. Emerging approaches include bioleaching using acidophilic bacteria (*Acidithiobacillus ferrooxidans*, *Leptospirillum ferrooxidans*) that oxidize metal sulfides and solubilize metals under mild conditions, and ionic liquid extraction that selectively dissolves metals without strong acids [3].

Pyrolysis char, or biochar, can serve as a low-cost adsorbent for heavy metals and organic pollutants in contaminated water [8]. The porous structure (surface areas of 100–500 m^2/g) and surface functional groups (carboxyl, hydroxyl, phenolic) of biochar facilitate metal binding through ion exchange, complexation, and electrostatic attraction [8]. Adsorption capacities for Pb^{2+}, Cd^{2+}, and Cu^{2+} range from 10 to 200 mg/g, depending on biochar feedstock, pyrolysis temperature, and solution chemistry [8]. However, biochar quality depends critically on feedstock composition and pyrolysis conditions, and uncontrolled production may yield materials with low adsorption capacity, high ash content, or residual contaminants (PAHs, dioxins) that limit environmental applications [8]. Standardized production protocols and quality testing are needed to ensure biochar safety and efficacy [8].

5. Case Examples: Informal Waste Management in India, Ghana, and Vietnam

5.1 India: Nashik and Delhi

India generates over 3 million tons of e-waste annually, which makes it one of the top five producers of e-waste in the world because most of this waste gets processed through informal waste operations in cities such as Delhi and Nashik and Mumbai and Bangalore

[6]. Waste pickers organize themselves into family-operated businesses which they use to disassemble electronics by using hammers and screwdrivers and heat guns while they burn plastic coatings to collect copper wire and they use open acid baths to obtain precious metals from circuit boards [6]. Studies conducted in Delhi's Seelampur and Mustafabad neighborhoods which serve as major informal e-waste processing centers have shown that 60 to 80 percent of children living near these areas possess blood lead levels above 10 μg/dL while soil tests show cadmium contamination at 3 to 6 mg/kg and chromium levels at 250 to 400 mg/kg and PAHs contamination at benzo[a]pyrene levels above 1 mg/kg exceeds Indian regulatory limits [6].

The informal recycling activities create dangerous working conditions, yet they provide employment opportunities to 1.5 million individuals who depend on recycling for their economic survival. Waste pickers earn $2–5 per day, and the informal sector recovers approximately 95% of India's e-waste, which prevents landfill disposal while providing manufacturing industries with secondary raw materials according to research [6]. The recent projects developed by NGOs and government bodies support safer dismantling methods that involve disassembling parts manually without using fire, wearing protective equipment such as gloves and masks and aprons, and building basic pollution control centers for collecting materials [8]. The implementation shows limited progress because financial obstacles exist while authorities fail to enforce regulations because illegal competitors use dangerous methods to reduce their operational expenses [8].

5.2 Ghana: Agbogbloshie, Accra

Agbogbloshie in Accra, Ghana, is one of the world's largest and most studied informal e-waste processing sites, receiving an estimated 40,000 tons of used electronics annually, much of it imported from Europe and North America under the guise of "second-hand goods" [3]. Workers, predominantly young men and boys, burn insulated cables over open fires to recover copper, releasing dioxins, furans, brominated flame retardants, and heavy metals into the air and soil [2], [3]. Soil samples from Agbogbloshie show lead concentrations up to 18,000 mg/kg—more than 100 times background levels—and elevated levels of cadmium (up to 50 mg/kg), antimony (up to 500 mg/kg), and polybrominated diphenyl ethers (PBDEs, up to 10,000 μg/kg) [3].

Groundwater beneath the site is contaminated with dissolved metals, with lead concentrations exceeding WHO drinking water guidelines (10 μg/L) by factors of 10–100, threatening water supplies for surrounding communities [3]. The Odaw River, which flows through Agbogbloshie, carries contaminated sediments downstream to the Gulf of Guinea, extending the geographic footprint of pollution [3]. Health surveys document elevated rates of respiratory illness, skin disorders, and neurological symptoms among

workers, and biomonitoring studies detect elevated blood levels of lead, cadmium, and flame retardants [2], [3].

Recent initiatives by the Ghanaian government, international NGOs, and academic institutions promote safer dismantling techniques and small-scale pyrolysis units to reduce open burning [8]. Pilot projects have introduced manual cable stripping tools, protective equipment, and centralized collection points with basic ventilation and fire suppression systems [8]. However, adoption remains limited due to cost (manual strippers cost $50–100, equivalent to 2–4 weeks' income), lack of regulatory enforcement, and resistance from informal networks that control access to waste streams and markets [8]. Achieving sustainable change will require integrated interventions that address economic incentives, regulatory frameworks, and social dynamics [7], [8].

5.3 Vietnam: Informal E-Waste Recycling Villages

In northern Vietnam, villages such as Bui Dau, Dong Mai, and Van Phuc specialize in informal e-waste recycling, processing imported electronics from industrialized nations and domestic sources [2]. Workers use rudimentary methods—open burning of cables and circuit boards, acid leaching in unlined pits, and manual sorting without protective equipment—resulting in severe environmental contamination [2]. Air monitoring in Bui Dau reveals dioxin concentrations of 50–200 pg TEQ/m³, exceeding WHO air quality guidelines (0.3 pg TEQ/m³) by factors of 100–600, and biomonitoring studies detect elevated levels of PBDEs (median serum concentration 200 ng/g lipid, compared to 10–20 ng/g lipid in reference populations) and heavy metals in residents' blood and breast milk [2].

Children in these communities exhibit neurodevelopmental delays, reduced IQ scores, and elevated blood lead levels (median 8–12 μg/dL, compared to 2–3 μg/dL in unexposed populations) [2]. Soil contamination is pervasive, with lead concentrations of 500–5,000 mg/kg, copper 1,000–10,000 mg/kg, and PAHs 10–100 mg/kg in residential areas adjacent to processing sites [2]. The Vietnamese government has initiated pilot programs to formalize e-waste recycling, including establishment of licensed recycling facilities, training programs for workers, and enforcement of import restrictions on hazardous waste [8]. However, informal practices persist due to economic incentives (higher profit margins from unregulated operations), weak enforcement capacity, and lack of affordable alternatives for waste pickers [2], [8].

6. Policy and Sustainable Futures: Environmental Justice Perspectives

6.1 Environmental Justice and the Circular Economy

The circular economy paradigm promises resource efficiency, waste reduction, and decoupling of economic growth from virgin resource extraction, but its implementation in informal settlements raises critical environmental justice concerns [7]. Informal waste pickers predominantly women, children, and marginalized ethnic and caste groups bear disproportionate health risks while generating economic value for downstream industries that purchase recovered materials [6], [7]. A just transition to circular systems must ensure that benefits (employment, income, reduced pollution) accrue to these communities, rather than displacing workers or concentrating hazards [7].

Environmental justice frameworks emphasize procedural justice (participation in decision-making), distributive justice (equitable distribution of benefits and burdens), and recognition justice (acknowledgment of marginalized groups' rights and contributions) [7]. Applied to waste management, this means recognizing informal waste pickers as essential actors in urban resource management, providing access to protective equipment and training in safer handling practices, and creating pathways to formalization that preserve livelihoods while improving working conditions [7], [8]. Policy frameworks should avoid "greenwashing" scenarios where circular economy initiatives displace informal workers, concentrate recycling facilities in marginalized neighborhoods, or export hazardous waste to lower-income countries [7].

Extended producer responsibility (EPR) schemes, which require manufacturers to finance collection and recycling of their products, can fund infrastructure and cleaner technologies, but must be designed to support not supplant existing informal networks [8]. Successful EPR models in Brazil, Colombia, and India have integrated informal waste pickers into formal collection systems, providing stable income, social benefits, and improved safety while leveraging their expertise and existing logistics [6], [8]. Key design features include direct contracts or cooperatives for waste pickers, performance-based payments, and investment in collection infrastructure and protective equipment [8].

6.2 Green Chemistry and Appropriate Technology

Deploying chemical recycling technologies in informal settlements requires adherence to green chemistry principles and appropriate technology criteria: simplicity of operation, affordability, robustness to feedstock variability, and compatibility with local technical capacity [8]. Small-scale pyrolysis reactors with integrated emission controls offer a promising pathway, converting mixed plastics to fuel while minimizing toxic byproducts [4], [5], [8]. Designs suitable for informal settings include batch reactors with external heating (wood, biomass, or waste-derived fuel), condensation systems to capture liquid products, and basic emission controls (cyclones for particulate removal, water scrubbers for acid gases) [8].

Community-based collection and sorting hubs can aggregate waste streams, improving feedstock quality for downstream chemical recycling and creating employment in sorting, cleaning, and baling operations [8]. Sorting by polymer type (PE, PP, PET, PVC) increases pyrolysis product quality and reduces hazardous emissions (e.g., separating PVC prevents dioxin formation) [4], [8]. Simple sorting protocols based on visual identification, density separation (float-sink in water or brine), and near-infrared spectroscopy (for larger operations) can be implemented with minimal training [8].

Capacity building is essential: training programs should cover safe handling of chemicals, operation and maintenance of recycling equipment, monitoring of environmental and occupational exposures, and basic business management [8]. Partnerships between governments, NGOs, academic institutions, and private sector actors can facilitate technology transfer, provide ongoing technical support, and link informal operators to markets for recovered materials and products [8]. Successful examples include the Waste Ventures India model, which provides waste pickers with training, equipment, and market linkages for recyclables, and the Precious Plastic initiative, which disseminates open-source designs for small-scale plastic recycling machines [8].

6.3 Regulatory Frameworks and International Cooperation

Effective waste management in informal settlements requires coherent regulatory frameworks that balance environmental protection with social equity [8]. Regulations should set emission and effluent standards for recycling operations, mandate use of personal protective equipment, prohibit the most hazardous practices (e.g., open burning of PVC, uncontrolled acid leaching), and establish licensing systems that formalize informal operators while providing transition support [2], [8]. Enforcement must be accompanied by support mechanisms subsidies or low-interest loans for cleaner technologies, microfinance for equipment purchase, health services for exposed populations, and social safety nets for workers displaced by automation or formalization [8].

International cooperation is critical, given the transboundary nature of e-waste flows [3]. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes restricts export of hazardous waste from developed to developing countries, but illegal shipments persist due to weak customs enforcement, mislabeling of waste as "used goods," and demand for cheap electronics in Global South markets [3]. Strengthening customs capacity, promoting regional recycling infrastructure, and supporting technology transfer can reduce the burden on informal sectors in the Global South [3], [8]. The Bamako Convention (African Union) and the Waigani Convention (Pacific Islands)

impose stricter bans on hazardous waste imports, but require enhanced enforcement and regional cooperation [3].

Producer responsibility and design for environment initiatives in industrialized countries can reduce the toxicity and complexity of products, making them safer and easier to recycle in resource-constrained settings [8]. Examples include phasing out brominated flame retardants, reducing heavy metal content in electronics, and designing products for disassembly with snap-fit rather than glued or welded joints [8]. International standards (e.g., RoHS Directive, REACH regulation) have driven some improvements, but broader adoption and stronger enforcement are needed [8].

7. Conclusion

Waste management in informal urban settlements of the Global South is fundamentally a chemical challenge, shaped by the molecular structures of polymers, the speciation and mobility of heavy metals, and the reaction pathways that generate persistent organic pollutants [1], [2], [3]. Open burning and uncontrolled disposal create multi-pathway exposures that disproportionately harm marginalized communities, while informal waste pickers perform essential resource recovery under conditions of extreme occupational hazard [2], [6], [7]. The chemistry of waste transformation—from polymer pyrolysis to metal leaching to dioxin formation—determines both the severity of environmental health impacts and the feasibility of circular economy interventions [1], [4].

Chemical recycling technologies pyrolysis, depolymerization, enzymatic degradation, and green chemistry approaches offer pathways to valorize mixed and contaminated waste streams that cannot be mechanically recycled, but their deployment must be guided by principles of environmental justice and appropriate technology [4], [5], [8]. Simple, low-cost systems with integrated pollution controls can reduce toxic emissions while preserving livelihoods and generating local economic benefits [8]. Pyrolysis reactors that convert polyolefin waste to fuel, glycolysis systems that recover PET monomers, and hydrometallurgical processes that extract valuable metals from e-waste all have potential applications in informal settlements, provided they are designed for safety, simplicity, and local capacity [4], [5], [8].

Case studies from India, Ghana, and Vietnam illustrate both the urgency of intervention and the potential for community-based solutions [2], [3], [6]. These examples demonstrate that informal waste management is not merely a technical problem but a socio-technical system embedded in economic necessity, social networks, and power dynamics [6], [7]. Effective interventions must address all dimensions: providing safer technologies and protective equipment, creating economic incentives for adoption, building technical

capacity through training, and establishing regulatory frameworks that formalize and support rather than criminalize informal operators [7], [8].

Achieving sustainable waste management in informal settlements requires integrating chemical innovation with social equity, ensuring that circular economy transitions deliver environmental and health co-benefits to the communities most affected by waste [7], [8]. Policy frameworks must recognize informal waste pickers as key stakeholders, provide access to safer technologies and protective equipment, enforce regulations that prevent the externalization of toxic burdens onto already marginalized populations, and create pathways to formalization that preserve livelihoods while improving working conditions [7], [8]. Extended producer responsibility schemes, green chemistry principles, and international cooperation on transboundary waste flows are essential components of a comprehensive strategy [8].

Only through such integrated, justice-centered approaches—grounded in rigorous chemical understanding and committed to equitable outcomes—can the Global South realize the promise of a truly circular economy that protects both people and planet [8]. The molecular-level chemistry of waste transformation must be harnessed not to perpetuate environmental injustice but to create pathways toward sustainable, dignified, and healthy livelihoods for the world's most vulnerable urban communities [7], [8].

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Chapter 18: Unequal Impacts of Climate Change: Women, Risk and Resilience

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Abstract

Among all the universal issues in today's world, climate change is one of the most challenging of all. Significant impact of climate change is seen among populations worldwide due to the increasing intensity of natural disasters. But the impacts of these disasters are not uniform, mainly due to the already existing social, economic, and biological biases. These impacts can lead to further widening of the current gender gap. Studies also indicate that women belonging to marginalized communities from impoverished households are more exposed to risks during disasters, especially those in lower-and middle-income countries (LMICs). This chapter undertakes an in-depth study of the different vulnerabilities of women to climate- induced disasters in the Global South, with a special focus on floods and droughts. The method used for this article depends on qualitative analysis of content conducted through secondary sources like DRR policies from ADPC, SADC, and Women's Resilience to Disasters (WRD) alongside peer- reviewed literature that focuses on the effects of floods and droughts on women and their adaptations in the Global South. Women are reported to be more prone to food insecurity, loss of livelihood, and displacement, in flood-affected areas. In drought-prone areas, the feminisation of household, water management, and agricultural duties greatly increases women's overall burden during disasters. Addressing gender-specific concerns in times of crises, such as protection from gender-based violence, access to reproductive healthcare and sanitation facilities and having economic stability, becomes crucial to prevent increasing inequalities. Although women suffer disproportionate impacts of climate- induced disasters, they have come up with different types of adaptations. Most commonly it is observed that women try to diversify the income sources of the family. Other strategies include stocking up of dried foods and using local knowledge and wisdom to form community groups to guide others to safety during disasters. These practical strategies exhibit women's resilience during disasters. This chapter thus expands on how women are not mere victims but are agents of building better strategies for disaster risk reduction. Therefore, it is important for disaster management plans and policies to follow a gender- sensitive approach and form plans that allow women to be resourceful in the face of crises. It is also crucial for DRR

policies in the Global South to integrate women into their frameworks and prioritize their leadership roles. This will further help build better policies and strengthen long-term resilience across affected communities.

Keywords: climate change, gender, health, mitigation, floods, droughts

Introduction

Climate change is notably one of the most concerning topics of the contemporary era. In the present age of technology, where everything is very fast-paced, climate change is one of the issues that cannot be overlooked. Since the beginning of the industrial revolution, there has been a significant increase in global energy consumption. The shift to fossil fuels became a major contributor to growing economies, allowing countries to develop very quickly. While developed countries now have reduced their emissions efficiently, developing countries still face rising emissions because of their need for rapid industrialization and urbanization which further reinforces climate change.

Technology has grown at a tremendous speed over the last century, leading to urbanization and growth in the medical field, but this comes with its own drawbacks. Environmental degradation, pollution, greenhouse gas emissions, ocean acidification- are only a few of the many issues that have intensified, thereby harming not only animal or human life, but the planet as a whole. Greenhouse gas emissions is one of the main reasons for changing climate. Other causes include deforestation, methane emissions from livestock, industrial processes to name a few. These activities have a direct impact on rising global temperatures, leading to sea-level rise, melting ice caps and extreme weather fluctuations. According to Our World in Data (2023), before 1950, Europe (especially UK) and US accounted for almost 80-90% of global emissions due to early industrialization [1]. In the recent years, Asia have contributed immensely to greenhouse emissions with China being on top for almost 30% and India in the third with approximately 8% of global emissions. [2]

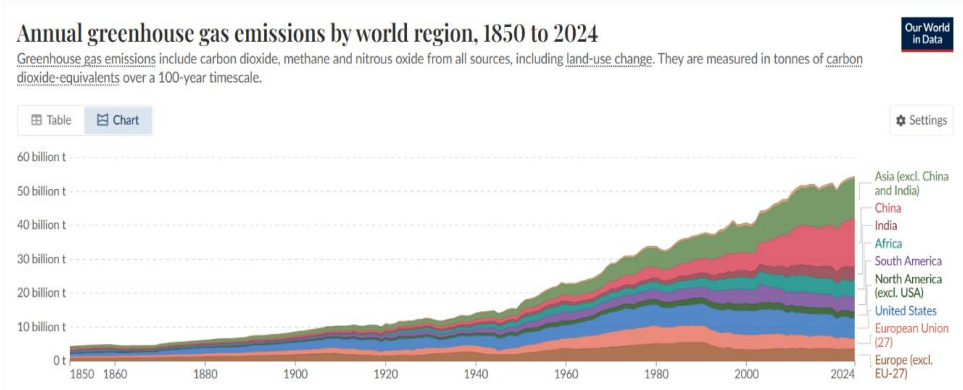


Fig: Annual greenhouse gas emissions by world region, 1850-2024 (adapted from Our World in Data) [1]

With the drastic changes in weather and disruption of global climate patterns due to greenhouse gas emissions, climate change is inevitable. A recent study estimates that due to climate change around 132 million people (especially those in Sub-Saharan Africa and South Asia) may be pushed to extreme poverty by 2030 [3]. Climate-related disasters have increased significantly over the last 50 years, causing around 1.23 million deaths between 2000 and 2019 [4]. In the Global South, about 143 million individuals are projected to be displaced due to climate change impacts [5]. Disasters spare no one. But among the worst sufferers are women and children, especially those who belong to rural and lower income families. This chapter therefore analyses the impacts of climate disasters, specifically floods and droughts on women. Drawing on different studies from countries in the Global South, this chapter also explores the various strategies and adaptations that women have undertaken to keep them and their families safe.

Methodology

This article is analytical in nature. It follows a qualitative research approach that analyses secondary documents which includes policies and schemes based on Disaster Risk Reduction (DRR) and Disaster Risk Management (DRM), reports from credible international organizations (e.g., ADPC, SADC) and peer- reviewed articles that focuses on floods, droughts, impacts and adaptations by women in the Global South. The approach used in integrating information involves reviewing and selecting authentic sources using criteria like publications that identify patterns such as gaps noticed in gender- aggregated data and women's inclusion in DRR policies. This article also emphasizes on gendered impacts on women and their adaptive strategies through direct examination of documents and reports.

Findings

A study showing systematic review of 61 studies reveal that women experience heightened impacts of climate change, especially those residing in LMICs (low- and middle- income countries) and indigenous communities [30]. Socially structured roles and gender- based responsibilities are among the main reasons women are disproportionately affected by disasters [30]. Therefore, when disasters occur, existing inequalities widens the gender gap even more. Women's livelihood, food security, health and sanitation are severely impacted. Biologically, disasters also create many different illnesses in women. During disasters, there is a lack of proper hygienic washrooms and sanitary areas which can lead to various reproductive problems and infections in women. Additional issues also occur when there is unavailability of healthcare providers and services. It is also observed that many governmental and non-governmental organisations have taken a lot of measures to help and decrease the intensity of the impacts of disasters, but it is a never-ending problem. Although there are schemes and policies by governments which promises to consider the varying gender- specific needs, there is still a vast difference noticed of what is being implemented. Routine checks are required to ensure that proper steps are taken to collect gender- aggregated data and to carry out these policies in an unbiased manner. NGOs and community-based organisations also need to perform mock drills in remote areas to increase awareness among people. A study in Indonesia reports that rural women heavily rely on local wisdom and traditions passed down orally, which may lack the scientific backing necessary to understand the severity of disasters and therefore have flawed or inadequate responses [23]. This points to the fact that not all women are impacted in a similar way. Women belonging to rural and low-income families are more prone to the impacts of disasters. However, despite all the difficulties and inconveniences women have adapted and continued living their lives and offered helping hands to their families and the community.

Floods, Droughts and its Impacts on Women Across Global South

Global warming is one of the primary causes of climate change. It results in multiple of climate crises and extreme weather events such as floods, droughts, tsunamis and heatwaves. Primarily driven by human activities, it is a major element in biodiversity loss, destruction of habitat and extreme loss of life. The impact of these kinds of disasters is fatal on everyone. However, these disasters harm men and women in different ways. Compared to men, women and children face a 14 times higher risk of death during disasters [6]. Also, almost 4 out of 5 people displaced during disasters are reported to be women and girls [6]. South Asia ranks among the most vulnerable regions to floods, frequently experiencing flash floods, coastal floods, and overflow of rivers mostly triggered by intense monsoon rainfall. In South Asia, India, Pakistan, Bangladesh, Sri Lanka, Nepal, are countries that are severely and consistently affected by floods. The monsoon rains (June- September) typically hit the southern coast of India first. As the

monsoon advances, it brings torrential rains to other parts of India, Pakistan, Nepal and Bangladesh. While the rains are essential for survival and agriculture, the high influx of waters due to rains or overflowing of rivers, causes significant loss of human and animal lives. As climate change accelerates, their intensity often leads to catastrophic consequences. Immediate human and health impact, permanent displacement, economic loss and psychological trauma constitute just a handful of the diverse challenges encountered during floods. In Southeast Asia, the Philippines, Thailand, Indonesia, Vietnam, are countries that are frequently affected by catastrophic floods. South and Southeast Asia is not only affected by floods, but also severe droughts. Lack of plant cover becomes one of the reasons for drying up of land, which interestingly also reinforces floods. Other causes include erratic behaviour of upcoming monsoon, rising global temperatures, and over-extraction of groundwater [33]. Unsustainable agricultural practices and overgrazing also reduces the topsoil, leading to moisture loss which reintegrates further drying of land. As the intensity of disasters have increased in the last few years, so has the number of people affected. Although all individuals are at risk, women are often forced to face the full brunt of the crisis, with the aftermath impacting their lives far more severely than those of their male counterparts.

In lower-and middle-income countries like India, Pakistan, Sri Lanka, which are mostly agriculture based, many rural women have been unable to take advantage of opportunities that come with land holdings. For example- in India, only 14 per cent of women have land holdings [7]. Because the agricultural sector is very sensitive to disasters like floods and droughts, women agricultural workers who often lacks land ownership face threats to their livelihoods and income [7]. Societal structures are also one of the prominent reasons as to why women suffer more during disasters. Mortality differences arise not only because of immediate disaster, but also post- disaster events, such as shortage of economic resources or breakdown of the social order, where existing gender disparities are magnified. The relationship between disaster-affected populations and female intentional homicide rates was found to be most pronounced in Central and South Asia, with East and Southeast Asia ranking next [8]. Violence against women and girls also saw a significant increase in the aftermath of disasters including sexual exploitation and abuse, child marriage and human trafficking. Because of gender roles, women are more occupied with caregiving and caretaking roles of others rather than themselves; this leads them to prioritize the safety and protection of others before their own lives [9]. During floods, it is observed that women living in the Sundarbans often travel further in search of food and resources to better support their families [10]. Reduced income following crises frequently leads to the migration of male household members, which places the primary responsibility for family management on women and intensifies their physical and emotional burden [10]. In Afghanistan, people are of the view that women should not be allowed to work outside homes due to deeply rooted social norms and safety concerns. Due to very patriarchal family structures, is it also difficult for single

Afghan women and widows to survive without protection from male family members [22]. Owing to their lack of education, women have frequently expressed concerns of limited awareness of flood- related disasters. Reports also points out that due to lack of female training staff in disaster risk reduction workshops, women were not allowed to sit in these gatherings [22]. These barriers pose a very significant threat to women during times of crises. There is a critical need to integrate women in climate relief frameworks so that policies and recovery strategies reflect their perspectives as well. There are also issues that have been observed regarding the segregation of toilets in shelters and camps for women [34]. Menstruating women, and pregnant or lactating mothers also require hygienic spaces, safe environments and good access to healthcare. Reports observed that pregnant women who get displaced during disasters are less likely to have access to proper healthcare [24]. Severe stress and trauma during disasters also results in a variety of pregnancy complications, where the growth of the fetus can be impacted or could lead to premature birth of the baby [24]. A study revealed that when conditions like droughts arise, violence on women by their respective partners increases in Sub- Saharan Africa [29]. Women living in extreme droughts reportedly had more risk from abusive and controlling partners than women in mild droughts [29].

The revised National Disaster Management Plan (NDMP) 2019 in India, prioritizes the inclusion of women and encourages their greater involvement in disaster risk management. Schemes like 'Aapda Mitra' encourages training of women for disaster response. Women are also given significant roles in Task Force groups that prepare for disasters, conducts mock drills and rescue operations [25]. The Philippines Disaster Risk Reduction and Management Act (RA 10121) also provide for gender-responsive measures for disaster risk management. The policy also integrates gender analysis in recovery frameworks [26]. The Southern African Development Community (SADC) Gender Responsive Disaster Risk Reduction Strategic Plan and Action Plan (2020-2030) talks about taking into consideration the needs of marginalized groups who are more at risk, such as women. The report suggests that to make disaster risk reduction (DRR) and climate change adaptation (CCA) a reality, responsibility and accountability at every level is necessary including sex-aggregated data collection and proper evaluation [27]. It has also targeted to reduce the number of affected and mortality rates during disasters among women, men, girls and boys and a substantial increase in the number of early warning systems by 2030 [27]. However, in many countries as reported by Asian Disaster Preparedness Centre (ADPC), women are identified as vulnerable but their skills and expertise in disaster risk reduction strategies are not recognized [28]. It mentions examples of Vietnam's 'National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020' and Papua New Guinea's 'National DRR Framework' that mentions pregnant and lactating mothers as a vulnerable group without any additional attention to gender related concerns in disaster risk management (DRM) [28]. Therefore, there is a need for more effective implementation of policies and schemes that promote gender

inclusivity. Proper attention must be given to ensure that policies are not confined to paper but are effectively implemented on the ground. Also, greater emphasis must be given to strengthening policies that address specific needs of all vulnerable groups, including women.

Women and their Adaptations in South and Southeast Asia

Even though they have been at the suffering end, women have found ways to learn, adapt and be resourceful in times of need. During floods or droughts, the responsibility on women amplifies. In Solmari and Boramari villages in Assam, India, it was observed that because most men reportedly had moved away from home for work, women-led households became more common [11]. As the government authorities made plans for building embankments in the frequently flooded areas, women had the sole responsibility of not only demolishing their original homes or making deals with landowners, but also for entirely relocating and rebuilding their new homes [11]. In many Asian countries, women play a vital role as farmers and agricultural producers. This also means that they are very dependent on agriculture for their survivability which is significantly impacted when disasters like droughts and floods occur. In 2022, ActionAid Nepal, started a project focusing on preparing women with Disaster Risk Reduction (DRR) skills by using modern technologies for weather forecasting and learning proper first-aid methods. This has greatly reduced the dependence of women on external agencies and moreover strengthened the community for future disasters [12]. Mangrove forests acts as natural barriers that protect land during floods and help maintain soil moisture in coastal areas during droughts. Therefore, in Cambodia, local women are working towards protecting coastal areas and mangrove forests. A completely women-led organisation, volunteers from Chroy Svay Keut village have taken it upon themselves to plant and protect new mangrove trees [12]. In communities where women have actively participated in climate adaptation strategies and in reducing risk during disasters, there has been an increase in preparedness during disasters and emergency response effectiveness [12]. Because of three major rivers flowing into the country (Ganges, Brahmaputra, Yamuna), Bangladesh is very prone to floods. In a research conducted in Sirajganj district, Bangladesh, it has been noticed that women store dry food items to be consumed in times when there is shortage of food [13]. Also, older women have much greater knowledge of medicinal plants that can be used during diseases like dysentery, or skin-related issues [13]. During disasters like floods, being amongst the right people helps a lot. Bangladeshi women who had friendly relations with their neighbours and other community members, received immense support from each other, thus building better bonds and cooperation [13].

One of the countries in South Asia which faces severe droughts is Sri Lanka, impacting a lot of different sectors. Women who are engaged in rural farming activities therefore face a lot of difficulties as droughts leads to disruption of harvests. The Climate

Resilient Integrated Water Management Project (CRIWMP) launched in 2017 has helped build resilience in individuals with a special focus in women [14]. Conservation efforts lead by women has helped build rainwater harvesting systems for better water management [14]. Agricultural techniques like crop diversification, soil conservation, introducing drought-resilient crops has helped produce better quality of crops [14]. As of 2024, the Afghanistan government has enforced a ban on women's higher education with banning girl child above sixth grade to attend schools which makes them severely vulnerable to disasters due to lack of awareness [31]. When floods hit, they often are unable to make informed decisions for themselves and their families if the male members are absent. Notwithstanding this ban on education, a lot of people regardless of their gender have unanimously started supporting girl's right to education [32]. And accordingly, in the face of disasters, women groups have set up their own way of alerting each other by using cell phones [22].

Local Knowledge, Adaptive Practices, and Women's Leadership: African Continent

The African continent is prone to both floods and droughts thereby affecting all individuals. Despite this, people have contributed to better adaptability through various means. Women have also contributed in their own ways to better conditions of their friends and families and collectively boost the morale of their communities. In Nigeria, women have made use of waterproof resources to build and protect their homes [15]. Other coping strategies by women that help during floods includes flood resistant crops, traditional make-shift bridges, and indigenous weather warning systems [15]. Coastal Nigerian women protect themselves by making use of readily available resources to increase the height of their huts and houses [15]. In Vhembe district of South Africa, rural women were seen earning through various economic sources given the unpredictable nature of climate disasters damaging agricultural products. Women are also seen planting different types of crops together to reduce the risk of crop failure due to shorter or unpredictable rainfall patterns which leads to droughts [16]. Older rural women due to their experiences can predict the possibility of droughts or rainfalls which strengthens disaster preparedness and make informed decisions during times of disasters [16]. In the country of Kenya, women of the community would come together to pool labour and resources which would help them to better prepare for adaptive responses. Men migrating to other place for jobs was also a common adaptation to droughts [17]. It was also noticed that since women had very less educational qualifications, they were unable to access weather information regularly. Despite the heavy burden of domestic responsibilities, especially during periods of droughts, women continued to proactively participate in social groups, enhancing their preparedness and capacity to respond during disasters [17]. In Rwanda, deforestation became one of the components that led to an increase in drought and groundwater depletion. Women collectively initiated beekeeping ventures, a

livelihood strategy that is less dependent on rainfall and promotes forest conservation leading to restoration of green cover [21].

Women and Resilience: Mexico, South America and Caribbean

In Brazil, traditional communities in the Amazon are dependent on the nature of river systems and rainfall. When droughts and floods change water patterns, livelihood, food security and cultural practices of the people are adversely affected. Due to the recurring challenges, women in the Amazon have emerged as key agents of adaptation. A project called "Amazonian Agroecological Logs" engages women to actively record and monitor the production, consumption, exchange and sale of food within their communities [18]. In parts closer to the Rio Negro River, women work together to preserve traditional agricultural knowledge and teach younger generations to interpret weather patterns and make informed decisions about crop cultivation [18]. Peru is home to many indigenous tribes and most of them are dependent on agriculture, fishing, and poultry rearing for their livelihood, which are very much impacted by climate disasters. But like many women elsewhere, women in Peru are also burdened by gendered responsibilities in the face of disasters and have expressed that because of their lack of basic education, their views and opinions are not really taken into consideration when planning about climate mitigation strategies [19]. Despite this, women have played significant role in collective maintenance of local water channels and creating resilience by using their knowledge and experiences to initiate cultural rituals that strengthen the mental well-being of the community [19]. But it is also important to recognize that greater efforts and better policies are needed in socioeconomically weaker regions for women to be more adaptive in the face of disasters. Research conducted in Yucatan Peninsula, Mexico in three different locations and found that all three were equally impacted by drought. Pluralization of income sources and changes in food consumption pattern is seen as an essential part of adaptation. Coastal fisherwomen were also seen fishing for different species as a functional adaptation [20]. In Xalapa, Mexico, United Nations Environment Programme implemented a project that taught local women how to plant and grow indigenous tree species, which plays a crucial role in reducing the impact of landslides and floods [21].

Conclusion and Way-forward

Over the past few decades, there has been a visible increase in the global temperatures. Countries in the Global South are more profoundly impacted by the progressive temperature changes because most of the countries are still in their developing phases. Forest fires, heatwaves, tsunamis, floods, droughts and the like have become extremely common. Due to this, it becomes very important for proper strategies regarding disaster risk reduction to be implemented. Women must be considered as key agents in adaptation and planning. It must also be ensured that governmental schemes and policies

offer to take into consideration the needs of everyone, regardless of their gender. Better protection laws and regulations in shelters and disaster relief camps should also be rolled out to safeguard women and children. Women should be made aware on how to access early warnings systems, first aid, and to reach emergency shelters at the earliest. It must also be guaranteed that post- disaster healthcare services are readily available to affected people. In addition, focus must also be given to mental health to reduce the trauma induced by disasters. Therefore, it is important for disaster management programs to actually reach people to ensure their safety and recovery.

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Chapter 19: Cultural Heritage, Ecotourism and Sustainable Development: The Role of Marginalised Communities in the Global South - A review of existing literature

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Abstract

Marginalised communities possess unique culture, heritage and traditions; which hold their own identity. These communities primarily reside in environmentally rich and resource-abundant areas, since their civilisation is based on nature. In the global south, many marginalised communities have been recognised, which are highly enriched with their own culture and tradition. Despite this, these communities lag behind in all aspects due to poor policy frameworks to provide them with equal opportunities like others. The development of tourism infrastructure in these places provides a scope to have a deep understanding of their lifestyle, cultural heritage and traditions. Additionally, tourism will provide employment opportunities to these communities beyond agriculture. Eco-tourism to these places can be encouraged as it will foster preservation of natural resources, safeguard biodiversity, and provide a path to ensure sustainable development. This paper reviews the existing literature on the interlinkages between cultural heritage, ecotourism, and sustainable development, with a particular focus on the role of marginalised communities in the Global South. The review highlights how cultural heritage and ecotourism have increasingly been promoted as complementary strategies for achieving inclusive and environmentally responsible development. The paper concludes that while cultural heritage-based ecotourism holds significant potential for advancing sustainable development, its success depends on effective policy framework and implementation from the top to bottom level with a focus on community-centric and justice-oriented approaches. Future research should prioritise comparative, and intersectional analyses to better understand how ecotourism can support both cultural resilience and equitable development.

Keywords: Marginalised Communities, Culture, Traditions, Global South, Eco-tourism, Sustainable Development

Introduction

American College of Trust & Estate Counsel (ACTEC) defined Marginalised Communities as "groups of people who experience social, economic, and/or political exclusion or discrimination based on characteristics such as race, ethnicity, gender, sexual orientation, socio-economic status, disability, or religion"(1). Mowat explains that marginalisation not only implies exclusion of an individual from an ecosystem, but also shows the feeling they hold because of the continuous reminder by others that they don't belong to that eco-system (2). In academia, marginalisation is understood as a continuum rather than a simple divide between inclusion and exclusion (3). Society sets boundaries based on shared norms, values and expectations – all of which are shaped by culture, time and lived experience. Discussing in the context of Global South, the concept of marginalisation extends towards the indigenous groups – whose cultural identities, heritage are underestimated by others. However, these indigenous groups of people have their unique history of evolution, culture, ethnicity and thus possess a great potential in the field of heritage and ecotourism.

Brundtland Commission defined Sustainable Development as the development that meets the needs of the present without compromising the ability of future generations to meet their needs. The 17 Sustainable Development Goals (SDGs) not only consist of economic indicators, but also have social indicators. This exemplifies a way forward for the recognition and development of the role of marginalised communities and their culture in the tourism and heritage sector; ensuring its sustainable development. SDG Resource Centre defines "Global South" as the countries in Latin America, Africa and developing Asia, including the middle-east. The 17 inter-linked SDGs by United Nations play a crucial role in the progress, development and upliftment of nations in the Global South. Despite the nations in Global South persistently facing problems like poverty, inequality, climate vulnerability, institutional weaknesses and financial constraints; the marginalised communities in this region possess a rich culture and bio-diversity. Hence, progress and fulfilment of SDGs in these nations will not only ensure local development but can also be a way for global stability. (4)

Marginalised communities and their culture can play a leading role in the context of local development as well as global stability due to their rich traditions, rituals, heritage-based livelihoods and environment-friendly sustainable development. Heritage tourism emerges as a way forward to enable marginalised communities to convert cultural assets into sustainable livelihoods while preserving cultural identity and strengthening social cohesion. Thus, this chapter is an attempt for systematic review and evaluation of the role of marginalized communities and their cultural heritage as a path to Eco-tourism and Sustainable Development. The chapter is solely based on secondary data sources including journals, research papers and some authentic, official websites.

The chapter begins with the definition of marginalised communities, global south and sustainable development and an effort to link them. The second section discusses the

cultural heritage and identity of marginalised communities followed by the third section explaining the role of marginalised communities in eco-tourism. The fourth section discusses the role of eco-tourism as a path to sustainable development in the global south.

Data source and methodology:

The book chapter is based on a systematic review methodology by reviewing existing research papers, official reports and case studies on the topic of the role of marginalised communities, their culture and heritage for the expansion of ecotourism and sustainable development in the global south. Searches were conducted across databases such as Google Scholar, Scopus, ResearchGate, the American College of Trust and Estate Counsel, Humans of Northeast, and the International Ecotourism Society. Search terms included combinations of keywords such as: Marginalised communities and their culture, scope of tourism to areas where marginalised communities reside, ecotourism and sustainable development.

Studies were included if they focused on the role of marginalised communities, their culture and heritage for the expansion of ecotourism and sustainable development in the global south. For each selected study, the following information was extracted: author(s), year, geographical focus, methodology, key findings, and identified challenges. The reviews were then thematically classified into the following themes:

33. Marginalised communities, their cultural heritage & identity
34. The role of marginalised culture in Eco-tourism
35. Ecotourism as a path to Sustainable Development in the Global South

Studies were excluded if they focused solely on tourism without referring to the role of marginalised communities in the global south in this regard.

Marginalised communities, their cultural heritage & identity:

Baehre defines heritage in terms of ‘multiple identities shaped by context, social values, cultural attitudes and participation’(5). “Cultural heritage includes artefacts, monuments, a group of buildings and sites, museums that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, scientific and social significance (UNESCO)” (5). Hence, in the context of marginalised communities, cultural heritage portrays long histories of shared knowledge, tradition and survival under similar social, economic and political circumstances. Cultural heritage, in this regard, acts as a bridge to connect past, and the present hoping for a sustainable future.

Marginalised communities are characterised with unique cultural heritage, that can enrich and broaden the cultural landscape, particularly within intangible cultural heritage framework. Despite their significant contribution to cultural heritage, they have to face

certain challenges including historical inequalities, socio-political pressures that undermine their authentic cultural expressions. Insights must be gathered on how technology could support professionals engaged with marginalised communities for active participation in cultural heritage activities (6).

Baehre explains the relation between marginalised communities and cultural heritage and how these communities are socially, economically and politically excluded (5). The culture and heritage of marginalised communities includes both tangible and intangible elements including oral histories, memories, cultural practices. All these elements play a crucial role in maintaining their unique identity. Through the documentation and recognition of local histories of evolution and underestimated identities of the indigenous and marginalised communities; heritage-based tourism can be encouraged. Scope to heritage tourism has the potential to create opportunities for these communities and local economies. The Global South is a hub of large number of marginalised communities who possess rich cultural traditions, knowledge systems and heritage landscapes that are closely tied to their identities and livelihoods.

A case study from Quanzhou, China by Lin states that global and national heritage frameworks primarily focus on UNESCO heritage values such as authenticity, outstanding universal value and tourism development, while focusing less on daily cultural practices, local memories creating a gap between defined heritage policies and real-life heritage experience of indigenous, marginalised communities. As for the indigenous people, heritage not only exemplifies monuments, but also includes unwritten traditions and social life too. Hence, the paper underlines the recognition of these elements in heritage governance (7). Focusing on Adivasi (Indigenous) communities in western India, Tilche found that these communities have been excluded both economically and culturally through loss of land, erasing traditional practices and the indigenous knowledge system. These Adivasi communities are trying to recover their history, traditional knowledge, allowing them to reattain the voice, identity and visibility after a long period of marginalisation. However, many Adivasis are moving away from their own tradition due to social change and development pressures, that acts as a barrier to bridge the connection between history and present lifestyle. (8)

The role of marginalised culture in Eco-tourism:

Ecotourism is now defined as “responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education” (9). “Ecotourism has emerged as a significant mechanism for facilitating sustainable development by harmonising environmental conservation with economic advancement and cultural safeguarding” (10). Ecotourism shares a very intimate relation with the principles of sustainable development as both aim for protection of natural environment, preservation of cultural heritage and generation of income for local

communities. The World Tourism Organisation (WTO) in 2019 recognised ecotourism as one of the most rapidly expanding segments of the global tourism sector –reflecting a wider shift towards more responsible and sustainable forms of travel.

Coria & Calfucura provided a comprehensive review of ecotourism activities among indigenous communities in the Global South, particularly in Latin America, Africa and Southeast Asia highlighting both the developmental potential and structural constraints faced by marginalised groups from ecotourists. Indigenous people mainly reside in peripheral areas surrounded by forests, wildlife and natural beauty which are away from mainstream development. These places stayed natural because indigenous communities have looked after the land for generations, rather than exploiting it. Ecotourists generally express their desire to benefit local people and respect their local customs. This aligns with indigenous communities' deep connection to their "traditional ecological knowledge". However, in real-life context, ecotourism has failed to provide anticipated benefits to the indigenous communities due to lack of human, financial and social capital. Many national parks, which are often located in indigenous lands have contributed to the marginalisation and poverty of rural communities by modifying boundaries and control over land use. This can lead to conflict over natural resources. In Southeast Asia, there are very few ecotourism project management communities because government policies primarily support mass tourism, instead of protecting indigenous rights. (11)

In the context of Assam, Jonbeel mela can be regarded as one of the prominent examples to showcase the role of marginalised communities in the tourism sector with a significant potential to ecotourism. For ages, many tribes and communities of Assam have been participating in the barter trade practice which makes the mela a crucial venue for maintaining these age-old trade practices. "Barter trade is the heart and soul of Jonbeel Mela. In a world dominated by cash transactions, the sight of people exchanging goods directly for other goods without the involvement of money offers a fascinating cultural experience. Various tribal communities from Assam, Meghalaya, and other neighbouring regions converge at Jonbeel Mela to trade agricultural products, handicrafts, livestock, and other essential goods" (12). Eminent tribes like Tiwa, Khasi, Bodo, Karbi from Assam, along with tribes from other north-eastern states participate in the fair, bringing their rich cultural heritage to the event, which is reflected in the goods they trade and the practices they uphold. This fair provides scope to many marginalised tribes to interact celebrate their heritage, and strengthen bonds that have been established over centuries. It is not just a marketplace; it is a cultural melting pot where traditions are shared and preserved. Thus, Jonbeel mela has a significant potential for the expansion of eco-tourism in Assam, with effective policy implementation in this regard by the administration. (12)

Ecotourism as a path to Sustainable Development in the Global South:

“Eco-tourism is extensively acknowledged for its capacity to foster environmental sustainability, particularly through the safeguarding of biodiversity and the judicious management of natural resources” (10, pp 3). Eco-tourism fosters three core pillars of sustainability; viz environmental, social and cultural sustainability. Environmental sustainability is enriched through biodiversity conservation, environmental awareness; while social sustainability is fostered through empowerment to the indigenous communities by expanding employment opportunities beyond agriculture. Cultural sustainability is enhanced by preserving local heritage and culture. “Policymakers, practitioners, and scholars must collaboratively formulate and execute strategies that guarantee ecotourism contributes constructively to all three dimensions of sustainability. By undertaking such measures, ecotourism can assume a crucial role in the realization of global sustainable development objectives, yielding enduring advantages for both humanity and the environment (10, pp 11).

In the study of eco-tourism as a path to sustainable development, Martinez et al. show that eco-tourism to the marginalised communities in La Trampa in Mexico has the potential for sustainable development through adequate institutional frameworks and capacity building. Eco-tourism in La Trampa has the scope for generating supplementary income and conservation of rich biodiversity landscape (13). “In the Magic Town of Tlalpujahua, eco-tourism in the town of La Trampa is a viable and necessary option because of its natural resources available and inclusion in priority sites for biodiversity conservation” (13, pp 36). However, the existing weak institutional framework and poor governance must be improved to ensure eco-tourism as a route to sustainable development.

Linking eco-tourism with sustainable development, Chan & Bhatta demonstrated that sustainability encompasses not only environmental protection but also includes economic benefits, social equity and cultural preservation. Eco-tourism has the potential to generate income and create employment opportunities for marginalised communities, while also conserving natural and cultural resources. Based on Nepal and other selected case studies from other developing regions, the paper develops a Community-Oriented Collaborative eco-tourism planning model. The model underscores the necessity for community participation and collaboration among stakeholders as well as equitable-benefit sharing for sustainable community development (14). Another case study in Nepal by Shrestha also highlights the role of community-based eco-tourism in empowering marginalised groups, particularly Dalit communities by providing economic opportunities and encouraging social and political inclusion. Though the study is highly concentrated to Nepal, it provides valuable insights relevant to the Global South context, where the marginalised communities depend heavily on natural resources for survival. The findings suggest that eco-tourism can serve as an effective tool for sustainable development, provided that inclusive governance and community participation are ensured. (15)

A study in India by Singh highlights the role of community-based eco-tourism in empowering marginalised groups, including tribal and forest-dependent communities by involving them as tourist guides, homestay providers and producers of local handicrafts. Examples from regions such as Sikkim, Meghalaya, Kerala and protected areas across India illustrate how eco-tourism can enhance income opportunities, strengthen cultural identity and acknowledge that eco-tourism may limit the process of sustainable development in marginalised regions due to poor infrastructure and inadequate policy implementation. (16)

New Directions in Community-Based Ecotourism and Sustainable Development:

"Community-Based Tourism (CBT) refers to a tourism development model in which local communities have substantial control over, and involvement in, its development and management, and where a significant proportion of the benefits remain within the community" (17, pp 5). Community-based tourism in the Himalayan region possesses a significant potential for economic development along with the preservation of environment and culture of the local communities. By involving local communities directly in tourism planning, CBT helps retain income within rural areas and aligns livelihood generation with stewardship of natural and cultural resources. Empirical evidence given in the study has shown that CBT initiatives across Himalayan states have generated measurable socio-economic gains for the marginalised communities residing there. Case studies from Sarmoli and Dzongu demonstrate increases in household income, reduced youth out-migration, and significant empowerment of women through leadership in homestay management and cooperatives. The literature also highlights important environmental and cultural outcomes associated with CBT. Positive effects include strengthened conservation incentives, improved waste management practices, and revival of traditional crafts and festivals. At the same time, the paper cautions that poorly managed growth can lead to seasonal water stress, rising carbon footprints, and cultural commodification. This dual character underscores the need for careful management of carrying capacity and community-led cultural safeguards in Himalayan tourism planning. Looking forward, the study identifies emerging directions in CBT research and practice, particularly the integration of digital marketing tools, multi-stakeholder partnerships, and climate-resilient tourism planning.

Jackson highlights that CBT serves as a powerful vehicle for achieving SDG1 and SDG8 by promoting poverty alleviation, job creation, and sustainable economic growth. By prioritizing local ownership, capacity building, and ethical labour practices, CBT fosters resilient communities that thrive economically while preserving their cultural and environmental assets. Unlike mass tourism, which often leads to environmental degradation and cultural erosion, CBT emphasizes sustainability. CBT enterprises prioritize responsible tourism practices that balance economic benefits with ecological conservation. Reinvesting tourism revenue into local infrastructure projects, such as

roads, schools, and clean water initiatives, fosters long-term economic development. However, ensuring equitable wealth distribution and addressing sustainability challenges require continued policy support and stakeholder collaboration. As global interest in responsible tourism grows, investing in CBT models will be essential for creating inclusive and sustainable tourism economies (18). Similar to this, Giampiccoli extensively discusses the need for new pathways and trajectories in tourism development for Small Island Developing States (SIDS), with a strong emphasis on sustainable tourism (ST) and community-based tourism (CBT). It aims to propose alternative tourism approaches, primarily CBT, within the framework of sustainable tourism, focusing on enhancing local control, ownership, and benefits, while reducing leakages and fostering inclusivity. (19)

Conclusion:

Eco-tourism in the Global South has significant potential for sustainable development as the nations of this region are rich in culture, heritage and traditions of the marginalised communities. Perfect execution of policies can help eco-tourism to facilitate environmental conservation and enhancing socio-economic condition of local communities. In the world of advanced knowledge and technology, scope of eco-tourism can be enhanced through new innovation and technology. “From leveraging digital platforms to promote eco-tourism destinations to using tools like GIS for mapping and monitoring environmental impact, technology can enhance the efficiency and effectiveness of eco-tourism initiatives” (16, pp 39). Efficient use of technology can also help to bring sustainable development to those indigenous areas through eco-tourism. Strengthening local participation, respecting indigenous knowledge system and merging of eco-tourism initiatives with SDGs are essential for ensuring inclusive economic growth in the Global South.

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Chapter 20: Invisible Citizens in Digital Democracies: Representation, Exclusion, and Sustainable Policy

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Abstract

The digital democracies offer to be inclusive, participative, and equal-representative due to technological innovation. On the other hand, in most places of the Global South, the digital transformation has exacerbated structural inequality to the extent of making a significant portion of the marginalized populations culturally and politically invisible. This chapter critically analyzes how algorithms governance, platform capitalism, and digital surveillance, as well as unequal access to the technologies of communication, marginalize ethnic minorities, indigenous communities, communities in the lower caste, informal workers, and gender minorities to meaningful participation in the process of democracy. The chapter builds on interdisciplinary insights into the media studies, political communication, and development studies, and digital sociology to understand how the issues of representation in digital space are organized on the basis of power hierarchies present in the technological systems. It also claims that digital infrastructures tend to reproduce rather than break down the social stratifications. The problem of data colonialism, language marginalization, urban digital inequalities, and bias AI are discussed to determine how digital democracies can disenfranchise instead of grant voices to the subaltern. The chapter also suggests sustainable policy-based frameworks that are based on ethical governance, community-based media engagement, inclusive digital literacy and rights-based technological design. Combining the ideas of social justice, environmental sustainability, and participatory communication, the paper presents the ways to realize the paths to culturally inclusive global South digital futures. It would eventually demand rethinking of digital democracy as not only technological growth but also as an ethical, culturally sensitive, and socially responsible process, in which those marginalized identities are at the center of policy-making and digital development priorities.

Keywords: Digital Democracy, Marginalized Communities, Algorithmic Governance, Data Colonialism, Sustainable Policy Framework

1.Introduction

The concept of democracy in the twenty first century has been overturned by digital technologies. Digital platforms have often been advocated by governments, civil society groups and international organizations as tools of empowerment, transparency, and participatory rule. The use of online petitions, social media campaigns, e governance portal, and digital public services is fronted as a demonstration of the fact that democracy has never been more accessible. Nevertheless, the potential of digital democracy should be looked into in the light of structural imbalance that determines access, representation, and participation.

The feeling that in the wake of technological connectivity there is a natural production of a democratic equality is a big issue. Even though these digital platforms facilitate communication on historically unprecedented scales, they do so within political and economic regimes, whose hierarchies trace their origins to earlier times. The digital infrastructures are overlapping with pre-existing inequalities based on caste, race, ethnicity, gender, disability, literacy, and rural urban divides in most areas of the Global South, such as South Asia, Africa, and Latin America. Subsequently, marginalized communities are usually left behind in effective participation even when technology is made available to them in a formal way.

Digital sociology scholars claim that technological systems are mirror images of their designers and controlling organizations (1). News curation algorithms, visibility and content moderation algorithms are entrenched in the logics of commerce and politics. These systems often favor dominant languages, urban users and economically lucrative user groups. As a result, some voices are more accentuated whereas other voices become invisible.

Digital democracies have turned into algorithmic governments. Automated systems have now been employed in predictive policing and welfare distribution among other functions of decision making (2). Although the use of such technologies is usually explained by the premise of efficiency and objectivity, it may replicate biases that exist in the historical data. Biased datasets and unclear decision making systems can lead to disproportionate surveillance or exclusion of marginalized communities especially lower caste groups, ethnic minorities, and workers in the informal sector as well.

The democratic potential of the digital technologies is also complicated by platform capitalism. Large technology giants dominate communication systems, data streams, and advertising systems. They make their profits through data mining and action forecasting (3). Users are not passive citizens of this environment but a commodity of data of which their personal information is a product in this context. It poses a major issue of autonomy, privacy and political manipulation.

These dynamics can be well defined with the concept of data colonialism. It speculates that modern digital economies are harvesting people in a manner that is similar to the past modes of resource extraction (4). Global South countries tend to be instruments of data creation and the ownership of technology and profit is concentrated within the Global North. This skew will strengthen global inequities and restrict local agency to influence digital forms of governance.

Digital exclusion is also significantly supported by language marginalization. Most of the digital platforms favor the major international languages, especially English. Societies speaking native or local languages experience obstacles towards being seen and heard. Moderation algorithms often fail to recognize non dominant languages, either deleting the content or making it less visible (5). These processes add to the invisibility of culture in the digital sphere of the public.

Urban digital inequalities also enhance exclusion. Policy frameworks can be based on the assumption of stable internet access, digital literacy, and access to smart devices. Nonetheless, inhabitants of rural areas might not have infrastructure, low-cost data providers, or training in digital literacy. Women in a more conservative or economically disadvantaged family may have limited access to personal devices. This means that the digital divide is not only a technological issue, but it has a strong social aspect.

This chapter claims that, digital democracy should be perceived as a conflict zone, not a technological neutral development. Although there is a potential to transform with the help of digital platforms, the platforms also pose a risk of institutionalizing new types of inequality. The main question that informs this chapter is the following: How do we reorganize digital democracies, to make them meaningfully represent and engage marginalized communities?

As a way of answering this question, the chapter uses an interdisciplinary approach based on the integration of media studies, political communication, development theory, and critical data studies. It looks at the interactions between algorithmic governance, surveillance regimes and platform capitalism and social hierarchies. It goes further to recommend a sustainable policy framework that incorporates ethical governance, design principles of inclusiveness, community involvement and safeguarding of the digital rights.

This chapter aims at transforming the discourse of digital transformation into justice based digital transformation by placing marginalized identities at the center of the digital policy discussions. Digital democracy ought not to be evaluated based on the quantity of the number of users that are connected, but based on the intensity of the representation, accountability and inclusion of cultures.

2. **Theoretical Underpinnings of Digital Democracies and Power Systems**

Digital democracy is commonly described as the application of digital technologies to increase democratic participation, governance and civic engagement. But this definition is not complete without the recognition of power structures that are inherent to the digital systems. Technology does not work on its own. It operates in political, economic and cultural space that determines those who gain and those who are left out.

Technological optimism had an impact on how digital democracy was initially discussed. According to academics, the internet would decentralize and flatten authority, lessen the influence of gatekeepers, and form a horizontal system of communication in which all citizens would enjoy equal access (6). The social media sites had been regarded as online communal forums through which governments and the citizens could have direct communication. Nevertheless, subsequent analysis revealed that online platforms are not a neutral space and not necessarily a democratic one.

Another idea which was initially developed by Habermas is the idea of the public sphere which focused on the rational discussion and engaging all citizens in the sphere of democracy (7). Theoretically, the digital media has the potential to enlarge this sphere by incorporating more voices. In practice, it is participating based on literacy, language access, algorithmic visibility and digital infrastructure. Thus, the access does not ensure the representation only.

The governance of power in digital democracies is conducted in what scholars refer to as platform governance. Platforms establish the regulations of appearance, mediation, and interaction. These regulations are usually tacit and commercial in interest (8). Content that is interactive is boosted and marginalized groups might be underexposed through the algorithmic filtering process. There is an unequal digital presence as a result of this.

The other concept that is significant is the concept of algorithmic governance. Algorithms are used to decide what news is displayed to users, what posts are trending, and what accounts are flagged. These computerized systems are based on previous data. In case historical information is socially biased, the results of the algorithms can repeat discrimination (9). An example is that automated systems can label a certain community as being risky or criminal due to biased training datasets. This strengthens structural inequality, instead of destroying it.

The concept of digital exclusion needs to be interpreted in terms of intersectionality, as well. Intersectionality is the manner in which various types of oppression, caste, gender, ethnicity and class relate to each other (10). A rural lady belonging to a low caste society can be subject to multiple exclusions in the digital environment based on the economic

constraint, linguistic constraints, and patriarchal values. Therefore, digital democracy cannot be considered through the single-axis approach.

Democratic participation is also further influenced by the political economy of digital media. The majority of the key platforms are controlled by big companies located in economically strong countries. They have the primary aim of generating profits by means of advertisement and monetization of data (3). This commercial system determines the form of content that is advertised. The value of democracy is often distorted by political discussions which are determined by the measures of engagement. Consequently, viral or provocative content can gain more exposure compared to the issues of the oppressed community.

The other characteristic of the digital democracies is the surveillance. Digital technologies are becoming more popular by governments to monitor the communication, track behavior and control of the services offered to the people. The justification of surveillance can be on the argument of security or efficiency, but the implication is that it can discriminate the vulnerable groups (2). Socially marginalized communities can face increased levels of scrutiny and can turn to fear and decreased political participation.

Data colonialism offers an international understanding of the digital power formation. It contends that the process of data mining users resembles colonial trends of resource exploitation of the past (4). The Global South populations create high amounts of data, but the power of data infrastructure and profitability stays in the hands of the technologically superior nations. This disproportion curbs digital sovereignty and local policy autonomy.

Digital democracy is also subjected to language politics. Online content production is dominated by English and other dominant languages. Local and native languages do not necessarily have technological assistance, such as proper speech recognition or content moderation system (5). This makes communities that are not algorithmically represented symbolically invisible.

Thus, digital democracy should be examined as a stratified system of authority as opposed to a technological improvement of governance. It is a mixture of political power, corporate control, algorithmic decision-making process, and social inequality. In the absence of critical policy intervention, the digital systems will be prone to reimburse the same hierarchies that are offline.

An understanding of digital democracy that is just demands the movement of attention to something other than connectivity which is representation. It presupposes not only the inquiry as to who is online, but also whose voices are heard, whose information is appreciated, and whose rights are taken care of.

3. Algorithms and the Politics of Digital Visibility

The rising phenomenon of automated systems to operate information, distribute resources, and control digital behavior can be referred to as algorithmic governance. In digital democracies, algorithms dictate what the citizens are shown, what trends, what is erased, and what is unseen. These processes greatly influence the political discourse and opinion of the population.

Algorithms are usually presented as impartial technological applications. Nevertheless, they are constructed by human architects and trained on historical data and optimized towards a particular objective, including engagement, advertisement income, or efficiency. They therefore mirror the values and prejudices involved in social and institutional frameworks (9).

Differential visibility is one of the most significant effects of algorithmic governance. Online media prioritize the content according to the forecasted interest. The posts, which receive good responses are given priority. This model is advantageous to sensational, polarizing or emotionally charged material. Problems that marginalized communities are faced with like land rights, caste discrimination or informal labor struggles can be given less amplification on the algorithm since they do not produce profitable engagement on the large scale.

Elsewhere, such as in India, caste discrimination has been trolled or may also be coordinately harassed or underexposed by algorithms. Among the urban middle class political controversy, there is a general shift toward the wider international digital discourse, with the issues of the rural or marginalized societies rarely having a voice on the national level. This brings about a symbolic hierarchy of the issues under which some voices seem more valid or pertinent than others.

Another important problem is algorithmic bias. Pattern recognition is applied to automated moderation systems. In case there is skewed representation in datasets, algorithms will discriminate against minority communities too. Studies have revealed that automated systems have the potential of wrongly labeling dialects, minority speech patterns, or expressions unique to the culture as harmful content (5). This results in over moderation or shadow banning of content, achieved by publication but suppression through algorithms.

The social media implications are not the only ones. Algorithms are more frequently used in the allocation of welfare, law enforcement, and identity checks by governments. As an example, biometric authentication systems employed in the delivery of services to the people may lock out people because they have technical failures or connectivity problems or the data they provide does not match. The marginalized groups especially

informal workers and rural populations are not mostly equipped with documentation or fixed infrastructures that enable smooth digital authentication.

These systems bring about what the scholars term as digital bureaucratic exclusion. Rather than the physical denial of services, the exclusion is done as a result of technological failure or automated decision making. Algorithms work under the background, so the citizens affected might not even know why they were deprived of any benefits (2). Algorithms systems are opaque so they restrict responsibility.

Law enforcement predictive analytics is also problematic. Predictive policing applications use historical data on crime to distribute surveillance resources. Yet, in case historical information represents over policing in the underprivileged communities, predictive systems will perpetuate to target the same areas (9). This forms a cycle in which the social inequalities are supported by algorithmic choices.

The other aspect of algorithmic governance is content personalization. Individual news feeds form filter bubbles in that the user is shown, first of all, content that supports their already held beliefs. It undermines the exposure to different views and may further polarize it. It is possible that marginalized groups struggle to enter the mainstream view due to the algorithms being biased to maintain content that corresponds with the primary patterns of user behavior.

In the view of democracy, political existence is visibility. When a problem does not manifest itself in the online public discussion, it has a problem securing the policy agenda. Thus, the design choices of algorithms affect the suffering of whom is considered and the priority of whom is granted.

One of the suggested solutions is transparency. Nevertheless, transparency is not enough when citizens are not technically literate to understand the workings of algorithms. Furthermore, algorithmic processes are often treated as a corporate secret and are not publicly examined by companies (8).

An algorithmic governance approach based on rights necessitates the application of three principles. To start with, the accountability mechanisms have to be such that automated decisions can be audited and contested. Second, training datasets should be representative of different communities. Third, platform design must be based on the values of the public interest but not on purely commercial motivations.

Algorithms governance is becoming a form of democratic participation at a pace never seen before in the Global South, where digital structures are developing at a high rate. Digital democracy can turn into a selective visibility system without any all-inclusive regulatory structures.

Therefore, the politics of digital visibility does not occur by chance. It is organized in algorithmic architectures provoking who is listened to, who is muted, and who is invisible.

3. Platform Capitalism, Data Colonialism and Economic Inequality

The digital form of democracy exists in a platform-capitalist economic system. Platform capitalism is an economic system where giant technology firms are the creators of digital platforms that facilitate social interaction, commerce, communication, and political discussion and charge data as an asset (3,11). Those platforms position themselves as neutral actors, but they have a large amount of control over digital ecosystems.

In contrast to conventional industrial capitalism, which had to rely on physical resources, platform capitalism has to rely on data mining, predictive analytics, and behavioral adjustment. The data are generated by users in their daily online behavior like posting, searching, shopping, or even scrolling. This information is gathered, processed, and sold via targeted advertisement and algorithms prediction systems (3). The users in this structure are not citizens, but also economic assets, in the democracy.

The political implications of this model in the sense of democracy are far-reaching. As mass communication occurs on privately held media, corporate policy defines the scope of expression. The choice of content moderation, the promotion of advertisements, and the promotion of algorithms directly affect political communication (8). Such choices can hardly be democratically reviewed.

The monopolized digital power is very high. The social media, search engines, cloud, and data systems are dominated by a few international companies. This concentration does not form structural symmetry between those who own technologies and digital citizens. According to scholars, this model turns democratic communication into a scenario where visibility correlates with profitability which is a market driven ecosystem (12).

Data colonialism provides an analytical tool to conceptualize a global inequality in platform capitalism. According to Couldry and Mejias, data colonialism is the new kind of extraction where human life is captured and used by data (4). As was the case with historical colonialism, which involved taking away natural resources in the colonized areas, the digital systems today collect data on people all over the world and economic gains are harnessed in the technologically superior countries.

The Global South is characterized by high population numbers and a growing number of mobile connections that generate very huge amounts of user data. The processing, data storage, and money-making infrastructure around this information is, however, in most

cases, owned by companies in the Global North. This brings about internet addiction. Local communities and local governments do not have control over their data ecosystems.

This is a sovereign imbalance in democracy. In cases where the national data flows are controlled by the foreign corporate policies, the domestic regulatory capacity is constrained. Governments might not be able to enforce laws protecting data or accountability of algorithms on transnational corporations. Consequently, the global corporate interests might indirectly influence the process of democratic decision making instead of considering the priorities of the local population (13).

Digital labor structures also further contribute to the increase in economic inequality. There are a lot of disadvantaged people who are members of platform economies either as gig workers, content moderators, or micro task providers. Such positions are not usually socially safeguarded; secure their employment, or hefty salaries. Workers who work on digital labor platforms are treated as independent contractors, which make corporations less accountable (14). Although platforms appear as the means of economic inclusion, they often replicate precarious jobs.

A good example is content moderation. The harmful contents are reviewed by a group of moderators who are usually in economically disadvantaged areas and they are subjected to conditions of psychosocial stress. Their work guarantees the safety of platforms, and they are not noticed in digital democracy. This is a representation of the dependence of digital participation on invisible hierarchies of labor.

Informational inequality is also brought about by data monetization. Places store profiled behavior of users. These profiles are not only applied on commercial advertising but also on political targeting. The specificity of targeted political advertising gives actors the opportunity to send messages to demographic segments and occasionally, it relies on fears or misinformation (15). This is a demeaning of the deliberative principles of democracy.

In India as well as other Global South countries, the electoral communication, the formation of opinion and subsequent mobilization on the ground are affected by platform driven digital ecosystems. Nonetheless, algorithmic amplification tends to support the one with well-financed political campaigns or superior social classes. Placing minorities with poor digital literacy or limited financial means they are not competitive in this attention economy.

The concept of attention economy, which was coined by Davenport and Beck, puts an emphasis on the way, in which the human attention becomes an uncommon resource in the digital setting (16). User attention is a competition to the platforms to maximize the revenue generated through advertising. Emotional triggering content usually gets priority

in this contest. The structural problems like land displacement, caste discrimination or indigenous rights may not get much algorithmic attention as compared to sensational narratives.

The digital democracy has thus resulted in economic inequality at various levels. To begin with, there is inequality between users and corporations. Second, there is inequality between Global North and Global south economies. Third, there is inequality in the countries between privileged and marginalized groups.

It is necessary to regulate platform capitalism through regulatory innovation. Laws on data protection, competition regulation and platform responsibility structures are needed. Nevertheless, structural justice has to be factored in the regulation, as well. Increased connectivity without redistributing digital power will never bring about inclusive democracy.

Sustainable digital democratic model should challenge ownership of digital infrastructure, ownership of data, and ownership of digital value creation. Digital democracy can be strengthening world and local hierarchies without economic restructuring in the guise of technological advancement.

4. Language Marginalization, Cultural Invisibility, and Digital Exclusion

Digital democracy presupposes that citizens have the freedom of expression and the right to engage in a social discussion. But the involvement is profoundly influenced by language, literacy and cultural acknowledgment. Language is not a medium of communication only. It is an identity, power and legitimacy indicator. In the virtual world, linguistic hierarchies tend to dictate the voices that are given more attention and those that are pushed to the periphery.

The majority of the world online platforms are run in leading languages like English. Even though there is an increased regional language interfaces, technological support is imbalanced. The speech recognition system, content moderation system and search algorithms are usually optimized to popular international languages. Indigenous and minority languages usually do not have a strong digital presence (5).

This asymmetry brings about digital linguistic discrepancy. In the event that algorithms are unable to handle some languages with accuracy, the information in such languages can be falsely labeled or demoted or eliminated. E.g. automatically-moderated automation tools might assume culturally-specific expressions as abusive. The result of such misinterpretation is over moderation and silence of marginalized speech communities.

Discoverability is also affected by language marginalization. The results in search engines are ranked according to popularity, back links, and participation. Material that is

created in local language is ranked lowly since it has fewer viewers. Consequently, digital knowledge communities place dominant language accounts at the center and peripheral place regional accounts.

In places with more than one language such as India, language is highly associated with caste, region and social economic status. Fluency in the English language is equated with education, privilege within an urban setting and social ascendancy. Online worlds thus recreate offline orders. The citizens speaking mostly regional dialects might not have a full access and exposure to the digital national discourse.

The invisibility of cultures does not just end at language. Online platforms are organized around conventional guidelines of articulation. The cultures of urban middle classes tend to influence visual aesthetics, modes of communication and political framing. The logic of platform design may not conform to indigenous storytelling traditions, oral histories or community based communication practices. As such, culturally specific modes of expression might have difficulties with obtaining algorithmic presence.

Digital inequality scholars believe that access cannot be only measured by device ownership or connectivity and meaningful participation (17). There must be digital literacy, cultural confidence, and institutional recognition in order to have meaningful participation. In the absence of those, connectivity is symbolic and not transformative.

Representation is also hindered by gender based digital exclusion. Females in patriarchal environments can be limited in their device access, harassed online, or morally police. Women, gender minorities and activists of marginalized communities are disproportionately victimized by online abuse (18). The risk of being bullied might deter action in online public discussions, and the silence will be maintained.

Exclusion is also caused by the digital literacy gaps. The citizens who do not know the platform algorithms, privacy settings or can detect misinformation might fail to effectively engage. Little digital training is usually provided to rural communities and disadvantaged economically. Consequently, they end up being consumers and not active players in digital ecosystems.

Digital divide has become a concept that has been able to reflect these layer inequalities. The former level divide was concerned with the access to technology. The second level focused on the differences in the skills and usage. The third level gap in terms of outcomes and influence is emphasized in the contemporary scholarship (19). When the marginalized citizens get online, they might not have a say on the policy agendas or even in the framing of narratives.

There are political implications of cultural invisibility. In a democratic society, policy focus is commonly preceded by public exposure. Matters that go trending on the internet

platforms have high chances of receiving media attention and government intervention. Unless marginalized communities are overrepresented in online discussions, their issues might be left out of the mass policy debate.

As an example, the indigenous land rights, the manual scavenging, or informal labor exploitation can be discussed in the confines of the small circles but never gain national recognition. The problem of algorithmic amplification is that it favors dominant political narratives or content that is celebrity driven. This establishes unequal power of agenda setting.

Additionally, online archives define the collective memory. The outcome of search engines and the history of platforms determines the society memory of events. And when the marginalized experiences are not recorded or indexed, chances of being lost to digital memory systems are high. This symbolic disenfranchisement of culture weakens culture.

The key to solving the language marginalization issue lies in the technological innovation and policy intervention. Governments and platform companies need to invest in inclusive language datasets, culturally sensitive moderation systems and multilingual content support. Local content creation and control of narrative can be empowered through community based digital projects.

Digital democracy cannot be effective in case linguistic and cultural hierarchies are not eradicated. Representation should not only be physical but also recognition, visibility and respect of various ways of expression. It is only in this case that the digital spaces can become truly inclusive public spaces and not reflections of preexisting social stratification.

5. Inclusive Digital Democracy: Sustainable Policy Framework

The above paragraphs show that digital democracy cannot mean a technological development. It is guided by algorithmic rule, platform capitalism, language hierarchies, surveillance, and economic imbalances of the world economy. Thus, the development of inclusive digital democracies will demand structural change and not an addition of connectivity to the surface.

A sustainable digital democratic structure should be based on five pillars that are connected to one another, including ethical governance, inclusive technological design, data justice, community engagement, and empowerment of digital literacy.

5.1 Accountable and Ethical Algorithmic Governance

The governments need to have regulatory measures that will make algorithms accountable. Auditability of automated decision making systems that are used in the

welfare distribution, the delivery of public services, and the content moderation should be sought. The citizens should be able to appeal against automated decisions, which impact their social and economic rights.

Periodic algorithmic audits should be done by independent regulatory bodies on the bias, discriminatory outcomes and exclusion patterns. The transparency reports are supposed to be compulsory and not voluntary corporate reports. The ethical governing framework should be in a position to enforce values of public interest to determine how technology is rolled out.

5.2 Non-Discriminatory and Culturally Sensitive Technological Design

There should be language and cultural diversity in technological systems. It is necessary to invest in multilingual artificial intelligence tools, regional datasets of language, and culturally aware moderation policies. Platforms need to work with local institutions of higher learning and community groups to create inclusive digital infrastructures.

Design justice models claim that the disadvantaged groups ought to be consulted during the technology design. Participatory design provides a way of ensuring that digital systems are responsive to lived realities, and not aggressive in their standardized solutions.

5.3 Data Sovereignty and Economic Redistribution

To reverse data colonialism, Global South nations need to advocate data protection legislature and facilitate digital autonomy. The governance structures of the various nations must not rely on corporate extraction of profits at the expense of citizens. The creation of public data infrastructures can be designed in such a way that the digital value creation is available to local economies.

Policies to deal with platform monopolies should be applied in competition. Decentralized and community based digital platforms should be encouraged in order to lessen reliance on transnational corporations.

5.4 Digital Participation Community-based Digital

Digital democracy should no longer stay in the top down mode of governance. Digital media efforts within the grassroots can enable marginalized communities to develop and share their own stories. There are community radio stations, local digital journalism websites and cooperative digital networks that enhance participatory communication.

There should be policy frameworks that promote community based digital initiatives especially in rural and deprived areas. The representation increases in situations where communities have control over their communication channels.

5.5 Inclusive Digital Literacy

Technical skills should not be the only definition of digital literacy. It should have critical media literacy, understanding of algorithms, knowledge of privacy protection, and rights based digital education. People must learn to recognize the role of digital systems in definition and shaping influence.Attention should be given especially to women, rural areas, lower castrate groups, and the indigenous groups. The training programs ought to be contextual in terms of culture and available.

6. Conclusion

Digital democracy is possibility and paradoxical. Although digital technologies are widening the field of communication and providing new platforms to help people take a civic role, they are also reproducing and exacerbating disparities in structure. There is the algorithmic governance of visibility. Platform capitalism is the concentration of economic power. Information colonialism amplifies inequality across the world. Language dominance kills voices of regions. The bodies that are sidelined are punished by surveillance.

The notion that being connected is the only way of being empowered democratically is inadequate. The inclusion should be quantified in the form of representation, recognition and rights protection. The fact that more citizens are on-line does not in itself fortify democracy. It becomes empowered as the marginalized communities shape the policy, narratives, and have digital autonomy.

The process of reimagining digital democracy needs a change of technological determinism into justice oriented design. Digital transformation strategies should be informed by ethical governance, inclusive infrastructure, data sovereignty, and community participation. Scholars, policymakers, and civil society actors need to cooperate such that digital systems do not become the historical inequality, automated.

The future of digital democracy will eventually come to pass depending on whether the marginalized identities will continue to be data subjects or policy makers. The digital future that is sustainable in the Global South implies that the invisible citizens should be put at the center of technological and democratic imagination.

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Chapter 21: Urbanization and the Digital Divide in Smart Cities

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Abstract

The rapid expansion of urbanisation has fundamentally changed the geometry and function of cities, compelling governments to establish smart city systems as a strategic response to growing urban issues. Smart cities utilize digital technology, data-driven systems, and ICTs to enhance urban governance, public service delivery, societal well-being, as well as economic inclusion. These developments are crucial for city planning. While smart city initiatives are innovative and groundbreaking, they also face significant challenges in promoting social inclusion, such as the ongoing digital divide within cities. Differences in socioeconomic levels' access to digital infrastructure, technological capabilities, and participation in digital platforms are known as the "digital gap.". The chapter scrutinizes the links between urbanisation, smart city growth, and digital inequality. By utilizing various empirical investigations and theoretical perspectives, the study explores how smart city technology could mitigate and perpetuate existing urban inequities. The inclusion of smart city results is heavily influenced by different governance styles, socioeconomic conditions, inequality in access to digital infrastructure, and disparate levels of digital literacy. The chapter focuses on the social and economic impacts of digital exclusion, which can result in limited access to public services, reduced civic engagement, and reduced economic opportunities for marginalized groups. Furthermore, it explores policy initiatives and governance methods for promoting digital inclusion, with a focus on equitable infrastructure creation, inclusive digital service design, and participatory governance processes. The chapter concludes by stating that digital equity must be embedded in planning and policy frameworks to enable smart cities to function as potent catalysts for sustainable and inclusive urban development.

Key Words: Urbanization, Smart Cities, Digital Divide, 'Digital Inclusion', Information and Communication Technology (ICT), Urban Governance, ‘Digital Literacy’, Social Inequality

1. Introduction

Urbanisation has become more widespread in cities worldwide over the past two decades, serving as a test of what is and remains possible. More than two-thirds of the world' s population will live in cities by 2050, according to the United Nations. This fast urbanisation has put a strain on infrastructure, public resources, and governance structures. Smart cities, which are metropolitan areas that use digital technology, data analytics and ICTs to improve public service delivery through sustainable means (i.e, reduce government expenditures on transportation costs), have become a popular response among governments across the world.

By combining ICT with traditional urban planning, the smart city paradigm strives to provide intelligent government services and facilitate greater mobility, reduce energy usage and maintain contact with residents in real-time.These innovations are based on smart technologies such as IoT, AI, and big data analytics, as well as e-governance systems that can enhance urban environments and promote responsiveness. The adoption of advanced technology solutions by cities poses a significant challenge in terms of access to digital infrastructure and competences. Smart technology benefits a diverse range of urban residents. Individuals, groups, or regions with widespread access to digital technology are categorized as the "digital divide." What is this term? Social inadequacies, educational disparities, inadequate infrastructure, or a lack of digital literacy can all contribute to digital isolation. Socially and economically disadvantaged communities in smart cities may be left behind by digital inequality, which can intensify existing socioeconomic disparities.

The chapter examines the intricate connections between urbanisation, smart cities, and the digital divide. The study examines the impact of smart technologies on urban inequality, digital divides among people, factors that shape digital disparities among urban residents, and policy frameworks for creating inclusive digital cities. Additionally,

2. Smart Cities' Growth and Urbanization.

Global urbanisation has been a hallmark of the last fifty years, The shift from rural to urban areas has resulted in a decline in public infrastructure, housing options, transportation facilities and service quality. In order to address these problems, urban planners and politicians have increasingly turned to digital technology to reduce complexity while also improving governance.

Smart cities are conceived as places where digital transformation can improve urban systems.) By utilizing sensors, intelligent transportation systems, digital service platforms, and big data analytics, municipal managers can enhance resource monitoring. Real-time traffic management technologies can help reduce congestion, and digital platforms can facilitate the access of municipal services.

Urban activities in smart cities are heavily influenced by the integration of digital technology. Studies indicate that smart urban features are often linked to higher efficiency and lower digital inequities within cities when combined with human and social capital

investments.

Smart city frameworks have been used in varying degrees. Digital solutions have become a popular tool for urban development, with cities in developed countries facing challenges such as limited finances, technological limitations, and governance shortages. This variation may contribute to urban inequality and can even trigger the digital divide as academics suggest.

2.1 Determining the Digital Divide in Urban Regions.

Digital divides are defined as differences in access to, use of and knowledge of digital technologies between different segments of the population. Hence they are called digital gap. In its original form, it was concerned with the basic "access to computers and the Internet" inequalities, but it has since broadened to include other elements such as digital literacy, connection quality, and social and economic inclusion-oriented measures. The digital divide in urban areas can be observed through disparities in:.

2.2 High Speed Internet and Broadband Connectivity.

Smart cities are built around the idea of obtaining reliable and affordable high-speed internet. Online education, e-learning, and telemedicine are among the tools available to citizens through it. Inequality in broadband access has led to a digital divide, especially among low-income and marginalized urban populations.

A. Digital device ownership and use.

The ability to engage in digital activities is influenced by the possession of individuals who use digital devices, including cell phones, laptops, and tablets. Those who own devices do not have access to digital potential or smart city services. Differing usage patterns despite the availability of gadgets create digital inequality.

B. Digital Literacy and Skills.

Digital literacy is the ability to use digital technology effectively, including basic computer skills, internet navigation, and online security. Digital education and training programs are essential as many urban people lack the necessary digital skills to benefit from smart city projects.

3. Cooperation with Digital Governance and Public Service Platforms.

Governance, citizen feedback, and public service provision in smart cities are increasingly being conducted through digital platforms. Due to limited access or abilities, citizens are less likely to participate in digital decision-making processes, leading to the marginalization of marginalised groups and undermined democratic governance.

Research indicates that economic levels, education, age, and work position all play a role in determining digital inequality. Enhanced access to digital resources and opportunities is closely tied to higher wealth and educational achievement. On the other hand, socially deprived individuals frequently experience inadequate digital tools and platforms, leading to increased marginalisation. Additionally,

The rise in digital inequality in urban areas could result in unequal access to various digital public services, including e-health, c-schools, and smart transportation systems, all

of which are intended to enhance overall quality of life. The benefits of inclusive digital policy and equitable allocation of infrastructure are contingent on the contribution of all citizens to smart technologies.

3.1. By implementing measures in smart cities, can digital inequalities be addressed?

Urban management can be improved through the use of smart technologies, but their lack of implementation may result in existing disparities. Many affluent neighbourhoods in metropolitan areas invest heavily in digital infrastructure, while low-income communities may struggle with basic connectivity or access.

Smarter metropolitan areas may have access to modern broadband networks and sensor-based services that are only available in informal settlements or slum areas. Marginalised communities often lack digital devices or the technical expertise required to access digital services, leading to inequalities and disparities with respect to opportunities, jobs, healthcare, and education. Specifically, the smart city schemes can cause an usage divide, where people who already have digital technology are not equipped or confident to use it effectively. This usage gap reflects differences in digital literacy, the importance of digital services to people's everyday lives and how digital technologies can be used to improve socioeconomic outcomes. (A)

3.2. Digital Divide and Urban Governance.

In smart cities, digital governance is based on technology to increase transparency and accountability and more public participation. The use of digital platforms could result in more efficient public service delivery, reduced access to essential services, and increased participation in decision-making. The failure of certain urban groups to use or access these platforms can result in exclusionary digital governance efforts that favor inclusion.

Evidence points to the need for governance frameworks that address technology deployment, fair participation, and digital literacy training. Without effective inclusion policies, essential digital services may be left out to those who are vulnerable, such as the elderly, those with disabilities, and those living on a low-income basis. Additionally,

3.3. Case Studies and Global Perspectives.

In many global contexts, the interaction between smart cities and the digital divide results in different outcomes due to differences in economic growth, governance systems, technology capabilities, and social inclusion programs. Research from Europe, China and Africa shows that while smart city projects can help with urban development and service delivery, it does not necessarily eliminate digital inequality.

Empirical studies in Europe demonstrate that smart urban features, such as advanced digital infrastructure, broadband connectivity, and integrated e-governance systems, are associated with lower digital access gaps. Urban populations are increasingly able to access digital gadgets and internet connectivity thanks to the support of public investments and strong regulatory frameworks. There is still a significant difference in usage, despite improvements to access.gov. The use of digital technologies by socially and economically disadvantaged groups tends to be more productive and social, while socialized and economic disadvantageous communities use digital tools less frequently

due to differences in education, digital skills, and technology usage habits.

The rapid urbanisation of China is closely linked to the widespread use of information and communication technologies (ICTs). The growth of smart cities has led to urban expansion, economic development, and the modernization of urban governing systems. In spite of this, urbanisation thanks to ICT has produced different digital outcomes in different regions. Digital services may be limited and deficient in quality for smaller cities and outlying suburbs, while major metropolitan areas benefit from extensive digital infrastructure. These inter- and intra-city differences highlight how the digital divide between smart cities can be exacerbated by unequal economic growth, as well as regional policy differences.

African smart city initiatives offer both opportunities and challenges in tackling urban development issues. The use of digital governance tools and mobile technology can significantly enhance service delivery, transparency, and citizen participation, particularly in healthcare, finance, public administration, or other sectors. Additionally, mobility enables citizens to participate more effectively in everyday activities. However, ongoing digital gaps remain to the exclusion of all outcomes.. Limited digital infrastructure, high connectivity prices, inconsistent electrical supply, and governance inefficiencies are the main reasons why many urban areas miss out on smart city benefits. Consequently, initiatives in smart cities often remain concentrated on elite urban centers, which tends to increase rather than decrease socioeconomic disparities.

Despite the potential of digital advancements to drive urban development, these case studies demonstrate that the digital gap remains a significant and ongoing issue. Focused policy interventions that address disparities in access, skill, usage, and participation are crucial in fostering inclusive growth in smart cities. Insufficient and context-sensitive policy responses may lead to exacerbated current inequalities in smart city initiatives, rather than advocating for equitable urban advancements. ".

3.4. Digital Inequality and Urban Mobility:

A more detailed examination of digital inequality in smart cities reveals that exclusion is not limited to technology infrastructure deficiency. Digital inequality is a complex phenomenon that is affected by various economic, social, educational, and governance factors. However, it does not have universal legitimacy. The extent to which urban inhabitants can benefit from smart city projects is influenced by the dimensions of access, skills, usage, and participation.

4.1. Access Gap.

The disparity in access to digital devices, reliable internet connectivity, and infrastructure across socioeconomic groups is known as the access gap in smart urban areas. High-speed internet, public Wi-Fi and smart infrastructure are common in technologically advanced metropolitan areas but often lacking in marginalised communities (people from informal settlements or poor households) and peripheral urban areas with low digital connectivity. This dissimilarity restricts them from interacting with

essential smart city amenities like e-governance platforms, online health services and digital learning, and smart transportation networks. Socioeconomic inequality plays a crucial role in the access gap, as the cost of devices and internet services remains incredibly high for those who are not adequately served.

4.2. Skill Gap.

In addition to physical access, the skill gap reflects differences in digital literacy, technical proficiency and trust for use of digital technologies. ". Even with digital infrastructure in place, a significant number of urban residents, such as elderly individuals, migrants, low-skilled workers, and those with limited education, are not equipped to navigate digital platforms proficiently. Lack of digital literacy in urban areas, where services are increasingly delivered through digital interfaces, can result in exclusion from public services, job opportunities, and civic engagement. This skills shortage stresses that human capital needs to be developed, not just the technology innovation itself, and that inclusion on digital means incorporating education and training alongside infrastructure.

4.3. Use Gap.

The usage gap is characterized by variations in the extent to which people use digital technology and whether digital services meet their daily needs. Digital technologies are used by some for education, employment, entrepreneurship and civic participation; others simply use them for passive or basic functions. Smart cities exhibit a disparity when advanced digital services are available but do not cater to the needs of marginalized groups. The use patterns are greatly influenced by cultural significance, language barriers, accessibility for individuals with disabilities, and confidence in digital systems. Socially advantageous groups are often the most benefit recipients of smart city technology**.**

4.4. Participation Gap.

The difference in the level of urban participation in digital governance, policy formulation, and decision-making is reflected in this widening participation gap.[a]. Smart cities are increasingly using digital platforms to facilitate citizen interaction, feedback systems, and participatory planning. Why? Individuals with limited resources, abilities, or conviction in digital systems are often not included in these procedures. The exclusion in the model reduces democratic participation and preserves power disparities, as urban policies can be largely determined by individuals with technological capabilities. The gap in participation reveals the possibility that smart city administration could become technical and exclusive if inclusive engagement measures are not actively pursued.

4.5. The Resolution of Digital Inequality in Smart Cities.pdf.

These interdependent aspects of digital inequality require a broad, multifaceted approach to be tackled. The main emphasis on infrastructure spending should be on providing cost-effective and ubiquitous access to high-quality digital connection in all urban areas. Dedicated digital literacy and capacity-building programs are necessary for individuals to learn about and benefit from smart city technology. The design of digital services must incorporate inclusive engagement, transparency, and user-centredness,

making governance changes essential. Smart cities may achieve inclusive, participative, and equitable urban futures by incorporating technical advancements and social justice concerns.

4.6. Strategies to reduce the Digital Divide through policy. What are some examples?

Digital inclusion must be a key focus of public policy to ensure that urban development objectives are met, even with smart city transitions. Unless policy solutions are developed that prioritize inclusiveness and purpose, the current social and economic disparities associated with smart cities may persist. The following solutions outline key policy options for governments to close digital gaps and foster equal participation in smart cities.

5. Universal Connectivity Initiatives.

Digital inclusion in smart cities is based on universal connection.' Public policy should focus on promoting the development of affordable, high-speed internet and broadband infrastructure in underdeveloped and excluded urban areas. This is crucial. ". The objective is to extend internet connections to unincorporated communities, outlying metropolitan areas, and low-income neighbourhoods that are typically not targeted for technology investments. Moreover, Governments can achieve this through public funding, subsidies, municipal broadband initiatives, and regulatory changes that promote competition among service providers. Through universal connectivity, all residents can access essential digital services such as e-governance, online education, telemedicine, and digital job platforms, which will help to reduce structural disparities in urban areas.

5.1.Digital Literacy Programs.

The ability to use technology is dependent on its accessibility. What exactly does this mean? The implementation of digital literacy programs is essential for facilitating meaningful connections in smart city environments. Disabled and marginalised groups, such as the elderly, women or migrants, low-income workers (like mine), and those with disabilities should be given priority over targeted training. The initiatives could encompass fundamental digital competencies, cybersecurity awareness, and the utilization of digital public services. Moreover, By enhancing digital skills, these projects help to close the skill gap and enable citizens to utilize technology for education, employment, entrepreneurship, and civic engagement in smart cities.

5.2. Inclusive Design of Digital Services.

The inclusion of urban population in digital services in smart cities is a crucial aspect of inclusive design principles that ensure accessibility, usability, and responsiveness to diverse urban needs. User-centric approaches should be utilized to design digital platforms that accommodate differences in language, reading and writing proficiency, physical limitations (physical equipment), and cultural context. Accessibility can be made better by adopting streamlined user interfaces, multilingual interoperability systems, and assistive technology for the disabled. Inclusive design not only boosts service adoption but also increases trust in digital systems, ensuring that technology is accessible to those who face structural or functional barriers to using it within smart cities.

5.3. Participatory Governance.

Inclusive smart cities require participatory governance. By utilizing digital platforms, citizens can now actively participate in urban planning, policy development and decision-making processes. Inclusion in digitally marginalized groups is necessary for actively encouraging participation. The policies must promote open data projects, digital consultation platforms, and hybrid participation models that involve both online and offline engagement. Smart city government is more democratic, transparent, and responsive to the needs of all residents by ensuring widespread participation rather than prioritizing technologically elite groups.

5.4. Public–Private Partnerships.

Smart cities' digital infrastructure and services require significant investment in public-private partnerships (PPPs). Why? By collaborating with governments, technology companies, and telecommunications providers (including civil society organisations), financial resources, technical knowledge may be generated. PPPs that are well-regulated can promote the development of broadband networks, smart infrastructure, and digital service platforms while maintaining public accountability and social equality. Connecting these collaborations with inclusive policy goals could accelerate smart city development and ensure that technological advancements benefit the common people.'

6. Future Directions in Research and Practice.

With the rise of urbanisation, it is essential to assess the long-term social, economic, and technical consequences of developing cities. The relationship between smart cities and the digital divide has been extensively studied through previous research, but significant gaps remain. A proactive research program and innovative approaches that prioritize inclusion, equity, and sustainability are necessary to address these gaps. The subsequent sections offer a summary of important directions forward in research and practice.

6.1. Longitudinal and Comparative Research Approaches.

To track the effects of smart city projects over a period of time, future research should be conducted using longitudinal methodologies rather than just cross-sectional studies. Long-term studies can provide more comprehensive information on the changes in digital inclusion across cities as a result of technological and demographic advancements.'". Such a study would help determine whether long-term increases in digital skills, participation and socioeconomic mobility can be attained through early internet access?

It is also important to conduct comparative research between countries, regions, and types of cities. The comparison of smart cities in both developed and developing countries, as well as megacities and secondary cities, could provide insight into how digital inequality is influenced by contextual factors such as governance ability, economic structure, and cultural norms. By examining these comparative results, policymakers can create more context-responsive systems.

6.2. Evaluation of Digital Literacy and Capacity-Building Programs.

While digital literacy is a crucial aspect of digital inclusion, there is no empirical evidence to support the effectiveness of current training programs. In future research, it is crucial to conduct a systematic assessment of digital literacy projects to determine the most effective ways to address skill and usage gaps among different groups.

Cities ought to experiment with new capacity-building strategies, including community based digital spaces (CADD), intergenerational education initiatives, and partnerships with schools and colleges. The promotion of equal participation in smart city ecosystems should involve strengthening the marginalised groups such as women, elderly, migrants and informal sector workers.

6.3. Incorporating Equity and Ethics in Smart City Design?

Next research should focus increasingly on the ethical issues surrounding the development of smart cities: data privacy, surveillance, algorithmic prejudice and digital rights.? But as urban areas become increasingly reliant on artificial intelligence, big data and robots to make decisions -- all of which could potentially exacerbate existing societal biases and exclude underprivileged people.

Urban planners and politicians should consider ethical and equitable considerations when designing and implementing smart city technology. Why? The task involves establishing transparent data governance structures, maintaining accountability in algorithmic systems, and safeguarding citizens' privacy and informed consent.

6.4. Smart Cities that are participatory and community-centered models.

A recent study highlights the importance of using participatory methods to address digital inequality Research should be directed towards methods of constructing smart cities that actively involve communities in decision-making, technology design, and service delivery. The lived experiences of digitally marginalised communities can be explored through the use of participatory research methods, such as action research and co-creation frameworks.

Smart city models that incorporate both digital innovation and grassroots involvement should be implemented by cities in their practice. Digital platforms with offline engagement can be integrated into hybrid governance systems to ensure inclusive and democratic smart city development.

6.5.Digital inclusion measurement and indicators.

Smart cities are increasingly requiring more detailed and comprehensive measures of digital inclusion. Why? The current evaluations typically prioritize assessing access to infrastructure over other factors, without considering usability, civic engagement, or social impact.

The development of multidimensional digital inclusion indexes that consider access, skills, usage, and participation gaps is recommended in future research. By utilizing these indicators, policymakers can monitor progress and identify communities facing discrimination while also measuring the success of inclusion initiatives. Data-driven monitoring systems can facilitate evidence-based decision-making and adaptive governance in practical applications.

6.6. Technological innovation in inclusive urban development.

The implementation of technological advancements could facilitate digital inclusion. The potential of emerging technologies like low-cost connection solutions, open-source platforms, and mobile-based services in reducing entry and involvement barriers in smart cities warrants further investigation.

Practitioners should prioritize scalable, cost-effective technology solutions that can be tailored to meet local needs. The focus on context-appropriate technology and economical innovation can help ensure that smart city improvements benefit all urban residents, not just those with technical advantages.

6.7. Compliance with the Sustainable Development Goals (SDG)).

In future research and practice, it is important to align smart city initiatives with the UN Sustainable Development Goals 9, 10, 16, and 16 in particular.

Through the integration of digital inclusion goals into wider sustainability frameworks, smart cities can advance equal and lasting urban development. By linking smart city initiatives to SDGs, one could achieve greater policy coherence, increased international cooperation, and a more effective promotion of long-term social and environmental objectives through digital transformation.

7.CONCLUSION.

Urbanisation has led to the creation of smart towns as iconic solutions to issues. They offer unparalleled opportunities for efficiency, sustainability, and good governance by incorporating digital technology into the fabric of urban life. Without intentional efforts to address digital inequalities, new technologies can only serve to reinforce existing inefficiencies, resulting in greater social and economic disparities. Additionally.

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Chapter 22: The New Frontier of Coloniality: Green Extractivism, Indigenous Territoriality, and the Struggle for Decarbonization Justice in the Global South

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Abstract

The accelerating global demand for lithium, cobalt, nickel, and other critical minerals has positioned the Global South as the material foundation of the global decarbonization agenda. Yet this transition reproduces entrenched patterns of coloniality, dispossession, and environmental injustice, while simultaneously testing and revealing the resilience of communities affected by extractive industries. This chapter examines green extractivism as a new frontier of colonial power, where climate-oriented mineral extraction reshapes Indigenous territoriality, deepens socio-ecological inequalities, and provokes diverse forms of community resilience and resistance. Drawing exclusively on contemporary scholarship, the chapter synthesizes four intersecting bodies of literature: green extractivism and the political ecology of critical minerals; decolonial environmental justice; Indigenous territorial governance, resilience, and resistance; and the geopolitics of the green transition. Research on lithium extraction in the Atacama Desert demonstrates how water depletion, cultural erosion, and asymmetrical governance regimes reproduce the coloniality of nature and power despite being justified under climate imperatives, while Indigenous communities mobilize legal, cultural, and territorial strategies to sustain their livelihoods and relational worlds in the face of extraction . Broader analyses of global critical minerals governance reveal how the emerging "decarbonization consensus" mirrors earlier commodity regimes, reinforcing dependency and marginalization in the Global South, even as communities experiment with new forms of transnational solidarity and political organizing . Decolonial environmental justice frameworks challenge these dynamics by foregrounding Indigenous epistemologies, territorial rights, relational ontologies, and community resilience that collectively contest extractive logics. Through a systematic literature review, this chapter identifies conceptual convergences, empirical gaps, and pathways for justice-oriented transitions. It argues that achieving decarbonization justice requires confronting the structural drivers of green colonialism, reconfiguring global governance architectures, and centering Indigenous sovereignty

and community resilience in environmental decision-making. The chapter concludes by proposing a conceptual model of decarbonization justice that integrates territorial rights, ecological integrity, community resilience, and geopolitical equity as foundational pillars for a post-extractive future.

Keywords: Green extractivism, critical minerals, Indigenous territoriality, Global South, decarbonization justice

1. Introduction

1.1 Background and problem framing

The accelerating decarbonization process created a growing demand for metals including lithium, cobalt, copper, and rare earth elements. These minerals are utilized in the manufacture of electric vehicles, batteries for renewable energy and digital infrastructures. This process is considered important for fighting climate change. However, the extraction boom has affected the lands of indigenous peoples and rural folks in Latin America, Africa and Asia. The social ecological burden of this green transition was borne by those groups [3,6,11]. Such a situation demonstrates a claim growing in popularity among scholars. They claim to witness an unforeseen aspect of colonialism. In essence, the manufacturing of low carbon futures in the Global North depends on further intensifying existing patterns of exploiting land, water and labour in the Global South [3,6,11]. The debates around green extractivism are centered on low carbon futures and the extractive violence they entail. The territories of green extractivism are also sites of resilience. Communities affected by extractive industries create strategies for life reproduction.

These communities mobilize their resources to make a living, protect their water and territory, and reproduce their culture. Structural dispossession is widespread, an effect of these practices. Indigenous territorial economies have been broken by dispossession that has also severed people-in-place relations and disrupted culturally-integrative practices. The life reproduction capacity of the Stationary Temperature community species is surprising given the structures. Elements that have structured fashion after that do not fit their sociocultural practice. Growing familiarity with the green transition thus requires looking not only at the violence of extractivism but also at the resilience and political creativity of the communities that confront it.

1.2 Green extractivism and the coloniality of the green transition

Green extractivism refers to the mining or extraction of resources for purposes that are supposedly environmental. In the past, the extractive industry was associated with the rise in industries and the fossil fuels economy. Climate discourse, rather than accumulation or industrialisation, legitimates green extractivism. Even so, the material and political consequences are very similar to the above. This includes the removal of Indigenous

peoples, the destruction of nature, and the elimination of Indigenous governments. A lithium mining operation in the Atacama Desert provides an example. Extraction is promoted as essential for the decarbonisation of the global economy. Nonetheless, water stress has deteriorated, adversely affecting Indigenous livelihoods and disrupting local governance systems. Furthermore, these processes result in the reproduction of asymmetrical governance structures that favour corporate and state actors [3,10]. These are manifestations of the so-called 'coloniality of nature'. Ecosystems are redirected as important reserve resources for the critical minerals. Further, hydrological regimes are engineered to suit international extraction and exchange [3,6]. Nevertheless, local actors have adaptive and recuperative practices to respond to them. Examples of initiatives that seek to restore vibrant pastures can be found in the National Land Policy (2016). Communities do not respond to dispossession in a uniform manner. It does not decry the violence of green extractivism.

1.3 Indigenous territoriality, resilience, and resistance

According to the report, community-led actions against green extractivism include mobilization for legal action and environmental monitoring. These struggles illustrate how territoriality is more than the ownership of land; it enacts certain types of relations and being, and ecologies grounding life. Likewise, in the Philippines context, “native immobile territoriality defies nature's marketization and legitimacy of extractivist development by providing alternative ontologies that are embedded with reciprocity, custodianship and collective rights’’ [1,12]. In essence, these stories challenge the knowledge-denying violence of green extractivism and open the door to more equitable and diverse environmental governance.

Territorial practices are resilient, you see. Although extractive projects can change local ecosystems, communities adapt to change, relying on cultural ceremonies, agreements over water sharing, and their decision-making structures [1,10,12]. In Atacama, Indigenous communities oppose lithium extraction through territorial claims, water justice, and challenging the state corporate governance arrangements. This opposition shows how Indigenous territoriality as political strategy and ontological practice challenges the coloniality of green development. It also shows the capacity of these communities at the core their ability to adapt, reorganize and sustain collective life despite these stresses [1,3,10].

1.4 Decolonial environmental justice

According to decolonial environmental justice frameworks, resilience should not be thought of as increasing one population’s ability to adjust to the detrimental impacts of an unjust socioecological regime. Instead, it is the ability of sets of peoples, communities to sustain alternate worlds, epistemologies, and governance practices and, more generally, to inhabit the present and future in multiple ways amid an ongoing coloniality.

In line with this social theoretical conceptualization of resilience, Ramcilovic Suominen et al. contend that decolonial environmental justice (EJ) frameworks diverge from technocratic, state-centric models for environments governance toward community led cultural approaches (e.g. ecological governance) [12]. The strategies focus on Indigenous knowledge, duties, culture and power. According to Ramcilovic Suominen et al., the decolonial approaches to EJs cannot be construed in too-narrow terms. Community resilience is linked to territorial rights and the survival of a cultural community as well as sovereignty or community capacity to define and control development on its terms [12].

1.5 Geopolitics of the decarbonization consensus

The scramble for key minerals has been an important site of geopolitical contestation and coalition-building between competing states and political blocs. Newer literature signals a shift away from a 'consensus of commodities' minerals and fossil fuels towards a 'decarbonization consensus largely focused on minerals [14] Countries compete as well as collaborate to secure the minerals that are used to manufacture green technology [14]. Most importantly, the latest geopolitics of critical minerals continue consolidating dependence-creating structures that undermine the agency of Global South actors, the sites of production for raw materials that underpin Northern decarbonization. The Northern interests are in control of governance of critical minerals. And there is limited involvement of Indigenous communities and South-based actors in the making of global standards, trade regimes and environmental and human rights safeguards [2,5].

Nevertheless, these limitations on justice-oriented transitions are neither deterministic nor unchallenged. The above-mentioned hegemonic decarbonization consensus is an expression of political struggle and process through which governments and social actors seek to intervene from within. Competition and alliance building concerning vital minerals create fresh avenues for opposition and obstruction.

Geopolitical relationships have changed because of the global critical minerals race. A new line of scholarship depicts a shift from a "consensus of commodities" to a "consensus of decarbonization", where states compete for mineral supply chains for green technologies. The recent geopolitical shift strengthens dependency arrangements that are disadvantageous to the Global South despite this supply of raw materials for Northern decarbonization. Most Global North stakeholders are participating in the governance of critical minerals. On the other hand, Indigenous communities and Global South states have very limited participation in global standards, trade regime, and environmental safeguards.

The geopolitical situation limits transitional justice possibilities while also producing new socio-political fields for resistance and resilience. Transnational advocacy has found its way into communities and social movements as well as to certain Southern governments, which have demanded stricter environmental controls and have tried out different

governance arrangements to retain more control over minerals [2,5,14]. Such initiatives show how resilience works not only locally but also across scales, as affected actors adapt and challenge the decarbonization consensus**.**

1.6 Purpose and contribution of chapter

Though growingly well-known as a concept and devising emancipatory practice, community resiliencies remain under-researched in the literature on extractivism. A large part of the literature on green extractivism that is often thought to be controversial tends to focus rather on the production of tensions and conflicts over territorial rights while also documenting the harms that extractive industries cause locally, both on the environment and on the society. This chapter facilitates a phenomenological view of the connection between these seemingly divergent stories. The paper contends that green extractivism is a new domain for the generation of coloniality, spatial restructuring and geopolitical unevenness. Simultaneously, it incites and exposes the flourishing potentials of communities subject to extractivism. Drawing on political ecology, decolonial and Indigenous studies, and global governance scholarship, this paper proposes a concept of decarbonisation justice that is attentive to territorial rights, ecological integrity, community resilience and geopolitical unevenness. In addressing this conceptual gap, the paper contributes to the growing literature that critically analyses the new green extractivism and its political implications. First, it discusses the decades-long history of green extractivism in Latin America and various ongoing social conflicts as a result of green extractivism.

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2. Theoretical Framework

2.1 Coloniality and the Green Transition

Coloniality provides a significant analytic for understanding how current environmental governance reproduces a specific historical and geographical formation of power, knowledge and resource control. What do we mean then when we talk of coloniality? Colonialism, after all, has ended. Colonial logics have lasted owing to many different kinds of forces. One indication is the fact that the global economy was, and continues to be, heavily architectured to aid a geo-political ordering, which defines the North as 'civilized' and the South as 'barbaric'. Every year, $18 trillion leaves the Global South by legal and illegal means. This is said to be the proxy for illegal money leaving a country by the Global Financial Integrity. The Second refers to the set of hierarchies in the order of knowledge and subjectivity. To put it differently, these meta narratives of economic development are thoroughly extractivist.

Most people think that the green transition is a good and just thing. Some authors identify how today's decarbonisation end-states or pathways risk itself reproducing distinctly colonial logics; that is, transferring at once demographic and socio - ecological externalities towards the Global South while concentrating technological and financial benefits in the Global North [4,6,14]. What are the practical implications of these dynamics? Green extractivism as a principal manifestation. That is to say, green extractivism means the spatial and sectoral extension of mining and other extractivist activities in the name of a supposed.

Such resilience is political in nature, as it contradicts the very narrative extractive interventions seek to impose, which is one of destruction of the Indigenous social world. Communities support their life under the structural violence agents through mobilizing relational ontologies, collective governance and intergenerational knowledge. We observe that coloniality and resilience exhibit co-constitutive dynamics.

2.2 Green Extractivism as a Political-Ecological Regime

Green extractivism is often considered as just a material process but it is far beyond that. According to political ecology scholars, green extractivism is mediated through processes of discourse. Other researchers have argued how the legitimacy of mineral extraction is what makes these discourses relevant. Lithium extraction, for instance, is justified as essential for climate mitigation. Hence, the discourse erases the socio-environmental violence. Dunlap and Jakobsen claim that these represent one aspect of what they refer to as the violent technologies of extraction. In other words, green development infrastructures like lithium brine evaporation ponds or high voltage transmission lines create new forms of violence. Nonetheless, these problems are ecological and social in nature**.**

Lithium Mining: Green Extractivism and Political Ecology.

Many scholars examine how green extractivism transforms landscapes, labour regimes, and ecologies. One of the best examples of lithium mining occurs in the Atacama Desert. On the whole, lithium extraction is thought to have a low impact. Although this is a beneficial outcome from extraction, the reality is quite different. Their hydrological regimes have been altered in a way that has increased water stress. Further, it has given rise to the constituent elements of the coloniality of nature. Ecosystem services can be perceived as a storehouse of useful functions.

Such tactics and strategies help people retain their environmental knowledge, guarantee the control over vital sources of water and territorial decision making among others. In simpler terms, resilience refers to a political ecological practice of resistance against extractive landscape reconfiguration. By emphasizing both extractive violence and community resilience, political ecology demonstrates how green extractivism occurs at various scales, from the micro politics of access to water, to the geopolitics of mineral supply chains.

2.3 Indigenous Territoriality, Relational Ontologies, and Community Resilience

Indigenous territoriality was instrumental in countering extractivist logics. In different Indigenous contexts, territoriality captures much more than a right of ownership over land (or sea). It relates to the network of relationships that constitute a place's meaning or life. It also elicits legally, historically, culturally, linguistically, identically, and ecologically. These relations are in connection with human and non-human creatures. As such, territoriality is a relational ontology where a territory, a body of water, and the nonhuman beings residing there mutually shape each other.

Álvarez and Coolsaet examine how Indigenous people and community resistance movements propose alternative views of environmental justice based on autonomy, reciprocity and collective care. These alternatives contest the concretization of extraction but also contest the epistemy of emptiness, underuse and plugging in to global climate solutions. Ontological resilience refers to the versions of resilience encoded in such ontologies that support ceremony, kin, and ecological practice which help to produce the collective identity and territorial belonging into which extraction is altering material landscapes.

Indigenous mobilizations against lithium extraction in Atacama take place through territorial claims, water justice and resistance towards states- companies' institutional arrangements. The opposition posed by indigenous people indicates that Indigenous territoriality acts as a political tactic but also as an ontological rejection which contests green development's coloniality. Simultaneously their engagement strategies foster

adaptation, reorganisation and continuation of collective life under stress this is community resilience in action [3,10].

Thus, Indigenous territoriality and resilience are inseparable. To defend territoriality is not only to resist extractivism, but also to reproduce lives, identities and relations**.**

2.4 Decolonial Environmental Justice

Environmental justice (EJ) has long been associated with the fair distribution of environmental costs and benefits. The decolonial EJ occupies a very different conceptual space. It uses emerging decolonial strategies and activists to help re-shape intercultural and institutional ordering. To begin with, it identifies a geo-historical and epistemic rupture. Also, it aims to promote the ontological diversity of worlds, practices, and existing through assemblage and institutional renovation. It further acknowledges the need for the reordering of politico-ecological orders with accountability.

This perspective understands existing legacies as results of colonial configurations of power, knowledge, and being, thus valuing human- environmental relationships highly. The recognition and inter-culturality politics foster the practices associated with the formation and mobilization of a community, as well as the negotiation of differences. There have also been more publicly funding institutions accountable as well as a re-configuring of governance assemblages to favour inter-cultural epistemologies and pluriversal ontologies. In simple words, it is the intelligence to understand the impact of environmental injustice due to the systemic colonial processes that are always racially biased. Further, we can say systemic racism takes on different forms like the colonial process. The existing environmental justice framework fails to articulate the epistemic structures and non-mechanistic causality of colonial power. It serves as a framework of environmental justice. Essentially, decolonial EJ conceptualizes resilience as a political and epistemic practice through the struggles against green extractivism.

2.5 Geopolitics of Critical Minerals and the Decarbonization Consensus

A worldwide scramble has produced significant contests and geopolitical shifts for critical minerals. There are new dependencies but also old asymmetries are reinforced. As per Andrews and others, it is observed that emerging governance regimes surrounding critical minerals are mainly engineered through Northern interests and values. For instance, Global South actors from developing countries still lack material roles in setting quality criteria, regulating trade, and dealing with environmental threats in standards regimes [2]. States' push for the mineral security of climate-aligned supply chains to advance their national climate goals hurts local actors in producer regions. This signals a growing "decarbonization consensus" [14]. According to Brooks et al., the politics of mining for critical minerals reveals deep contradictions and conflict between global climate objectives and local environmental justice politics. The transition to green

becomes a planetary project but this socialization of the materiality of transition is unequal. The Global South is subject to the most negative effects of critical mineral extraction and pursues limited yet significant measures of resistance and reform. This geopolitical structure is similar to past commodity configurations, where developing country actors pay the economic and social costs while global supply chains and standards systems pursue advancements without getting associated project effective consent. Consequently, it increases dependency and limits the Southern states' possibilities for independent development approaches. Marginalization due to geopolitics also brings forth the creation of new and alternative resilience.

Transnational advocacy networks are created by groups and social movements and some Southern governments. Resilience functions on a larger scale. Not only domestically. Challenging the decarbonization consensus may serve as a means of resilience.

2.6 Alter lives, Exhausted Ecologies, and the Coloniality of Water

In recent years, scholarship has turned to "alter lives" to describe the socio-ecologic transformations produced by green extractivism. Lithium Mining in the Atacama Produces Exhausted Ecologies - Andreucci and Voskoboynik These are landscapes that lack the essential elements of water, biodiversity and cultural meaning [3]. Exhausted ecologies produce the alter lives of Indigenous communities These alter lives are a field of action where they create practices that deter the material and symbolic effects of extraction and block it from expanding.

Water acts as a key axis of coloniality in lithium richness. Jerez et al. demonstrate how lithium extraction produces and exacerbates water injustices. Fresh water resources are diverted from industries, violating Indigenous water rights and damaging ecosystems [10]. Water coloniality indicates far broader patterns of dispossession and structural injustice. State and corporate actors redesigning hydro-systems in ways that facilitate extractive economies and deepened coloniality.

However, communities generate forms of resilience even in exhausted ecologies. Through new practices of water monitoring, recuperation of ancestral hydrological knowledge and building alliances for the defence of water as a relational and cultural being and not merely as a resource [1,10]. Through the application of these ecological practices.

2.7 Green Colonialism and the Geopolitics of Transition

Green colonialism is the name given to climate solutions that reproduce colonial relations of power by extracting land, labour and resources from the global south for northern decarbonization agendas. Lang, Manahan and Bringel; (2021) argue that "green" colonialism occurs through "geo-strategies" securing access to critical minerals, global

governance frameworks, discursive interventions which justify extractive activity in the name of climate action. Ulloa goes on to elaborate this discourse on the shift from a "consensus of commodities" to a "consensus of decarbonization". States and corporations use climate-discourses to legitimate new territorial control (14). This change in political geography further enhances the colonial dominance of global environmental governance because the global south would be the sacrifice zone for green transition. Nonetheless, the local communities undertake resilience strategies to counter green colonialism, which include organizing transnational solidarity infrastructures, using legal means and formulating alternative development imaginaries based on territorial autonomy (1,12,14). Consequently, Green colonialism is prevented by these techniques and they open up places where justice-oriented transitions are possible.

2.8 Synthesis: Toward a Framework of Decarbonization Justice

Based on the four pillars, the chapter brings the various theoretical strands together in a framework of decarbonization justice. Territorial rights refer to granting the first Indigenous inhabitants' sovereignty over governing natural resources and lands. Furthermore, to renew the wisdom of water, the biological and cultural diversities, the extractive imperative must go. Third, it stresses the capacity of communities to reproduce life, identity and governance under extractive pressures. Fourth, geopolitical equity that is equitable governance; benefit sharing of the Global South; communality of autonomy. The dismantling of coloniality and green extractivism is essential for enabling such justice. In the end, the framework directly incorporates the results and conclusions stressing the primacy of Indigenous territoriality, ecological justice and community resilience in post-extractive futures.

3. Methodology

3.1 Research Design and Rationale

The chapter conducts a systematic review of contemporary literature on green extractivism, coloniality, Indigenous territoriality, community resilience, and decarbonization justice in the Global South according to a theory-driven ashram. A literature review methodology is warranted in the absence of a coherent backdrop theoretical perspective tying its themes. The reason for this scarcity is that the field is conceptually dispersed across different domains of political ecology, decolonial theory, Indigenous studies and the study of global governance. Moreover, linking these distinct strands in dialogue can generate further insights into the extent to which the green transition continues to reproduce or disrupt colonial forms of power, and how communities build adaptive capacity alongside extractive pressures.

It will consist of scholarly books, expert opinion and peer-reviewed journals. The impetus for this review is that literature published between 2020 and 2026 will be covered,

as critical minerals and geopolitics of decarbonization debates are fast moving. Community level responses to extractive industries have received an increasing amount of scholarly attention over this period, emphasizing adaptive strategies, ethno ecology, territorial defence and relational forms of resilience in political ecology and Indigenous studies recent literature [1,3,10,12]. Because it is a chapter, the goal is not to methodologically integrate primary empirical findings of these sources, but rather to chart trajectories, identify thematic or theoretical ramifications and gaps, and provide a conceptual overview. The chapter aims to arrive at a framework of decarbonization justice based on territorial justice, ecological justice, community justice and geostrategic justice**.**

3.2 Scope and Inclusion Criteria

The author restricted the review to scholarship that directly speaks to the central processes of the green transition. As such, it focused on research about green extractivism and critical minerals (for example, lithium and cobalt,) particularly where these projects intersect with Indigenous territoriality, community-based resistance, and resilience. Also included were decolonial environmental justice studies that interrogate the historical and epistemic roots of environmental harm. Merging research on the geopolitics of the green transition and critical minerals governance helped reflect how power asymmetries manifest globally in the form of supply chains, which ultimately shape decision-making. And lastly, scholarship on the coloniality of power, nature and development provided the historical context to explain the persistence of extractive logics even under sustainability narratives.

This included only the references cited by the author, to create a curated and meaningful collection of literature. The sources are spread across various regions, particularly Latin America but also wider Global South contexts- an indication of the transnational character of green extractivism and the coloniality it is entangled with. The inclusion criteria were aimed at ensuring conceptual rigor and congruence with the analytical focus of the chapter. This included peer-reviewed literature as well as grey and indigenous knowledge at the intersection with the themes we have identified in this paper (coloniality, extractivism, Indigenous rights, resilience and decarbonization) but with a preference for academic sources contributing to deeper conceptual, theoretical or political-ecological discussions. For academic rigour, the review limited publications to well-known peer-reviewed journals and academic books, excluding grey literature, policy reports, and non-academic work. Focussing only on works published from 2020 to 2026 also enabled the chapter to identify state-of-the-art advancements in disputes about green extractivism and the geopolitics of the energy transition, as well as to guarantee that the synthesis is sufficiently communicated by fellow researchers coming to these topics in order to plot contemporary academic

Only the citations included in the text were considered. The initial examination of core references cited in the literature identified in steps one and two revealed their existence. Consequently, this results in a more coherent literature set. Literature thus far reviewed comes from various regional contexts; as far as Latin America is concerned there is also significant engagement to GN South contexts more broadly. This serves as a trans.

To keep the article academically healthy and substantive, the works published with reputed peer reviewed journals and scholarly books were considered. Grey literature, policy reports, and other non-academic materials were not considered. The papers that have been selected for inclusion in the chapter were based on the latest discussions on green extractivism and the geopolitics of energy transition (2020–2026). Consequently, the synthesis is more indicative of contemporary scholarly disputes, but without compromising the depth of exploration and theoretical integrity.

3.3 Analytical Strategy

The three-stage interpretive framework used in the literature analysis highlighted the complexity in extractive dynamics and the resilience of affected communities.

Stage One: Conceptual Extraction

A close reading of each source revealed its conceptual contribution. Extracted are key constructs.

- Green Extractivism [3,4,7].
- Colonial nature and power [6,10,14].
- Indigenous Land Ownership and Relationship Ancestries [1,10,12].
- Resilience strategy and their adaptive capacity [1,3,10]
- Environmental justice and decolonial environmental justice [8,11,12].
- Critical minerals, geopolitics and policies [2,5,14].
- Involved in changing lives and depleted ecologies [3].

Stage Two: Thematic Coding

The concepts drawn out were coded to four broad themes.

1. Green extractivism is a new frontier of coloniality.
2. The indigenous resistance to extraction and resilience.

The literature was analysed using a three-stage interpretive process designed to capture the complexity of extractive dynamics and the resilience of affected communities.

3.3.1 Stage One: Conceptual Extraction

3.3.2 Stage Two: Thematic Coding

The four main thematic codes for the ideas extracted from the contributions are Green extractivism as a new frontier of coloniality; Indigenous territoriality, resilience and resistance to extractive transitions; Decolonial environmental justice as an analytic and political framework; Geopolitical restructuring under the decarbonization consensus. These themes are derived inductively from the literature but are also the direct product of the guiding research question of the chapter. These themes emerged inductively from the literature but were also shaped by the chapter's guiding research question:

How does the green transition reproduce or challenge colonial power structures in the Global South, and how do communities cultivate resilience in response?

3.3.3 Stage Three: Integrative Synthesis

The last stage of integration involved the weaving of themes into a narrative that integrates scholarship in political ecology with that of decolonial and Indigenous studies and global governance. This allowed the development of the chapter's conceptual model of decarbonisation justice, which brings together insights across disciplinarity and geography.

The unifying phase also facilitated the identification of tensions within the literature, for example, between technocratic visions of sustainable development and Indigenous relational ontologies, or between a global climate imperative and local social ecologies. However, this also points out that resilience is not just a way of responding to extractive harm but is generative of alternative governance and territorial futures [1,3,12].

4.4 Positionality and Epistemological Orientation

Since this chapter is based on secondary literature, we are adopting a decolonial epistemological position. We assert that knowledge is always a relative effect of power. Not only do development discourses marginalise Indigenous epistemologies, but also undesired forms of knowledge or critique gets silenced through environmental governance processes. In fact, often scholarly academic knowledge can play a similar role if it is not self-reflexive. In light of Escobar's 2015 call for transitions based on relational ontologies and drawing on post development thinking, we privilege scholarship that centre Indigenous voices, that is critical of extractive development, and that challenges universalising accounts of sustainability.

This involvement also entails recognising the value of community resilience as an epistemic and political practice. According to scholars, resilience is not a technocratic metric, but rather the relational capacity of people and communities embedded in territorial governance, cultural continuity, and collective resistance.

4.5 Limitations of the Literature Review

Several limitations shape the scope and interpretation of this review:

4.5.1 Regional Concentration

A significant amount of published research currently focuses on Latin America, particularly on the lithium triangle formed by Bolivia, Argentina and Chile. Although this geographical area of global lithium supply chains is very important globally, it leads to African and Asian locations being not very prominent in the literature. This trend shows the larger geopolitical patterns in not just academic publishing, but extractive economies more broadly.

4.5.2 Conceptual Fragmentation

The literature stems from so many diverse disciplines such as political ecology, Indigenous studies, development studies, global governance, and more which use rather different terminologies and create very different theoretical assumptions. This conceptual spread gives useful and often surprising analytical instrumentation, but also raises problems for synthesis**.**

4.5.3 Limited Empirical Data

Emerging Governance Scholarship on global governance in critical minerals is just beginning to emerge. These analyses of new international mechanisms, supply chain standards and geopolitical alliances are highly tentative [2,5] Consequently, this review relies on conceptual and theoretical contributions rather than empirical evaluations of governance outcomes.

4.5.4 Absence of Community-Generated Knowledge

As the review is limited to academic sources, it does not take into account Indigenous community reports and testimonies or local knowledge. This is a shortcoming of the source inventory, not the author's epistemological position.

4.6 The Methodological Approach Strengths.

The methodology used for literature review has a few strengths despite its limitations.

The article incorporates theories from political ecology, decolonial theory, and indigenous studies.

• The below sections will address some of these new conceptual innovations like alter lives, exhausted ecologies and the decarbonization consensus.

• Establishing community resilience as an essential factor in territorial conflict.

• A comprehensive understanding of how green extractivism functions at various scales from territorial struggles to geopolitical re-scaling.

• A chance to create a newer conceptual model of decarbonization justice which links insights across the literature opening up new areas of debate**.**

4.7 Ethical Considerations

Although primary research has not been conducted for the purpose of this chapter, there are still ethical considerations. The review avoids extractive academic practices by respecting the intellectual sovereignty of Indigenous scholars and communities, by avoiding the appropriation of Indigenous concepts without contextual grounding and by acknowledging the political stakes of environmental justice research.

The chapter also refrains from romanticizing Indigenous resistance or homogenizing Indigenous identities, recognizing the diversity of territorial struggles, governance systems, and resilience practices.

Because the review draws exclusively on academic sources, it does not incorporate Indigenous community reports, testimonies, or local knowledge systems. This limitation reflects the constraints of the source list rather than the author's epistemological commitments.

4.6 Strengths of the Methodological Approach

Despite these limitations, the literature-review methodology offers several strengths:

[2] It enables cross-disciplinary synthesis, revealing connections between political ecology, decolonial theory, Indigenous studies, and global governance

[3] It highlights emerging conceptual innovations, such as altered lives, exhausted ecologies, and the decarbonization consensus

[4] It foregrounds community resilience as a critical dimension of territorial struggles

[5] It provides a holistic understanding of how green extractivism operates across scales-from local territorial conflicts to global geopolitical shifts

[6] It supports the development of a new conceptual model (decarbonization justice) that integrates insights across the reviewed literature

4.7 Ethical Considerations

Although the chapter does not involve primary data, ethical considerations remain relevant. The review avoids extractive academic practices by respecting the intellectual sovereignty of Indigenous scholars and communities, by avoiding the appropriation of Indigenous concepts without contextual grounding and by acknowledging the political stakes of environmental justice research.

The chapter also refrains from romanticizing Indigenous resistance or homogenizing Indigenous identities, recognizing the diversity of territorial struggles, governance systems, and resilience practices.

The methodology combines systematic review techniques with interpretive, decolonial analysis to synthesize contemporary scholarship on green extractivism, coloniality, and community resilience. This approach provides a robust foundation for the subsequent Results section, which presents the thematic findings of the review and demonstrates how resilience, territoriality, and geopolitical inequality intersect in the context of the green transition.

5. Results

The literature review reveals four interlinked thematic clusters that shape contemporary debates on green extractivism, coloniality, community resilience, and decarbonization justice in the Global South. Together, these themes illustrate how the green transition, despite its sustainability rhetoric, reproduces structural inequalities rooted in colonial histories while simultaneously eliciting diverse forms of resilience among affected communities.

5.1 Green Extractivism as Colonial Continuity

The review discusses how green extractivism is a new form of coloniality. In essence, the increased mining of lithium, cobalt and rare earths in the global south economies is not portrayed as a break from historical extractive regimes but rather a phenomenon that reproduces broader patterns of dispossession, racial governance and territorial control. Babidge and Bolados (2023), have discussed lithium extraction contributing towards prevalent inequalities that are a product of colonial property relations and these colonial property relations have their basis in borderlands. Similarly, Dunlap and Jakobsen hint that infrastructures providing for renewables are violent technologies in which extraction involves taking from many peoples and lands. According to the authors, green development might rely on coercive practices and militarized political-territorial interventions.

This is reinforced by the narratives surrounding the spike in critical minerals. Different states, industry and the media frame these minerals as critical to climate mitigation and

viable futures. This is an effective form of legitimation for extractive expansion and renders largely invisible the socio-ecological harms experienced by Indigenous and rural peoples. As such, political ecologists and human rights activists reveal how critical mineral mining constitutes a biopolitical regime or "decolonial paradox", where people's lives are rendered indispensable to planetary health yet simultaneously expendable (Mora and Jinnah, "Planetary Health). These community-based practices varying from collective decision making to reviving ancestral ecological knowledge illustrate how resilience is a counter force to colonial continuity [1,3,10]. Green extractivism thus, creates not only harm but new sites of community adaptation and resistance.

Across the reviewed scholarship, green extractivism is consistently framed as a renewed expression of coloniality. Rather than representing a break from historical extractive regimes, the expansion of lithium, cobalt, and rare earth mining is shown to reproduce patterns of dispossession, racialized governance, and territorial control. Babidge and Bolados argue that lithium extraction in Chile perpetuates longstanding asymmetries embedded in colonial land relations and state–corporate alliances.[4] Dunlap and Jakobsen similarly describe renewable energy infrastructures as "violent technologies of extraction," revealing how green development can rely on coercive practices and militarized territorial interventions.[6]

This continuity is reinforced by global narratives that frame critical minerals as indispensable for climate mitigation. Such narratives obscure the socio-ecological harms experienced by Indigenous and rural communities, legitimizing extractive expansion under the banner of planetary urgency. Ulloa conceptualizes this dynamic as the "decarbonization consensus," a geopolitical project that prioritizes mineral security for Northern economies while marginalizing Southern sovereignty and Indigenous governance systems.[14]

Yet, within these structures of domination, communities cultivate resilience. They develop strategies to maintain cultural practices, protect water sources, and sustain livelihoods despite extractive pressures. These practices, which range from collective decision-making to the revitalization of ancestral ecological knowledge demonstrate how resilience operates as a counter-force to colonial continuity [1,3,10]. Thus, green extractivism produces not only harm but also new terrains of community adaptation and resistance.

5.2 Socio-Ecological Impacts of Critical Minerals Extraction

The literature has documented that lithium extraction causes an impact on ecology and hydrology especially in arid regions like Atacama Desert. Water has become the central point of harm. Brine extraction is not only responsible for the depletion of our aquifers but is also transforming the hydrological cycle and making water scarcer for Indigenous

people. These transformations are undermining traditional practices such as pastoralism and salt harvesting and disrupting cultural practices tied to water and landscape.

The abandoned ship trans-ports domestic and industrial waste to extractive sites, a practice already seen in the waste tourism of shanty towns elsewhere in the Global South (Chatterjee 2015). For Kopas, ex-traction involves the desiring and obsolescing of identities, states of mind and biological entities.

The literature documents significant ecological and hydrological impacts associated with lithium extraction, particularly in arid regions such as the Atacama Desert. Water emerges as the central axis of harm. Jerez, Garcés, and Torres show how brine extraction depletes aquifers, alters hydrological cycles, and intensifies water scarcity for Indigenous communities.[10] These transformations undermine traditional livelihoods, including pastoralism and salt harvesting, and disrupt cultural practices tied to water and landscape.

Andreucci and Voskoboynik describe these transformations as producing "exhausted ecologies" landscapes depleted of biodiversity, cultural meaning, and ecological resilience.[3] Their concept of "alter lives" captures how communities navigate the material and symbolic consequences of extraction, revealing the deep entanglement between ecological degradation and cultural erosion.

Despite these harms, communities demonstrate resilience through adaptive strategies. These include:

- **Community-led hydrological monitoring** to document water depletion and challenge state–corporate data [10]
- **Revival of ancestral water-sharing systems** to sustain collective access to scarce resources [1]
- **Diversification of livelihoods** to reduce dependence on extractive economies [3]
- **Strengthening of local governance institutions** to assert territorial authority [12]

These practices illustrate how resilience is enacted not only as survival but as a form of political agency that contests extractive governance and sustains socio-ecological relations.

Governance asymmetries exacerbate extractive harms. Environmental assessments often fail to incorporate Indigenous epistemologies or cumulative ecological effects, while state–corporate alliances marginalize Indigenous participation in decision-making [1,5] These governance gaps reinforce extractive logics and limit the potential for justice-oriented transitions. Yet they also motivate communities to build new forms of resilience through legal mobilization, transnational advocacy, and community-based monitoring.

5.3 Indigenous Territoriality, Resistance, and Community Resilience

Many articles noted the importance of Indigenous territoriality in resisting green extractivism. Territoriality refers not to property but to a set of relations: land, water, ancestors and future-generations. According to this way of thinking, another mode of environmental governance can be constructed that is not based on nature's commodification, but rather on reciprocity, guardianship, and collective rights. [1,12].

Resistance is often multiple. Through legal strategies, environmental monitoring, transnational networking and cultural practices, communities engage in asserting territorial belonging. The protection of territorial integrity indicates that community resilience cannot be separated from defence. Resilience is expressed in cultural, ecological and political practices resulting in the continuity of life on the territory [3]. The process of Condensation of Ceremonies and Rituals, reaffirming relationships with land water and the Communities enhance collaborative governance practices that build autonomy and authority vis-a-vis external interventions [10]. At the same time, they work with NGOs, scientists and international networks to claim territory and make it easier to contest projects that extract resources [1,12]. Collectively, these practices show resilience as a dynamic, social process that ensures cultural continuity, ecological sophistication, and political capacity**.**

In the Atacama, Indigenous communities have mobilized against lithium extraction by asserting territorial rights, demanding water justice, and challenging state–corporate governance arrangements.[10] Their resistance reveals how Indigenous territoriality functions as both a political strategy and an ontological stance that disrupts the coloniality of green development. At the same time, their ability to adapt, reorganize, and maintain collective life under pressure illustrates community resilience in action.

5.4 Geopolitical Restructuring and the Decarbonization Consensus

The world's race for key minerals has reshaped geopolitical relations creating new dependencies and reinforcing old ones. The argument is that the various framework emerging for the governance of critical minerals are still foisted by Northern interests. There is little scope for the Global South to shape the standards, trade regime, or environmental safeguards [2]. This further solidifies dependency structures. The southern states are thus limited in their capacity to pursue autonomous development pathways.

Brooks et al. on mining for critical minerals wade into the thorny issues of the politics of local resistance to those mining operations to explore the clashes local grapple with climate action priorities and environmental justice [5]. These tensions highlight the need for governance of the mining of critical minerals that prioritizes justice, sovereignty, and ecological integrity over mineral Ulloa's idea of the decarbonization consensus refers to how states use climate discourse to rationalise their extractive interventions and secure

mineral supply chains [14]. The unity of consensus demonstrates the coloniality of global environmental governance, making the Global South a sacrifice zone for the green transition. The geopolitical marginalization also generates new forms of resilience as societal actors, social movements and a number of Southern governments seek to re-shape the terms of the green transition. They advocate across national borders to oppose extractive forms of governance and dispute the Northern hegemony of critical minerals frameworks [2,14]. The establishment of alliances to negotiate better extraction terms, alongside regional coordination, enhances their position and strengthens their control over resource governance [5]. Many Indigenous and community-based actors endorse alternative visions of development underpinned by territorial autonomy and ecological integrity, which assert ways of living that reject extractive logics and articulate relational forms of wellbeing [1,12]. The efforts at the 2022 UN Climate Conference's co-creation space by countries located in the Global South and indigenous groups are covered in "Anti-green Imperialism: Construction of Green Colonialism."

Ulloa's concept of the decarbonization consensus captures how states mobilize climate discourse to justify extractive interventions and secure mineral supply chains [14]. This consensus reinforces the coloniality of global environmental governance, positioning the Global South as a sacrificial zone for the green transition. Geopolitical marginalization also generates new forms of resilience, as communities, social movements, and some Southern governments work to reshape the terms of the green transition. They engage in transnational advocacy to contest extractive governance norms and challenge Northern dominance in critical minerals frameworks [2,14]. Regional coordination further strengthens their position, with alliances formed to negotiate fairer extraction terms and assert greater control over resource governance [5]. Alongside these political strategies, many Indigenous and community-based actors advance alternative development visions grounded in territorial autonomy and ecological integrity, offering pathways that reject extractive logics and centre relational forms of wellbeing [1,12]. Together, these efforts illustrate how geopolitical exclusion can catalyse concise yet powerful forms of multiscale resilience that contest green colonialism and open space for more just transition trajectories.

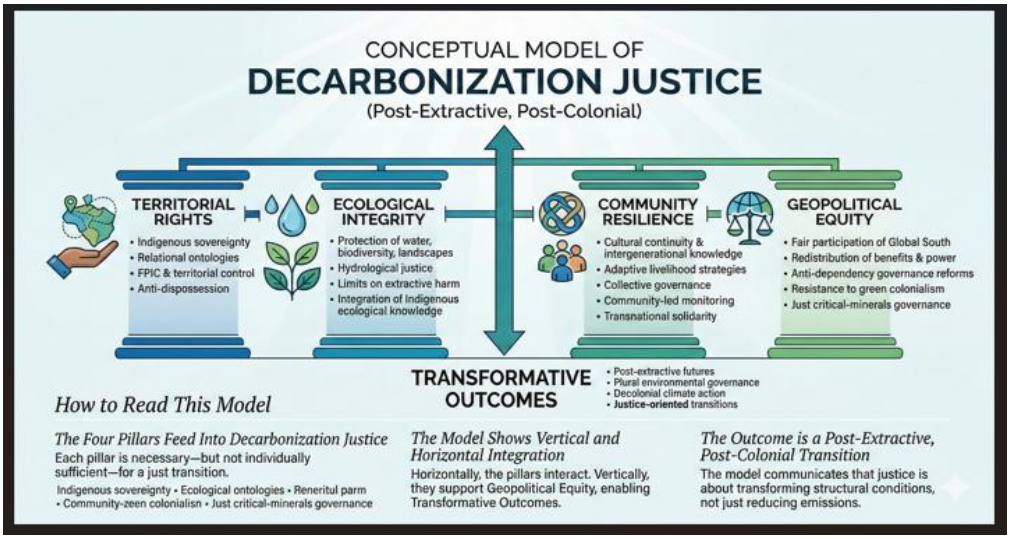


Fig 1: Graphical conceptual model of Decarbonization Justice

(Fig. represents four pillars-Territorial Rights, Ecological Integrity, Community Resilience, and Geopolitical Equity showing their interaction to produce justice-oriented transitions)

Source: Author's own creation

6. Discussion

The literature surveyed in this chapter highlights a key contradiction that informs current global green transition thinking. The necessity of decarbonisation is depicted as a necessity for planet Earth. Yet the decarbonisation material basis reproduces long-standing coloniality and socioecological injustice terrains in the Global South. Ongoing extractive logic is reproduced by (green) extractivist projects related to lithium and other critical minerals (discussed below) even when climate change discourse legitimatizes in-situ operation of pre-existing patterns. The researchers record an intensification of dispossession of land and water, marginalisation of Indigenous governance systems, entrenchment of asymmetrical state–corporate power relations privileging extra-local interests over local sovereignty [3,4,7,10].

All the works that have been reviewed in this chapter take coloniality as a structuring force. In other words, there are sets of power relations that shape the imagining, governance, and transformation of mineral-rich landscapes. The coloniality of nature operates through processes and systems that render everything a possible "mineable order of things" [3,6,10]. Likewise, the governance regimes systematically exclude decision-making and knowledge systems of the Indigenous people [3,10].

Different types of scholarship have demonstrated that these areas are more than just the sites of extraction but also those of resistance and resilience. Indigenous territoriality serves as a political technology to counter land and water commodification as relational ontology. These alternate forms of relationship are manifesting in community-led water monitoring, legal mobilization and reproduction of ancestral practices [1,10,12]. The everyday practice of governance, cultural continuity and collective organizing embodies resilience. Members of the community also engage with and influence the conduct of paramilitary and police state inspectors. As a result, the literature not only sees communities as victims of environmental harm but it also marks how they shape environmental governance to contest extractive interventions.

This understanding is further enriched within critical scholarship that uses decolonial environmental justice approaches [8, 12]. Those dimensions obscured in causal explanations are colonial-historical and colonial-epistemic. Achieving justice calls for transforming the embedded colonial power relation and state it was. The focus must be placed on concepts like Indigenous sovereignty and relational ethics. The capacity of communities to endure and sustain practices and worlds alike amidst the threats of an ongoing coloniality.

The "decarbonization consensus" serves to sustain global asymmetries [2,5,14]. The agreement ensures that Global North's mineral security remains intact; its true intentions are concealed, and Global South is denied regional- and territorial autonomy.

7. Conclusion

This chapter explores the ways decarbonization is giving rise to new socioecological and political formations in the Global South. In simpler terms, the carbon reduction processes refer to the acquisition and commodification of what are commonly referred to as important "green" minerals and metals. This chapter importantly examines how Green Extractivism is linked to Coloniality, Indigenous Territoriality, and Community Resilience. Drawing from a systematic literature review of recent publications, this study illustrates how climate change mineral extraction continues to reproduce (dis)possessive and environmental patterns and asymmetries in governance and power, framed as necessary for the survival of our planet [3,4,7,10]. Scholarship demonstrates how rural and Indigenous peoples mobilise their culture as a political resource.

The research identifies conceptual convergences and gaps between four bodies of scholarship: political ecology, decolonial environmental justice, Indigenous territorial governance, and the geopolitics of critical minerals. Accordingly, it uses them to inform a conceptual model of decarbonization justice based on territorial rights, ecological integrity, community resilience and geographic equity.

The chapter's novelty lies in reframing community resilience from a neutral capacity to absorb green extractive pressures to a political strategy and practice to generate and sustain alternatives The implications from the study suggest that post-extractive futures are not just utopic/visionary ideals or political prospects but a reality, experienced through practices, oppositions and world-making engagements of Global South communities.

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Chapter 23: Embers Beneath the Dust: Gendered Environmental Precarity and Development in *A Thousand Splendid Suns*

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Abstract

Climate change and development are often framed as gender-neutral crises, but literature repeatedly exposes and exhibits, how their consequences are deeply rooted in gender, shaped by patriarchy, colonial histories, and unequal access to resources. This paper examines the gendered impacts of climate change and uneven development in Khaled Hosseini's *A Thousand Splendid Suns* (2007), situating the novel within ecofeminist and postcolonial ecocritical frameworks, where the text is not conventionally categorized as climate fiction, but it foregrounds environmental precarity, war-induced infrastructural collapse, and patriarchal governance as interconnecting forces that disproportionately affect women. Set against Afghanistan's drought-prone landscapes and decades of political turmoil, the novel reveals how ecological scarcity and militarized development intensify the existing gender inequalities and discriminations. Women's unpaid domestic labour expands under conditions of food shortages, economic instability, and restricted mobility, while access to healthcare, education, and public space becomes increasingly limited or non-existent. Through the characters of Mariam and Laila, Hosseini portrays how environmental stress and socio-political breakdown are inscribed upon female bodies, particularly through hunger, reproductive suffering, and domestic violence. Delving into the ecofeminist lens, this paper tries to argue that the domination of women parallels the exploitation and devastation of land, as both are subjected to the systems of control rooted in patriarchy and conflict-driven modernization, where the text also gestures toward alternative models of resilience through female solidarity and communal care, challenging masculinized narratives of development. Analysing the novel through the lens of gendered environmental vulnerability, this paper contends that, it exposes climate and development crises not as gender-neutral phenomena but as structurally unequal processes that render women both the primary sufferers of ecological collapse and the central agents of survival and ethical reconstruction.

Keywords: Ecocriticism, Ecofeminism, Patriarchy, Climate, Development, Postcolonialism, Afghanistan, Suppression, Urbanisation, Exploitation, Khaled Hosseini, *A Thousand Splendid Suns*, Modernization.

Introduction

Climate change and development are frequently occurring and articulated in policy discourse as gender-neutral crises, framed within the universal vocabulary of sustainability, modernization, and humanitarian aid. Yet, literary texts often reveal the concealed imbalance embedded within such crises, demonstrating how environmental degradation and uneven development disproportionately burden women, even when they are not directly connected with it. Khaled Hosseini's *A Thousand Splendid Suns* (2007), though not conventionally categorized as climate fiction, foregrounds the intimate entanglement of environmental precarity, war-driven infrastructural collapse, and patriarchal governance in Afghanistan. The novel, set across decades of political upheaval, situates its female protagonists within drought-stricken landscapes, resource scarcity, and militarized urban ruin. This paper examines the gendered impacts of climate change and uneven development in *A Thousand Splendid Suns*, situating the novel within ecofeminist and postcolonial ecocritical frameworks. Through portraying the lives of Mariam and Laila, in such adverse conditions, Hosseini renders visible ways in which environmental stress and socio-political breakdown are inscribed upon female bodies. The hunger, reproductive suffering, restricted mobility, unpaid domestic labour, and domestic violence, intersect as manifestations of ecological and patriarchal crises, where the novel reveals, how environmental scarcity intensifies pre-existing inequalities, exhibiting women both as primary victims of ecological collapse and as central agents of survival. Employing ecofeminist theorists such as, Vandana Shiva and Val Plumwood, alongside postcolonial ecocritical discourse, it can be said that, the domination of women in the novel parallels the exploitation and devastation of land under systems of patriarchal control and conflict-driven modernization, where, it points toward different models of resilience through female solidarity and communal care, challenging masculinized narratives of development, which ultimately, *A Thousand Splendid Suns* does, by exposing climate and development issues not as a neutral phenomena but as a structurally unequal process deeply rooted in colonial histories, militarization, and gendered oppression.

Methodology

This study adopts a qualitative, interpretive research methodology grounded basically in three stages – Contextual analysis, thematic analysis and theoretical application. Implementing Contextual analysis, the study situates the novel within Afghanistan's geopolitical and ecological history, examining war, drought, and

development narratives, whereas, thematic analysis is used to identify recurring motifs of scarcity, hunger, bodily suffering, unpaid labour, and restricted mobility. Theoretical application plays a role in interpreting these motifs through ecofeminist and postcolonial ecocritical frameworks to demonstrate how environmental and patriarchal domination are mutually reinforcing.

Here, the study goes through literary analysis where it employs close textual reading of *A Thousand Splendid Suns* examining representations of environmental scarcity, infrastructural collapse, domestic labour, bodily suffering, and female solidarity, where selected passages or excerpts depicts drought, food shortage, reproductive trauma, Taliban restrictions, and urban ruin are analysed as narrative sites where ecological and patriarchal crises intersect. The research is theoretically anchored in ecofeminism, feminism and postcolonial ecocriticism. Ecofeminist theory, particularly the works of Vandana Shiva and Val Plumwood, provides a conceptual framework for analysing parallels between the domination of women and the exploitation of nature. Their critiques of patriarchal development, dualistic hierarchies, and extractive modernization inform the interpretation of gendered environmental vulnerability in the novel. Postcolonial ecocriticism functions as a secondary analytical lens, situating Afghanistan's ecological degradation within histories of foreign intervention, militarized modernization, and global political economy, where, Rob Nixon's concept of slow violence is employed to interpret drought, famine, infrastructural decay, and reproductive suffering as gradual, accumulative forms of structural harm. This approach does not treat climate change as an explicit thematic category within the novel, but read its environmental precarity as embedded within broader structures of uneven development and militarization in the land. By integrating literary close reading with interdisciplinary theoretical frameworks, the methodology reveals how ecological vulnerability in the novel is gendered, historically situated, and politically produced.

Literature Review

A Thousand Splendid Suns by Khaled Hosseini published in the year 2007, has predominantly been examined through feminist, postcolonial, and trauma studies frameworks, where, critics have focused on its representation of patriarchal violence, female endurance, and the socio-political upheavals of Afghanistan. Feminist readings interpret Mariam and Laila as figures who negotiate structural oppression under domestic patriarchy and Taliban governance. Such scholarship situates the novel within discourses of gendered violence, female solidarity, and maternal resilience, often foregrounding the domestic sphere as a site of both confinement and resistance. Postcolonial critics examine Afghanistan's geopolitical history, as shaping the social landscape of the novel, where these readings emphasize how war-induced displacement, infrastructural collapse, and ideological extremism produce systemic vulnerability, particularly for women. The nation

is frequently interpreted as a feminized space, occupied, regulated, and symbolically violated, which parallels the bodily suffering of female characters.

However, while scholars have extensively analysed patriarchy and war, fewer studies root on the environmental dimension of the text. The novel's recurring drought, food scarcity, dust-laden urban ruin, and agrarian fragility are often treated as background rather than constitutive forces shaping gendered experience. This gap becomes significant when examined through ecofeminist theory. Vandana Shiva argues that patriarchal development models commodify both women and nature, treating them as passive resources for extraction. Similarly, Val Plumwood critiques dualistic hierarchies, that legitimize domination and their frameworks illuminate how environmental degradation and gender oppression operate through shared ideological logics. Postcolonial ecocriticism, further extends this analysis by examining how colonial histories shape ecological exploitation and uneven development. Rob Nixon concept of slow violence also play a major role, in describing environmental destruction as gradual, often invisible, yet disproportionately affecting marginalized populations. When applied to Hosseini's novel, drought, infrastructural decay, hunger, and reproductive suffering can be understood as forms of slow violence compounded by militarization and patriarchal governance.

Existing scholarship and studies, have not sufficiently synthesized ecofeminism with postcolonial ecocriticism in reading *A Thousand Splendid Suns*. Thus, this study contributes to the field by foregrounding environmental precarity not as mere backdrop but as structurally intertwined with gendered oppression and uneven development.

Discussion

Ecofeminism positions a conceptual and material link between the domination of women and the exploitation of nature, whereas, Vandana Shiva argues that's, the patriarchal development models treat both women and the environment as passive resources to be controlled and extracted. Similarly, Val Plumwood critiques the dualistic thinking, where, man/woman, culture/nature, civilized/primitive, that underpins Western rationality and legitimizes hierarchical domination. Focusing within this framework, environmental degradation is not merely ecological but ideological, where, it emerges from structures that privilege control, conquest, and profit over care and sustainability. When looked through the lens of the text, Hosseini opens the novel, by portraying the female endurance, which could be paralleled with the endurance of nature.

> *"Mariam was five years old, the first time she heard the word harami … This is my reward for everything I've endured an heirloom-breaking, clumsy little harami" (Hosseini, 01.)*

Postcolonial ecocriticism extends this analysis by examining how colonial histories shape environmental exploitation and uneven development of a particular space. Afghanistan's geopolitical history, which is marked by foreign intervention, Cold War politics, and globalized militarization, forms the backdrop of Hosseini's novel, where the war-induced infrastructural collapses and displace exacerbate ecological vulnerability, rendering development which is uneven and deeply gendered. Rob Nixon's concept of *slow violence* is particularly relevant here, as he states that the environmental devastation unfolds gradually, often invisibly, which disproportionately affects marginalized populations. In the novel, elements of drought, famine, and urban ruin constitute forms of slow violence that compound the overt brutality of war and patriarchy, where the landscape of Afghanistan becomes not merely a setting but an active participant in shaping women's lived realities. Although the novel is primarily read as a feminist and political novel, it consistently foregrounds environmental scarcity. Mariam's childhood in rural Herat unfolds within a fragile agrarian ecology, where subsistence living depends upon seasonal cycles and limited resources. Later, in Kabul, drought and war converge to produce acute food shortages, where, Hosseini describes dust-choked streets, barren fields, and dried-up wells, as images that evoke ecological exhaustion and he even describes water as a luxurious. Inspected under the lens of feminism and ecocriticism, the conditions of Laila and Mariam, is the same as the environment, which is forced to endure degradation and anthropogenic activities, which decays the ecosystem, like how patriarchy and war politics decay the society.

> *"It's our lot in life, Mariam. Women like us. We endure. It's all we have" (Hosseini, 18.)*

> *"Learn this now and learn it well, my daughter: Like a compass needle that points north, a man's accusing finger always finds a woman. Always. You remember that, Mariam" (Hosseini, 15.)*

The recurring drought intensifies economic instability. When food becomes scarce, women's labour expands, where, they ration meals, stretch ingredients, and bear the psychological burden of feeding families amid shortage. As Shiva observes, women in the Global South often act as *invisible providers*, absorbing all the environmental shocks through unpaid domestic labour. Mariam's and Laila's daily negotiations with scarcity exemplify this phenomenon, where, hunger becomes gendered, as women routinely sacrifice their portions for children. Environmental precarity in the novel is not presented as a natural disaster alone but as intertwined with war and governance failure, where, bombings destroy irrigation systems and markets, while Taliban restrictions limit women's ability to seek employment, basic rights or medical care. Thus, ecological vulnerability emerges from political decisions. The drought-stricken landscape mirrors

the erosion of public infrastructure, suggesting that environmental and institutional collapse are mutually reinforcing. Development in the novel appears as a fractured and masculinized project, where, Kabul is shown as once the symbol of modernization, with cinemas, schools, and universities. Laila's father, a progressive educator, believes in development through education and infrastructure. However, decades of war transform the city into rubble. Militarized modernization, funded and shaped by foreign powers, only leaves behind ruined buildings and displaced populations. Postcolonial ecocriticism interrogates such narratives of development, exposing how they privilege geopolitical interests over local sustainability, where, Afghanistan becomes a battleground for superpowers, as its environment damage collaterally in ideological conflicts. The destruction of homes and public spaces renders women particularly vulnerable, where, there are no stable infrastructure, access to healthcare, sanitation, and education. Under Taliban rule, patriarchal governance intensifies women's exclusion from public life. Some of the instances in the novel are, Laila being barred from working and girls' schools being closed. Development becomes gender-exclusive, reinforcing male authority. Plumwood's critique of dualistic hierarchies resonates here, where he explains that, women are relegated to the private sphere, associated with nature and domesticity, while men monopolize the public sphere of culture and power. Environmental collapse, thus, reinforces gender segregation, trapping women within deteriorating domestic spaces.

> "It is not proper for women to wander about the streets. If you go outside, you must be accompanied by a mahram, a male relative" (Hosseini, 248.)

Hosseini portrays the hypocrisy of the Taliban's laws in the novel, where they forbid women from working outside their homes. Through this, the Taliban endangered the lives of many women and children, who did not have a male member to support them. Women were denied access to proper health care or even basic amenities. The Taliban ordered that there should be separate hospitals for men and women, where they will be treated separately and that all-female staff would be sent to work in one central women's hospital. However, only the health needs of men were prioritised, and the women's hospital was left in a devastated state by the government. There is a mention of a widow in the novel who, rather than waiting to die from starvation, embraced suicide to end her sufferings.

One of the novel's most striking features is its portrayal of bodily suffering. Environmental stress is inscribed upon female bodies through hunger, miscarriage, and domestic violence. Mariam endures repeated pregnancies that end in miscarriage, each loss accompanied by Rasheed's cruelty. Her reproductive suffering reflects not only personal tragedy but structural neglect, which points out the limited healthcare, nutritional deficiency, and psychological abuse. Ecofeminist theory highlights how women's reproductive capacities are often controlled within patriarchal systems. In the novel,

Mariam's worth is measured by her ability to produce a son. Rasheed's disappointment after each miscarriage reveals a logic of possession and entitlement, where the female body becomes a site of both ecological and patriarchal exploitation. However, Laila's pregnancies unfold amid war and displacement. Bombings, malnutrition, and stress shape her maternal experience. The scarcity of medical care during Taliban rule underscores how development crises disproportionately impact women's health. Nixon's slow violence manifests here, as he states that, reproductive suffering accumulates gradually, often normalized within the broader context of conflict. Then there is domestic violence, which is graphically portrayed by Hosseini, where both Mariam and Laila falls victim to Rasheed's cruelty. The domestic sphere in *A Thousand Splendid Suns,* operates as a microcosm of national crisis, where Rasheed's home, initially presented as a space of patriarchal control, gradually becomes a site of confinement and deprivation, where Hosseini uses images such as Food shortages leading to rationing, windows being covered, and fear permeates everyday life. The home itself mirrors the drought-stricken and war-torn nation. Ecofeminism critiques the romanticization of domesticity, emphasizing how women's association with nature often justifies their confinement. In the novel, domestic labour intensifies under ecological strain. Mariam and Laila manage cooking, cleaning, and childrearing despite dwindling resources. Their resilience, however, is not romanticized, as it emerges from necessity. At the same time, the domestic sphere becomes a site of resistance. Female solidarity transforms the home into a space of care and mutual support. When Mariam and Laila forge a bond, they challenge Rasheed's authority. This solidarity parallels ecofeminist visions of relational ethics grounded in cooperation rather than domination.

> *"Rasheed raised the belt again and this time came at Mariam. Then an astonishing thing happened: The girl lunged at him. She grabbed his arm with both hands and tried to drag him down, but she could do no more than dangle from it. She did succeed in slowing Rasheed's progress toward Mariam" (Hosseini, 179.)*

Ecofeminist thought emphasizes alternative models of development rooted in sustainability and cooperation. Laila's commitment to rebuilding aligns with such models. Rather than pursuing profit or militarized power, she invests in education, particularly for girls. This vision counters masculinized narratives of modernization. The novel concludes with cautious hope, where, Kabul begins to rebuild after the fall of the Taliban. Yet Hosseini does not erase environmental vulnerability, where, reconstruction remains fragile, dependent on political stability and equitable resource distribution. By positing women's experiences at the centre, the narrative suggests that sustainable development must address gender inequality. While the novel exposes structural oppression, it also gestures toward resilience. Mariam's ultimate act of sacrifice – killing Rasheed to protect Laila – marks a radical assertion of agency. Her decision disrupts patriarchal violence,

albeit at the cost of her life. Laila's later return to Kabul to rebuild a school symbolizes reconstruction grounded in education and community care.

> *"And so, Mariam raised the shovel high, raised it as high as she could, arching it so it touched the small of her back. She turned it so the sharp edge was vertical, and, as she did, it occurred to her that this was the first time that she was deciding the course of her own life. And, with that, Mariam brought down the shovel. This time, she gave it everything she had" (Hosseini, 255.)*

Afghanistan's ecological and infrastructural crises cannot be separated from global politics. Foreign interventions contribute to environmental destruction and displacement, while postcolonial ecocriticism insists on recognizing such transnational responsibilities, where the novel implicitly critiques global indifference to Afghan women's suffering.

Conclusion

Climate change, though not explicitly named, forms part of a broader matrix of vulnerability. Drought and resource scarcity reflect global environmental shifts exacerbated by industrialized nations, where the women in conflict zones often bear the brunt of such crises despite contributing least to carbon emissions. The novel, thus, resonates with contemporary debates on climate justice and reveals climate and development crises as deeply gendered phenomena shaped by patriarchy, war, and colonial histories. Through the characters of Mariam and Laila, Hosseini portrays how environmental scarcity and infrastructural collapse intensify existing inequalities, inscribing suffering upon female bodies. Hunger, reproductive trauma, unpaid labour, and restricted mobility emerge as interconnected manifestations of ecological and patriarchal domination. Situated within ecofeminist and postcolonial ecocritical frameworks, the novel exposes the structural violence underlying narratives of modernization, where it challenges the assumption that development is inherently progressive, demonstrating how militarized and gender-exclusive governance intensifies vulnerability. At the same time, it gestures toward alternative ecologies of care grounded in female solidarity and education. Ultimately, *A Thousand Splendid Suns* compels readers to reconsider climate change and development not as abstract global issues but as lived realities mediated by gender, power, and history, where women are both primary sufferers of ecological collapse and central agents of ethical reconstruction.

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Chapter 24: Traditional Ecological Knowledge: Prospects and Challenges

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Abstract

"TEK" refers to the knowledge about nature that is learned by local and indigenous people by living close to nature and understanding its patterns. It helps people understand nature and guides them to use natural resources carefully and respectfully. TEK is not old; it changes over time according to new experiences and environmental changes. It comes from everyday experiences, oral traditions, and shared cultural values. TEK offers a deep understanding of biodiversity, seasonal cycles, climate patterns, and sustainable ways to care for land, water, and forests. TEK is not old; it changes and grows with time. It responds to social and environmental changes. This chapter explains why TEK is still important. It also talks about the challenges it faces in today's world. On one hand, TEK offers important pathways for creating more sustainable and climate-resilient futures. Its place-based knowledge enhances scientific approaches by connecting environmental decisions to real-life experiences. With passing time, people understand that different knowledge systems can also learn from each other and work together. This helps in research and protecting the environment. Respecting TEK helps communities live strongly and sustainably. It also helps to protect the culture. TEK is facing many problems today. It is being affected by modern changes. Social and economic changes are also impacting local communities and their traditional knowledge. It is becoming harder to protect this knowledge and pass it on to the next generation. There are also problems related to ownership and unequal power relations. Differences in worldview between Western science and Indigenous perspectives can also cause misunderstandings or marginalization. By recognizing both the potential and the challenges of TEK, this chapter urges respectful and context-aware engagement approaches that honour knowledge holders, appreciate cultural diversity, and encourage meaningful knowledge sharing for more just and sustainable futures.

Keywords: Traditional Ecological Knowledge, Indigenous Knowledge, Climate Change, Sustainability, Sustainable Development

Introduction

Traditional Ecological Knowledge (TEK) implies a progressive body of proficiency that includes practices, values, and belief systems that are developed by Indigenous and local communities alongside prolonged interactions with their surrounding environments. Evolving through generations of lived experience, observation, and adaptive practice, TEK lives up to a dynamic and precise system of environmental understanding. It encompasses knowledge of biodiversity, soil and water waste as well as conservation management, climatic variability, resource conservation, and sustainable livelihood strategies

Where on the other side of the coin, the dominant Western scientific prototype that often conceptualizes humans as separate from nature as TEK is rooted in relational worldviews that position humans as assimilated within ecological systems. Knowledge is circulated orally through a lot of means such as stories, rituals, songs, customary laws, and everyday practices where it reflects not only empirical observation but also ethical obligations and cosmological beliefs. Therefore, TEK represents both a practical system of environmental management as well as a cultural framework shaping human and nature relationships.

Over the past few decades, traditional ecological knowledge has gained ample amount of light and attention in environmental governance, conservation biology, climate change adaptation studies, and sustainability science. Researchers increasingly recognize its potential contributions to biodiversity conservation, disaster risk reduction, and resilient natural resource management. However, the integration of TEK into mainstream scientific and policy frameworks remains compound and rigid. Hence leading to rising surrounding epistemological hierarchies, intellectual property rights, ethical research practices, and the risk of knowledge appropriation continue to shape academic debates. In light of these ongoing transformations, this paper questions on how Traditional Ecological Knowledge (TEK) can be repositioned within contemporary sustainability and environmental governance frameworks without being reduced to symbolic recognition or selective lineage. Although TEK has gained increasing visibility in policy and academic debate, it is often engaged in disintegrated and instrumental ways, hence frequently confined to documentation rather than treated as a living system of knowledge. This paper argues that TEK should be understood as a relational and associational epistemology that is embedded within cultural landscapes and social institutions rather than as a static repository of practices to be preserved.

Focusing on the ecologically sensitive and culturally diverse region of Northeast India, the study adopts a conceptual-analytical approach to explore both the opportunities and the structural challenges shaping TEK's role in sustainable natural resource management

and conservation argumentation. This paper carefully evaluates for strengths, weaknesses, and hidden power dynamics instead of presenting empirical case studies. Tek states its standing within wider sustainability transitions where it contends that meaningful engagement with TEK requires more than acknowledgment as it calls for respect for customary ecological ethics, and a move beyond token inclusion toward genuine epistemological recognition and eminence.

Traditional Ecological Knowledge at Glance

Traditional ecological knowledge (TEK) consists of the body of knowledge, beliefs, traditions, institutions, and worldviews developed and sustained by indigenous peasant, and local communities in interaction with their biophysical environment (Toledo, 2002; Berkes, 1993). TEK offers complex and predictive insights that are valuable for understanding ecosystem dynamics, conservation, and sustainable resource management at multiple scales from local populations to global contexts (Albuquerque et al., 2021). TEK goes beyond practical skills as it is closely linked to cultural identity, ethical values, rituals, and spiritual beliefs. TEK reflects a worldview in which humans are part of nature where they are maintaining reciprocal relationships with the environment rather than dominating or exploiting it.TEK follows deep Ecology religiously.

Through customary laws, taboos, sacred spaces, and collective decision-making, TEK guides agriculture, fishing, forest management, and water conservation. These practices mostly depend on detailed precise and experienced knowledge of species behaviour, seasonal cycles, soil conditions, and ecological balance.

TEK is dynamic and adaptable. It changes as communities respond to environmental and social transformations whereas on the other hand retaining core cultural principles. It presents prospects such as complementing Western scientific knowledge by providing holistic ecological assessments that extend across longer time horizons and integrating socio-cultural dimensions into environmental stewardship (*Souther et al., 2023).* In recent run TEK is widely recognized as a valuable complement to scientific knowledge which is contributing to not only to climate adaptation but also other relevant fields like biodiversity conservation, disaster resilience, and sustainable environmental governance and so on and so forth.

Prospects of Traditional Ecological Knowledge

Traditional Ecological Knowledge (TEK) refers to the knowledge which is built by the native communities and indigenous communities through their interaction with their environment for centuries. It is the practical wisdom that local communities have gained from continuous interaction with their surroundings over generations. It develops its basis of prolonged observation of different environmental phenomena. Unlike modern

scientific knowledge. TEK is usually not written down in books. It is passed orally from elders to younger members of the community. It is deeply connected with everyday life, traditions, customs, rituals, and livelihood activities

TEK provides locality-specific knowledge, such as folk taxonomy and species ecology, which can improve conservation strategies and management plans through incorporating Indigenous people's observations and ecological relationships that have developed over generations (Drew, 2005). In fisheries, for example, TEK contributes significantly to environmental preservation efforts by transmitting memory and practices essential to sustainable management (Sousa et al., 2022). It also supports climate change adaptation by enabling communities to monitor environmental changes and respond with culturally relevant resource management strategies, promoting socio-ecological resilience and empowerment (Hosen et al., 2020).

Traditional Ecological Knowledge denotes the understanding developed by people about nature. Based on their observations, they can predict several things, like when birds migrate, when crops should be planted, and know about soil fertility patterns. This knowledge is passed on by the old generation to the new generation. It helps to understand the ecosystem in a better way. In Meghalaya, the sacred groves are protected by the local communities, namely Garo and Khasi. These places help to conserve biodiversity and protect many plant species.

Another important benefit of TEK is that it helps people adjust to climate change. Tribal and local communities understand nature very closely because they live with it every day. They can easily notice small changes in weather or seasons. Over time, they have developed their own ways to predict natural events. TEK also offers unique educational opportunities by challenging conventional, often Western-centric pedagogies. Its integration into geography and environmental education fosters learner-centered and inquiry-based approaches, encouraging informed decision-making and transdisciplinary understanding that are crucial for contemporary environmental professions. If this traditional knowledge is used together with modern science, it can reduce damage and even save lives.

TEK systems have great contributions in sustaining biodiversity, providing ecosystem services (Gadgil et al., 1993; Reid et al., 2006; Boafo et al., 2016), and building resilience in the face of global climate change (Folke, 2004). Across various regions, forests managed by tribal communities are better maintained and preserved than those under government control. This is because local people follow old customs and rules that protect nature in a natural way. For example, in Arunachal Pradesh, the Apatani tribe follows a traditional land-use system. It protects wetlands and forests while allowing farming to continue.

TEK is also useful in farming and water management. Local people practice mixed cropping, rainwater harvesting, and soil conservation from generation to generation. The Apatani farming system is an appropriate example of this practice. They grow rice and fish together in the same field without using chemical fertilizers. Jhum cultivation, when done with proper fallow periods, allows forests to grow back naturally. TEK gives simple and practical ways to manage nature without harming it. It also supports larger goals like the Sustainable Development Goals (SDGs)

Challenges confronting Traditional Ecological Knowledge

Traditional ecological knowledge, though deeply grounded in lived experiences and prolonged interaction with the environment, is increasingly challenged by various complex issues. The rapid pace of environmental changes, shifts in socio-economic factors, and the dominance of formal scientific systems have placed immense pressure on its continuity and relevance.

One of the urgent issues is the intensification of climate variability, which has changed the indicators of seasonal and ecological observations passed down through generations. Indigenous communities that have traditionally relied on these intimate indicators are now facing uncertainties as extreme weather events and shifting agroclimatic conditions disrupt inherited systems of prediction and adaptation.

The market economy and consequent agricultural modernization increase the use of HYV seeds, chemical fertilizers, and monocultural farming, which has gradually replaced diverse indigenous crop varieties along with traditional farming methods that are ecologically integrated. For example, the growing use of chemical fertilizers and pesticides has replaced traditional organic inputs such as cow manure, compost, ash, and botanical pest repellents, i.e., neem-based mixtures in most part of the Brahmaputra floodplain and its adjacent areas.

Declining biodiversity and the deterioration of habitats severely undermine the foundation of TEK. The growing severity of deforestation, mineral extraction, land-use and landcover change and river bank erosion etc. changes the ecological functioning and destabilizes the environmental conditions that support traditional practices. Once certain plant species become extinct, indigenous crop varieties decline, or hydrological systems are unbalanced, then the associated experimental knowledge is weakening, and it erodes the practical relevance and transmission of the knowledge embedded with it and runs the risk of disconnecting from its material and cultural roots.

Migration causes a significant threat to TEK as it breaks the transformation of information from generation to generation. As young people migrate to urban centres for the betterment of livelihood opportunities and a better lifestyle. As a result, the natural process of learning from elders through oral tradition and daily practices is interrupted

which hinders the normal flow of knowledge through oral traditions. Furthermore, the mainstream educational systems rarely include indigenous viewpoints and traditions. As a result, the traditional knowledge system often remains outstream and undervalued. This exclusion gradually strengthens the belief that traditional knowledge is outdated or lacks relevance in modern scientific discussions, although it continues to hold practical and ecological significance in many communities.

It is often seen that modern scientific institutions are prioritizing data driven quantitative methods of research. As a result, Traditional knowledge systems received less recognition. This structural disparity hinders the effective incorporation of TEK into strategies for environmental governance, climate adaptation, and sustainable development and planning.

Concern related to intellectual property, biopiracy, and inadequate legal safeguards expose indigenous communities to exploitation (*Houde N, 2007*). The commercialization of indigenous medicinal, agricultural, and ecological knowledge without consent or equitable benefit sharing can undermine community rights, weaken cultural ownership, and erode trust in research institutions, which marginalizes original custodians and disrupts traditional knowledge transmission systems.

Future recommendations

To pass on the cultural and traditional relevance and vitality of TEK, several forward-looking strategies are essential. First, systematic documentation must be undertaken in collaboration with Indigenous communities, ensuring that knowledge recording respects cultural sensitivity and community ownership. Documentation should not aim at extraction but at preservation with the consent of these highly enlightened communities.

Secondly, meaningful integration between TEK and scientific knowledge systems should be encouraged through participatory research and co-production of knowledge as well as interdisciplinary collaboration. Bridging epistemological gaps can strengthen the roots of TEK on climate adaptation, biodiversity conservation, and sustainable development planning. Legal safeguards and intellectual property protections must be reinforced to prevent biopiracy and unauthorized commercialization of Indigenous traditional knowledge. Benefit-sharing mechanisms should ensure that communities prosper rights over their knowledge, and receive equitable recognition.

Educational reforms are equally important as including Indigenous ecological perspectives within curricula can promote respect and privilege for knowledge pluralism and encourage upcoming technology-centric younger generations to value their cultural heritage. Community-based traditional learning platforms may help restore intergenerational knowledge transmission.

Conclusion

Traditional Ecological Knowledge (TEK) represents far more than a collection of local environmental practices; it is a comprehensive knowledge system rooted in lived experience, cultural identity, and ecological ethics and is developed through generations of close interaction with nature. TEK embodies a real worldview in which humans are understood as integral components of ecological systems rather than external controllers of them. This perspective offers a powerful alternative to dominant paradigms that often separate society from nature.

The debate of prospects and challenges demonstrates that TEK holds an ample amount of potential for sustainable natural resource management, biodiversity conservation, and climate change adaptation, particularly in the context of Northeast India, only if it is projected right. Many practices illustrate local ecological knowledge, which contributes to environmental resilience and sustainable livelihoods. When respectfully integrated with scientific or Western approaches, TEK can enrich environmental governance and promote overall development routes.

Nevertheless, TEK faces significant menaces including climate variability, biodiversity loss, modernization, migration, and the expansion of market-driven agriculture, which are weakening traditional systems of knowledge transmission. Epistemological hierarchies within academic and policy institutions continue to marginalize Indigenous knowledge, while it also concerns intellectual property rights and biopiracy to communities to exploitation. These challenges throw light on the urgent need for ethical engagement and legal protection of the biodiversity and recognition of the knowledge holders of the society. Traditional Ecological Knowledge (TEK) is the accumulated knowledge developed by indigenous communities through generations. This chapter demonstrates that TEK is not simply a cultural remnant of the past but a living and practical resource for sustainable living. It offers place-based knowledge related to agriculture, biodiversity, and natural resource management, which strengthens livelihoods and enhances community resilience. Northeast India, with its rich indigenous diversity, has developed a robust body of traditional ecological knowledge through generations of environmental engagement. Practices such as shifting cultivation, community forest governance, and medicinal plant use remain central to coping with climate risks like floods and landslides. Integrating TEK with scientific approaches can significantly strengthen climate resilience in the region.

In summary, the future of traditional ecological knowledge depends on a careful balance between preservation and innovation. When TEK is properly documented, respected, and meaningfully integrated with modern science in partnership with Indigenous communities, it can guide resilient and sustainable development pathways. By prioritizing such collaboration, the rich ecological wisdom of Northeast India's tribal

communities can remain a living and dynamic force for adaptation and collective well-being.

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Chapter 25: The Woods as a Symbolic Ecosystem in Neikehienuo Mepfhu-o's *Out of the Woods*

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Abstract

This paper examines the symbolic meaning and significance of the woods in Neikehienuo Mepfhu-o's work *Out of the Woods* (2022), as an ecosystem of psychological, social, and cultural forces rather than a literal natural space. Drawing on the framework of deep ecology, particularly Arne Naess's concept of deep ecology, Fritjof Capra's ecology, and Felix Guattari's transversal ecology, the paper proposes that mental illness in the novel cannot be understood as a purely individual condition. It is, rather, something produced within and sustained by a network of relational structures: the boy's inner psychological world, his family's responses, his community's judgements, and the inherited cultural beliefs of Naga society together constitute the symbolic woods through which he must find a way. The paper is divided into three main sections: The first attends to the boy's inner psychological landscape, exploring how the woods figure the complexity and disorientation of his mental experience. The second examines the social ecosystem surrounding him- the roles played by family, neighbours, friends, and medical figures in either deepening his isolation or enabling his recovery. The third turns to the cultural register, tracing how the community's spiritual belief systems shape the interpretation of his condition and complicate the possibility of adequate care. Across all three sections, the central argument holds: that the woods as metaphor accumulates meaning precisely because psychological experience, social interaction, and cultural belief are not separate domains but mutually conditioning ones. Identity is formed within this web, and healing must emerge from within it too.

Keywords: Cultural Beliefs, Ecosystem, Family, Neikehienuo Mepfhu-o, Psyche.

Introduction

Nagas have shared a close relationship with nature since time immemorial. Before the advent of Christianity, their cultural, spiritual, and social lives were largely rooted in animistic beliefs, where forests, mountains, rivers, and even stones were regarded as sacred. Nature, in this worldview, was not a backdrop to human existence but a living presence within it- an entity with which human communities stood in ongoing, reciprocal relation. It is within this cultural inheritance that the fiction of Neikehienuo Mepfhu-o takes root. Mepfhu-o's novel *Out of the Woods* (2022) reflects the deep sense of interconnectedness and extends it into the domain of the psychological and the social. The narrative centres on a young boy who experiences severe mental disturbances- psychosis, hallucinations, and delusions that generate alternate realities he cannot reliably distinguish from the world around him. His condition draws him steadily inward, away from the community: he becomes isolated from friends, neighbours, and villagers, and at times even from members of his own family. That isolation is not simply the consequence of illness; it is compounded by the family's difficulty in understanding what he is undergoing, and further entrenched by social stigma and the fear of communal judgment, which together inhibit open acknowledgement and meaningful support.

Yet the novel refuses to read this suffering as a purely individual matter. What *Out of the Woods* ultimately proposes is that the conditions for recovery are relational rather than clinical. The boy's healing does not emerge from medical intervention alone but grows out of the acceptance, care, and love that his family gradually extends to him. In this sense, the novel aligns itself with the broader ecological intuition that no life and no mind is truly self-contained. Recovery, like suffering, is shown to be something that happens between people, within the web of relationships that constitutes a life.

Deep Ecology and Relational Identity

Deep ecological philosophy provides a necessary conceptual foundation for understanding the relational dynamics at work in *Out of the Woods*. Central to this framework is Arne Naess's notion of "self-realisation,"[1] which he understood not as the cultivation of individual autonomy but as a gradual expansion of identity outward- a process through which the self comes to identify with larger relational and ecological wholes. In *Ecology, Community and Lifestyle* (1989), Naess states:

> *The maxim 'live and let live' suggests a class-free society in the entire ecosphere, a democracy in which we can speak about justice, not only with regard to human beings, but also for animals, plants and landscapes. This presumes a great emphasis upon the interconnectedness of every- thing and that our egos are fragments- not isolatable parts…By identifying with greater wholes, we partake*

in the creation and maintenance of this whole. We thereby share in its greatness.[1] *(p173)*

For Naess, the self is a self-contained entity; it is better understood as an intersection within a larger ecological whole, deriving its character from the web of relations that sustain it. The rejection of individualism allows and opens productive ground for reading and engaging with literary texts dealing with psychological and individual belonging.

Fritjof Capra extends this thinking by conceptualising life itself as a networked structure. In his account, meaning does not inhere in isolated organisms or individuals but emerges instead through patterns of interdependence- through the sustained, dynamic relations that connect one form of life to another:

... deep ecology asks profound questions about the very foundations of our modern, scientific, industrial, growth-oriented, materialistic worldview and way of life. It questions this entire paradigm from an ecological perspective: from the perspective of our relationships to one another, to future generations, and to the web of life of which we are part.[2] *(p8)*

Where Naess's contribution is primarily philosophical and ethical, Capra's is structural and scientific, yet both arrive at a broadly similar conclusion: that autonomy is not a given but rather something that depends on relationship and context. Felix Guattari, writing from a different disciplinary vantage point, advances this line of thinking further still. In *The Three Ecologies*, Guattari identifies three registers- environmental, social, and mental- that cannot be meaningfully separated but must be read as operating transversally, each shaping and being shaped by the others, "Now more than ever, nature cannot be separated from culture; in order to comprehend the interactions between ecosystems, the mechanosphere and the social and individual Universes of reference, we must learn to think transversally..."[3] (p29).

When read together, Naess, Capra, and Guattari make available a genuinely relational way of reading literature whereby psychological distress is not simply an individual problem but must be situated within intersecting social and cultural ecologies. It is through this theoretical framework that the present study approaches *Out of the Woods*. The woods, in this reading, are not simply a geographical setting or a backdrop for the novel's events. They function as a symbolic ecosystem- a metaphorical network in which psyche, community, and inherited belief systems operate in mutual dependence, collectively shaping how identity is experienced and how suffering is made intelligible.

Symbolic Ecosystem

The term symbolic ecosystem, as it is used throughout this study, requires some conceptual clarification. It refers, broadly, to a web of relations in which psychological states, social interactions, and cultural beliefs do not operate in isolation from one another but continuously shape one another. None of these domains is prior or foundational, as each is continually shaped by its implication in the others.

The woods in *Out of the Woods* carry this kind of relational density. As a metaphorical ecology, they become the space where emotional turmoil, communal stigma, spiritual interpretation, and medical discourse converge not as separate threads that happen to share a space, but as forces that actively constitute one another. To read the woods in these terms is to recognise that the novel's treatment of mental suffering cannot be contained within an individualist frame. What the narrative suggests, rather, is suffering as an emergent condition: something that arises not from within the isolated subject but from the particular configuration of relational structures in which that subject is embedded and caught.

Critical Context and the Intervention of the Present Study

Within Naga literature specifically, several writers have engaged with the relationship between landscape, culture, and human experience in ways that are relevant to the present study. Easterine Kire's *When the River Sleeps* (2014) and *Son of the Thundercloud* (2016) explore the deep connection between the natural world[4] and human interiority in the Naga context, treating nature not as a passive backdrop but as a force that actively shapes identity and spiritual life[5]. Other writers, including Temsula Ao, Sentilong Ozukum, Nzan Kikon, Inakali Achumi, Charles Ezung, and Dr. Benjungkumba have continued to develop this literary conversation, addressing questions of identity, memory, belonging, and social change from within the Naga experience [6].

Within this growing body of criticism, Elvina S. Amongla's (2023) paper "Situating Insidious Trauma in Neikekhienuo Mepfhu-o's *My Mother's Daughter*: A Feminist Consideration" represents one of the few sustained engagements with Mepfhu-o's fiction from a theoretical standpoint. Drawing on feminist clinical psychology-particularly the work of Maria Root, Judith Herman, and Laura Brown, Amongla reads the novel through the framework of insidious trauma, arguing that the everyday experiences of domestic violence and gendered suffering constitute a form of trauma that classical trauma theory has historically failed to recognise[7]. Her reading is attentive to how patriarchal structures render women's suffering invisible, and to the novel's capacity to bring that invisibility into critical view.

In a recent study, Imchenmeren and Thokchom Sunanda Devi's (2025) "A Psychoanalytical Study of Eros and Thanatos in *The Starry Night* by Nzan Kikon" brings

Freudian psychoanalysis to bear on another significant work of Naga fiction. Reading through the lens of Freud's life and death instincts as elaborated in “Beyond the Pleasure Principle”, the paper examines how traumatic experience manifests in the behaviour of the novel's characters, driving them toward either the preservation or the destruction of life[8]. The study's attention to repetition compulsion, psychological motivation, and the consequences of unresolved inner conflict reflects a broader critical recognition that Naga literature is increasingly being read not only as a cultural or historical document but as a site of complex psychological inquiry. Taken alongside Amongla's work, it suggests that psychologically oriented approaches to Naga fiction are beginning to gain critical ground, though the specific intersection of ecological philosophy and mental illness, which the present paper addresses, remains largely unexplored.

Critical engagement with the work *Out of the Woods* itself remains limited. The novel has attracted some passing commentary, but it has not yet been the subject of extended theoretical analysis[9]. This gap is perhaps surprising given its ambitions as a work that straddles the psychological and the sociocultural. This chapter seeks to address that gap directly. By bringing ecological relational theory to bear on the novel’s representation of mental illness, it offers an interpretation that is attentive to both the specificities of Naga cultural experience and to the broader theoretical questions that Naess, Capra, and Guattari collectively raise. In doing so, the chapter does not merely apply an external framework to a local text; it argues that the novel itself demands and rewards precisely this kind of reading.

Methodology

The methodology of this study is qualitative and interpretive, grounded in close reading and guided by ecological philosophy. Rather than approaching *Out of the Woods* as a clinical document or a sociological case study, the analysis attends to the novel as a literary text- one in which the woods function as a sustained and mobile metaphor, accumulating meaning across psychological, social, and cultural dimensions simultaneously. The aim is not to diagnose the boy's condition but to interpret it: to ask what the narrative itself proposes about the origins and character of his suffering, and how the formal and figurative choices of the text participate in that proposition.

The Inner Psyche of the Boy: Symbolism of Woods

The woods in the novel function, first and most persistently, as a symbol of the boy’s inner psychological world. His psyche is complex and layered, resistant to easy comprehension by those around him, and this opacity gives rise to the misunderstandings and misjudgements that shape so much of his social experience. The difficulty his

community faces in reading him is not a failure of care. In ecological terms, what the boy lacks is the relational condition that Naess identifies as central to self-realisation: the possibility of being recognised as part of a larger web of relationships rather than treated as an aberration within one. His struggle is not purely interior; it is shaped at every turn by the quality of the connections that surround him.

The novel makes clear that the boy spends the greater part of his days in social withdrawal. He retreats from his friends, grows indifferent to the gossip of his neighbours, and turns increasingly inward. His mind is crowded with thoughts and emotions that he cannot organise or resolve, and he finds himself unable to reliably distinguish between what is real and what his mind has generated. Imaginary companions appear to him with the full weight of reality; he accepts their presence, plays alongside them, and in doing so drifts further from the world his family and neighbours inhabit. Yet the novel is careful not to present this inner world simply as a site of pathology. Rather, the boy's imagined world functions as a kind of refuge- a space in which he can exist without the constant pressure of being misread or judged. In this interior landscape, his deceased sister is still alive, his neighbours are neither hostile nor threatening, and his friends play willingly beside him. It is a world shaped by his desires and governed by his own logic, and within it, he experiences something that the external world consistently withholds: a sense of safety and authenticity. The woods as a metaphor capture this precisely. The boy's psyche is overgrown, layered, and difficult to move through without losing one's bearings. The novel portrays this condition particularly in Chapter Four:

> *After a few moments, he buried his face in his hands and started sobbing uncontrollably. It was a different sadness altogether… He knew in his heart that something was wrong and it was not something trivial. He wanted somebody to explain to him but he couldn't ask. If he asked, it would mean his truth was a lie. He saw them laughing at him- it was all too real to dismiss. So, if he asked them, and they told him that what he was seeing was not real, that would mean a different reality for him. This terrified him. He chose to cling onto his own reality as it was too real to ignore.*[10] *(p63)*

This passage is among the most psychologically precise in the novel. The boy is not simply confused; he is caught in a bind that has its own internal coherence. To seek clarification from others would be to submit his experience to an external standard he cannot trust, and to risk having the only reality that feels liveable declared invalid. His refusal to ask is therefore not irrational but a form of self-protection. The grief he carries is compounded by loss- his sister's death, his distance from his friends, the incomprehension of his family, the harshness of his neighbours- and the tangled undergrowth of this accumulated pain makes clarity feel not merely difficult but threatening.

Social Ecosystem: Family, Friends, Neighbours, and Doctor

If the woods figure the boy's inner life, they equally figure the social world he inhabits. The people around him- his family, his neighbours, his friends, and eventually his doctor, together constitute a social ecosystem in which each figure responds differently to his condition, and in which those responses collectively determine the shape of his suffering and the possibility of his recovery. The family is the most immediate and, in many respects, the most consequential of these relational forces. They love the boy, and the novel does not allow that love to be doubted. But love, it turns out, is not sufficient to generate understanding, and without understanding, it can become another form of pressure.

The family's responses are shaped by social stigma and a near-total absence of any framework for comprehending mental illness. Unable to interpret what they are witnessing, they fall back on the registers available to them: anger, shame, and blame. The father's words in the novel make the cost of this failure unmistakably clear:

> *You are such a disgrace to this family. One of the neighbours complained that you stole their clothes from their hut in the field. Another complained that you drank all the water they kept to drink the next day. Why are you stealing? Why are you embarrassing me? Where did you keep the clothes you stole? Am I not giving you enough clothes and food that you had to steal? Not only are you mad, you're also a thief.*[10] *(p17)*

The force of this passage lies less in the father's cruelty- he is not, the novel implies, a cruel man- than in the structural position from which he speaks. He is a man responding to communal pressure, interpreting his son's behaviour through the only categories available to him, and finding in those categories nothing that allows for empathy. The boy's reaction is telling: "The word 'mad' always gets him furious. He always avows that he is not mad when his father accuses him"[10] (p17). The label does not simply describe a condition; it closes down the possibility of being seen as anything other than that condition. In this way, the family's incomprehension becomes part of the social woods- an environment that disorients rather than guides, which traps the boy in an identity not of his making.

It is only after their own attempts at management have failed, and prompted in part by a neighbour's suggestion, that the family seeks medical help. The doctor who enters the narrative at this point represents a significant shift in the social ecosystem surrounding the boy. His perspective is professional and, crucially, compassionate; he offers the family not a diagnosis alone but an orientation toward acceptance. His counsel to the family is worth attending to at length:

> Accept him as he is with all his conditions. Only if you accept, you will be able to seek help and make changes for him. This is not the end- it is just the beginning of his first medical treatment and there's much more to come. In our society, mental illness is still considered to be a stigma but as his family, the more you are open about his condition, the more accommodating people will become. If you, as his family are so ashamed of him and who he has become, you are going to allow people to look at him from that perspective as well…[10] (p337-338)

This moment functions as a turning point not because the boy is cured but because the relational environment around him begins, however tentatively, to change. The doctor's intervention introduces a new vocabulary- one in which the boy's condition is a medical reality to be engaged with rather than a moral failing to be concealed. His words implicitly address the social stigma that has compounded the boy's isolation, making the argument that the family's openness is not only an ethical obligation but a practical precondition for any meaningful recovery. When shame is replaced with responsibility, and judgement with understanding, the woods begin, at last, to thin.

Cultural Beliefs and Misinterpretation

The woods in the novel carry a third layer of symbolic significance, one that is specifically cultural. They are presented from the outset as a space of eerie silence, regarded by the villagers not merely with caution but with something closer to collective dread. The boy's father reprimands him for venturing there, noting that "people are scared to come even during the day"[10] (p174). This is not an individual eccentricity; it is a shared perception, a piece of communal knowledge about the nature of certain spaces. The woods are understood to be associated with spirits, with bad omens, with presences that exceed ordinary human understanding. They are, in the cultural imagination of the village, a place where the boundary between the visible and the invisible becomes unreliable.

It is within this belief system that the boy's condition is first interpreted. The community does not reach for a medical or psychological vocabulary because no such vocabulary is readily available to them; instead, they draw on the framework they possess. The neighbours advise the boy's father to take him to the prayer house, persuaded that what afflicts the boy is spiritual in origin- that he has, in some form, been taken hold of by forces beyond the natural. The family, shaped by the same cultural environment, is susceptible to this interpretation. Their faith is genuine, and it is important not to read their turn toward religion as mere ignorance; it reflects a coherent cultural logic in which the sacred and the everyday are not sharply distinguished, and in which spiritual intervention is a reasonable response to suffering that resists ordinary explanation.

The boy himself has grown up within this system of belief, and it has shaped the terms in which he understands his own experience. The novel states:

> He holds his Bible and closes his eyes. Suddenly, tears roll down his cheeks. He quickly wipes his face with the sleeves of his sweatshirt. Then, he takes his Bible and starts to pray, hoping for the kind of miracle that happened at the prayer house. He does not pray to get better but begs God just to take away this nagging feeling in his heart.[10] (p209)

The distinction the boy draws here is precise and painful. He does not pray for healing in any clinical sense; he prays for relief from the feeling itself- from the interior pressure that his illness generates and that nothing in his life has yet managed to ease. His faith is not denial; it is desperation articulated through the only language of transcendence available to him. And yet the novel, while treating this moment with sympathy, does not endorse the conclusion that spiritual intervention will prove sufficient. As the narrative progresses, the family's explanatory framework shifts from the spiritual to the more explicitly supernatural- from prayer to a conviction that the boy is possessed by demonic forces. This escalation is significant. It marks not a deepening of understanding but a retreat into more extreme versions of the same cultural logic, a logic that, however sincerely held, moves the community further from the kind of engagement with the boy's actual condition that might make recovery possible.

The cultural woods, in this sense, are perhaps the densest and most disorienting of the three registers the novel explores. They are inherited, collective, and largely invisible to those who inhabit them. They do not present themselves as obstacles but as orientations- as the natural way of making sense of the world. It is precisely because of this that they are so difficult to move through.

Conclusion

The prologue of *Out of the Woods* establishes, from the first pages, the relational and interconnected worldview from which the novel proceeds. The narrator evokes a world in which "...there are no strangers"[10] (p7), a community in which everyone is, in principle, known to everyone else. Yet the prologue is careful not to present this as an uncomplicated ideal. It acknowledges that the same world contains fear, pain, anger, tears, frustration, anxiety, and all kinds of dark emotions, and that there are days when "their minds drive them to the nadirs of desolation"[10] (p8). Connectedness, in other words, does not automatically produce understanding, and the presence of community is no guarantee against loneliness. The tragedy of the boy's situation is not only that he suffers but that he

suffers in the midst of people who cannot reach him- who are present, and yet absent in the way that matters most.

What the novel ultimately proposes is that healing, in this context, cannot mean the correction of a private defect. It means the restoration of the relationship. The boy wants, before anything else, to be seen, to be understood, and to be accepted on terms that do not require him to be other than he is. Recovery becomes a genuine possibility only when the people around him- his family, above all- begin to move from incomprehension toward acceptance, from shame toward openness. This is precisely the trajectory that Naess's concept of self-realisation traces: the expansion of identity outward, through identification with others, until the boundaries of the self become permeable enough to allow genuine connection.

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Chapter 26: The Apple Shift and Socio-Economic Vulnerability in the Upper Himalayas

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Abstract

Growing up in the Kullu Valley I have seen firsthand how the *Apple State* is being forced further up the mountains by a warming climate. For us, the apple wasn't just a business it was the heartbeat of our community it dictated when we celebrated and how we lived. But today that heartbeat is moving to escape the heat, and it is leaving local families behind. This Apple Shift is creating a dangerous *Adaptation Gap* where the rich can fight the sky with expensive nets and imported trees while the small holder is stuck on warming land with falling yields. Based on my own field observations from 2024–2025 and oral histories from our elders in the Beas basin I have watched how the retreat of our snowline is leading to a cycle of debt and the sale of ancestral land. While production numbers in places like Lahaul might keep the state's total tonnage high it hides the quiet tragedy of local farmers being displaced by outside investors. We must stop measuring success by raw profit and start ensuring that our policies protect the land rights and dignity of the traditional families who made these valleys what they are.

Keywords: Apple Shift, Environmental Justice, Kullu Valley, Adaptation Gap, Climate Migration

Introduction

As a local who has walked these orchards and listened to the stories of our elders, I can elaborate on the deepening transition of the Kullu Valley. This shift is more than just a change in the weather; it is the slow unraveling of our heritage and the quiet displacement of our people.

For generations we relied on a sacred pact with the winter. By late December a thick white blanket of snow would settle over the valley, acting like a cold compress for the earth. This wasn't just scenery; it was the chilling requirement the 800 to 1200 hours of deep sleep below 7^C that every Royal Delicious tree needs to wake up strong. The most heartbreaking part of being a resident here is watching the *false spring*. Because the winters have turned warm and erratic our trees are often tricked into waking up too early. They bloom in February covering the hillsides in delicate white and pink
blossoms, only to have a freak March frost descend and kill the entire harvest in a single night.

When the harvest fails year after year the Debt Trap sets in. Small holders turn to high interest informal credit just to buy fertilizers for the next season, a cycle that almost always ends with the sale of ancestral land to affluent investors or concrete tourism projects. As a resident, what hurts most is the loss of our living library. When a local farmer is forced to leave for low wage labor in the city, we lose generations of knowledge about the soil, the water and the specific temperament of the wind through these trees. We are trading a community of caretakers for a landscape of corporate-style estates and absentee owners.

The success of our valley should not be measured in the total tons of fruit exported to the plains or the revenue listed in government ledgers in Shimla. Success should be measured by the number of local families who can still afford to stay on their land. If our policies continue to favor only those who can afford high density models and expensive technology the traditional Kullu farmer will become a ghost in their own home. We must act to ensure that the Apple State remains a place where a local son or daughter can still dream of a life under the shade of their own trees not just as laborers on someone else's mountain.

Methodology

To truly understand what is happening to our home I didnt just look at charts or government reports I went into the orchards and sat in the kitchens of the people who have lived this for generations. This methodology is built on the lived reality of the Beas basin explained in simple terms

1. The Timeframe: Witnessing the Cycles

I spent the 2024–2025 harvest cycles walking the land. This wasnt a oneday visit it was about being there when the blossoms should have opened but didnt and being there during the harvest to see how many crates were actually filled. By staying for two full cycles, I could see firsthand how the shy snow of winter led directly to the thin harvests of autumn

2. Oral Histories: Listening to Our Elders

Numbers can tell you its warmer but our elders can tell you what we have lost. I conducted 15 in-depth interviews with multi-generational orchardists who remember a different Kullu.

The *Thick White Blanket* They shared stories of winters where the snow stayed for weeks, acting like a cold compress for the trees.

*The Dry Winter Reality*We compared those memories to today's dry winters where the ground stays bare and the trees never get the deep sleep they need to be productive.

3.Data Sources: Following the Paper Trail

To prove that this is a financial crisis and not just a weather change, I looked at two very specific types of local records *Village Patwari Records*: I looked at these official land documents to see who still owns their family orchards and who has been forced to sell to outside investors or big tourism projects.

Informal Credit Ledgers This is where the real debt trap is hidden. I looked at the local records of credit to see how many small farmers are borrowing money at high interest rates just to buy basic sprays and fertilizers. These ledgers show the quiet tragedy of families who are working harder and harder only to fall deeper into debt because their yields are shrinking.

When I sat with our village elders, they didn't speak of thermal regimes they spoke of a time when the snow was a reliable partner that stayed on the ground for weeks giving our orchards the deep winter sleep they needed to thrive. These oral histories act as a living record of a climate that no longer exists a time when the chilling hours were guaranteed and the harvest was a shared celebration of our community identity. Today that identity is being hollowed out.

Ultimately this evidence shows a valley divided by a checkbook. While the wealthy can afford to *fight the sky* with high-tech nets and imported trees, the traditional Kullu farmer the one who knows the specific temperament of every slope is being pushed to

the margins. This research is a plea to recognize that we arent just losing a crop we are losing the caretakers of our mountains and the structural fairness that once allowed a local family to live with dignity.

The Science of the Shift: Thermal and Hydrological Regimes

As a local who has watched the snowline climb higher every year I can explain the science behind this shift in simple, human terms. When we talk about Thermal and Hydrological Regimes we are really talking about the broken relationship between our trees the cold and the water they need to survive.

1. Chilling Requirements: The Tree's Winter Sleep

Think of an apple tree like a person who needs a long undisturbed night of rest to be productive the next day. In our orchards we call this *dormancy*

The 800-1200 Hour Rule: Traditional varieties like our beloved Royal Delicious are cold-dependent; they specifically need roughly 800 to 1200 hours where the temperature stays below 7^C.

The Tired Orchard: Because our winters are becoming "dry" and warm, the trees never get that deep sleep. When a tree doesn't rest properly in the winter, it wakes up exhausted. This is why we are seeing thinner yields, smaller fruit and trees that simply look tired and worn out after only a few seasons.

2. Premature Blooming: The Cruelty of False Springs

In the past winter was a reliable partner the snow stayed on the ground like a cold compress keeping the trees asleep until it was truly safe to wake up. The Deception Now because the winters are warmer, the trees are tricked into thinking spring has arrived in January or February.

The Freak Frost: They wake up in a false spring and put out delicate blossoms. But in our mountains, the weather is erratic. A sudden freak March frost descends and in a single night, those blossoms are killed off. For a local family this is a catastrophe because once the blossoms are dead there will be no fruit for the entire year.

3. Frontier Migration: The Climbing Gold Mine

As the lower and middle belts places like Mandi and lower Kullu lose their consistent cold, the ideal zone for apples is physically climbing the mountains to find the chill it needs.

The New Stronghold: We are watching the frontier of the Apple State migrate away from

our traditional valleys and toward the high altitude deserts of LahaulSpiti and the rugged peaks of Kinnaur.

The Land Grab: Places that were once considered too cold for anything but potatoes are now the new Gold Mine for apples. This has triggered a frantic land grab where prices have surged so high that the average local farmer can't even dream of buying land there.

For those of us born and raised in the lower valleys of the Beas basin this shift is a slow motion heartbreak that feels like our very heritage is being pulled out by the roots. Watching the snowline retreat further toward the sky every year isn't just an observation of nature it is the sight of our livelihoods and our children's futures drifting out of reach Every year that the winter remains dry and the snow stays shy a piece of our history vanishes. We are being left behind in a *warming trap* watching the wealthy use their gold to buy up the new cold safe frontiers while we are tethered to ancestral land that no longer remembers how to be cold. It is a devastating thing to realize that the soil that raised your parents might no longer be able to sustain your sons, leaving us to feel like ghosts in our own homes as the mountains we love turn their backs on the traditions we've cherished for a century.

Analysis: The Social Cost of the Shift

As a local who has watched these stories play out in our tea stalls and courtyards I can elaborate on the deep social scars being left by this shift. While the government focuses on the macro numbers, we are losing the micro heartbeat of our villages.

1. The Debt Trap: A Cycle of Silent Despair

In our valleys a failed harvest isn't just a bad year it's a financial death sentence for the small-holder.

The Pincer Movement: When the snow stays shy and the yields drop the cost of fertilizers and sprays doesn't go down it actually goes up as we try to force he tired trees to produce. *Informal Credit:* Because many of us can't get quick bank loans, families turn to high interest informal credit just to keep the house running and buy seeds for the next season.

The Final Sale: I have watched neighbors who have farmed the same hillside for a century finally fold under the weight of this interest. They end up selling their ancestral land often to the same affluent growers who already have the capital to fight the sky leading to a landscape of corporate-style estates instead of a community of neighbors.

2. Loss of Local Knowledge: The Vanishing Library

When a small farmer is forced to leave the valley for low wage labor in cities like

Chandigarh or Delhi we lose more than just a pair of hands.
Generational Wisdom: We lose a *living library* of knowledge that can't be found in any textbook. These farmers know the specific temperament of every slope which stream dries up first in May and exactly how the wind moves through the trees during a storm.
Caretakers vs. Owners We are replacing a community of caretakers people who love the land because it is their identity with high fences and absentee owners who view our mountains only as a portfolio.

3. Institutional Barriers: The Modernization Dream Out of Reach

Projects like the **HP Horticultural Development Project (HPHDP)** sound brilliant on paper but for the local man on the ground they often feel like a door that is locked from the inside.
The Land Tenure Trap Many families here have worked their patches of land for generations based on traditional understandings, but they lack the formal, bank ready titles required to qualify for government subsidies.

The Barrier to Entry: Even with a subsidy, the upfront cost for high-density saplings drip irrigation and anti-hail nets is astronomical—often more than a small family earns in five years.

Structural Exclusion: Without recognized collateral, the modernization dream remains a luxury for the wealthy, effectively locking the traditional Kullu farmer out of the future of their own industry.

As a local who has walked these orchards and watched the snowline climb higher every year, I see this shift as a slow-motion heartbreak that is hollowing out our community. We are witnessing a "pincer movement" where traditional farmers are squeezed between an unforgiving climate and a system that only rewards those with deep pockets. While the government celebrates rising production totals in high-altitude zones like Lahaul, those numbers hide the quiet tragedy of the "paperless farmer" in the lower valleys families who have tended the same trees for generations but now face a mountain of debt because they lack the formal land titles to access modernization subsidies.

When our neighbors are forced to sell their ancestral land to outside investors or leave for low-wage city labor, we lose more than just a harvest; we lose a living library of knowledge about our soil and water that can never be replaced. If we continue to measure the success of the Apple State only by tons of fruit rather than the number of
local families who can afford to stay on their land with dignity, we will eventually be left with a landscape of corporate-style estates and concrete tourism where the original

caretakers of the valley have become mere ghosts in their own homes.

Conclusion and Policy Recommendations

As a local who has watched the orchards of my childhood change, these recommendations are not just policy points they are the requirements for our survival. If we want to keep the soul of Himachal intact our leaders need to look past the balance sheets and see the people. Here is an elaboration of how we can protect our future

1. Prioritize People over Profits: Measuring What Matters

For too long the success of our state has been judged by how many lakh tonnes of apples we send to the markets in Delhi or Mumbai. But as someone living in the Beas basin I know that total production can rise even while our communities fall apart. The Human Metric We need to stop cheering for high production numbers if those apples are only coming from a few massive corporate style estates. True success should be measured by the number of small-holder families who are still living with dignity on their own land.

Social Health: If our villages are emptying out and our youth are moving to cities to work lowwage jobs because the family orchard failed then the
Apple State is failing no matter how much revenue it generates.

2. Democratize Credit: Breaking the Debt Trap

Right now, the *modernization dream of things* like high density plants, drip irrigation and anti-hail nets is a luxury only the wealthy can afford.

Simplifying the Path: A farmer with only two or three bighas shouldn't have to jump through a hundred bureaucratic hoops to get a loan. We need a single window system designed for the small-scale grower.

Ending Predatory Debt: When the banks say no because the land holding is too small our neighbors turn to informal moneylenders with high interest rates. By making institutional credit accessible to everyone we can stop the cycle where one bad harvest leads to a family losing their ancestral land.

3. Protect Land Rights: Keeping Himachal for Himachalis

As the *Gold Mine* for apples moves to higher altitudes like Lahaul and Kinnaur we are seeing a frantic and dangerous land grab.

Securing Tenure: Many local families in these emerging belts have traditional rights but lack the formal, "bankable" titles. We must fast-track the legal securing of these land rights so that local residents cannot be easily displaced.

Stopping Speculation: Our mountains should not be a portfolio for outside speculators and big investors who have no connection to the soil. We need strict protections to ensure that as the apple moves up the land stays in the hands of the local mountain communities who have the generational knowledge to care for it.

Ultimately if the apple is to remain the heartbeat of our hills our policies must become as resilient as the people who farm them. We are at a crossroads where we can either choose a future of high tech corporate monopolies or a future where the traditional Himachali farmer is empowered to adapt. By prioritizing social equity fair credit and land security we can ensure that a local son or daughter can still dream of a life under the shade of their own trees. keeping our heritage alive even as the climate changes around us.

As a resident of the Kullu Valley I see this research not just as a study of trees but as a plea for the survival of our communitys soul. If our policies continue to measure success through the raw tonnage of fruit exported to the plains we risk creating a landscape where the traditional Himachali farmer the true caretaker of these mountains is replaced by high fences and absentee owners. We must ensure that the Apple State remains a place where a local son or daughter can dream of a life under the shade of their own trees, defined by a future of inclusion and justice rather than a deepening divide of debt and exclusion.

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Chapter 27: Subaltern Ecologies of the Global South: Ecocriticism, Literature, and Environmental Justice

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Abstract

Subaltern Ecologies of the Global South: Ecocriticism, Literature, and Environmental Justice explores how literary works from the Global South give voice to communities that experience environmental crisis not as abstraction, but as everyday reality. This chapter examines how writers from historically marginalized regions narrate land dispossession, water scarcity, extractive violence, climate vulnerability, and ecological loss through lived experience, memory, and cultural belonging. Drawing on ecocriticism alongside postcolonial and decolonial perspectives, the chapter argues that Global South literatures challenge dominant environmental narratives that often universalize the climate crisis while overlooking inequality, colonial histories, caste and racial hierarchies, and uneven development. These texts foreground indigenous knowledge systems, gendered experiences of environmental harm, and community-based forms of resistance. In doing so, they reframe sustainability not as a technocratic solution, but as an ethical relationship between people, land, and more-than-human worlds. Through close readings of selected literary texts, the chapter demonstrates how storytelling becomes a powerful mode of environmental justice. Literature does not merely depict ecological degradation; it preserves cultural memory, exposes structures of power, and imagines alternative futures rooted in solidarity and resilience. By centering subaltern voices, this study positions the Global South as a critical space of ecological thought and creative resistance rather than as a passive site of crisis. Ultimately, the chapter contributes to contemporary ecocritical debates by emphasizing that environmental justice must remain attentive to history, identity, and lived realities. It calls for an ecocriticism that listens carefully to voices at the margins and recognizes their role in shaping more just and sustainable futures.

Keywords: Ecocriticism; Global South; Environmental Justice; Subaltern Voices; Decolonial Perspectives

1. Introduction

Increasingly, the contemporary environmental crisis is not being perceived as a global phenomenon, experienced in an identical way that everyone around the globe, but as a highly uneven phenomenon with historical, power and geographical characteristics. Environmental degradation is commonly the reality of communities in the Global South and not something far future. You have climatic changes, pollution, loss of land, and resource exploitation, which overlap with the history of colonialism, inequality in growth and development, caste systems and racial systems and political marginalization (Rahman,2021). Consequently, displacement, disruption of livelihood, loss of culture and increase in vulnerability all lead to environmental crisis. It is important to identify this imbalance to re-conceptualize environmental discourse that is no longer statement of universal narratives that hide structural inequality.

Under environmental humanities, the Global South is becoming a key location of concern when analyzing how ecological change is caught up in social justice. Asia, Africa, Latin America, and the Pacific are often put in the roles of environmental hazard, however, they are also the places of environmental expertise, opposition, and imaginative performance. This change puts the Global South into a new perspective as a region that has become the passive victim of the environmental crisis rather than an intellectual and culture centre where other ecological models can be expressed. Literature is a key factor in this change as it encapsulates the experiences that are not necessarily recorded in policy talk and scientific reporting.

Of great importance is the association between literature and environmental justice. Literary works not only describe the destruction of the environment but tell the social relations that cause harm to the ecology. Storytelling helps writers to expose the ways to see environmental violence within the daily life, the ways to see ecological identity formed through memory and place, and the ways of expression of resistance developed by marginalized communities (Rodriguez,2024). Literature then serves as a library of environmental experience and a place where ethical issues of responsibility, care and sustainability are examined. Literary writing is a form of witnessing by presupposing the voices which are often left out of the mainstream environmental discourses.

The chapter has presented a new term, that is, the concept of subaltern ecologies, as the ecological knowledge and experience that has arisen when marginalized communities are structurally underrepresented in terms of their voices. Subaltern ecologies attract attention to the processes of mediating ecological damage through inequality and to ecological knowledge as constructed by lived-in experience and not by dispassionate knowledge. The notion highlights voice, positionality, and narrative as being of central importance in ecological thought. It also presents the significance of hearing other forms

of knowledge that live beyond the institutional environmental dialectic, such as the indigenous traditions, oral narratives, and community memory.

This chapter seeks to analyze the way Global South literary works express environmental injustice and form part of the current ecocritical issues. It states that "Global South literatures disrupt the dominant narratives about the environment in their forwarding of inequality, historic responsibility, and relational conceptualizations of land and nature. Instead of making sustainability seem like a technical fix to the problem, these texts make ecological survival a question of ethical and political concern.

The chapter continues the main thesis that literature is one of the most important locations where the subaltern ecological point of view can be seen and where the environmental justice can be fantasized with the help of the narrative form. The chapter focuses on how storytelling reconstructs environmental knowledge by examining thematic expression of environmental degradation and conceptual arguments within ecocriticism.

The dialogue occurs in a number of phases. To begin with, the chapter places ecocriticism into a wider set of theoretical transformations that no longer focus on Global North conceptualizations. It subsequently creates an analytical tool of subaltern ecologies. This is then accompanied by a discussion of how environmental injustice is brought out in literature works by reoccurring themes of dispossession, extraction and climate vulnerability. The chapter concludes by demonstrating that Global South literature broadens ecocritical investigation through lived experience, memory and resistance as their main focus.

2. Methodology

The study employs and understanding of everyday environmental changes like- soil erosion, pollution and other ecological shifts documented in literature This study is guided by an interdisciplinary theoretical framework, informed by concepts from:

•Ecofeminism and postcolonial criticism (Jabeen, Khanh Vi, Sankaran, C.).

•Ecocritical studies of extractivism and environmental justice that affect marginalized communities (Vasudevan H. & Mukherjee, A.,Egya).

Through close textual analysis of three novels—Amitav Ghosh's The Hungry Tide,Indra Singh's Animal's People and Helon Habila's Oil on Water-this research will explore how literature exposes the complexities in environmental justice.

3. Ecocriticism Beyond the Global North

Ecocriticism has arisen as a discipline interested in the interaction between literature and the natural world that was first influenced by issues that were grounded mainly in Global North settings. The emergence of ecocritical studies focused on wilderness, nature writing, and issues of environmental representation in Euro-American literature (Khanh Vi,2024). Although this scholarship was able to lay down significant foundations, it was characterized by a propensity to generalize environmental experience, and a preference for aesthetic experiences of nature rather than the inequality and power concerns. With the escalation of the environmental crisis around the world, researchers started to realize the inability of the existing structures to explain the role of colonial histories, development gaps, and asymmetrical vulnerability.

Ecocriticism has developed in a transitional way with the scientific analysis of nature being replaced by methods of justice. Environmental racism, resource extraction, displacement and climate injustice are some of the issues explored in contemporary ecocritical scholarship. This change represents a trend toward the abandonment of the idea of environmental issues as something purely ecological and the interpretation of environmental issues as socio-political processes (Sankaran,2021). In this case, literature will be significant in that there will be the revelation on distribution and variation of environmental harm among communities in a different manner.

Universal environmental discourses tend to believe in the idea that climate change is a taken-in-common global situation that needs to be solved together, but there is a danger that such discourses will lead to the coverage of structural disparities. The communities who have the least contribution to environmental degradation often face the worst effects of the same. In addition, the prevailing environmental discourse can act in favor of technological solutions, ignoring historical responsibility and even local ecological knowledge. Such shortcomings have led to scholars requesting a shift of the ecocriticism to be geography, history and power-conscientious.

An ecocritical inquiry must expand hence a global south perspective is necessary. The literary works of such areas preempt all aspects of environmental reality like agrarian crisis, urban pollution, water scarcity, and extractive economies (Roy,2019). They also show the intersection of ecological change and gender as well as social classes and caste and the identity of indigenous people. Focusing these experiences, Global South literature contests the argument that environmental discourse can be universalized and applied without reference to the situation.

The environmental humanities more broadly have started to focus on inequality as a primary category of analysis. This change is characterized by acknowledging that environmental crisis cannot be considered outside of colonial resource extraction, capitalist development and power structures that is geopolitical. The use of literature helps to bring to the fore stages of environmental violence that are gradual, scattered and are

usually invisible as policy. The forms of narratives enable readers to experience the ecological change as something experienced but not measured in facts.

The fact that ecocriticism is no longer confined to the Global North does not imply that the history of ecocriticism should be abandoned but on the contrary, its focus should be extended. It entails the incorporation of perspectives that prefigure justice, relational knowledge and experience of community (Egya,2020). In such a way, ecocriticism can be considered an approach that is not just concerned with the way nature is represented, but also with the politics of environmental knowledge. Subaltern ecologies in this context has been proposed as an important conceptual approach which points at the reworkings of environmental thinking by marginalized voices.

4. Conceptualizing Subaltern Ecologies

The subaltern is the notion that describes groups of people whose voices are not represented in major knowledge and representation systems. Within the context of the environment, subaltern ecologies characterize ecological experience and ecological cognition that arise out of groups that are disproportionately impacted by environmental damage but are under-represented in the process of environmental decision-making. This idea highlights the fact that ecological knowledge is not objective but is determined by the social location, history, and experience of living.

The marginality is frequently associated with the increased ecological exposure. Locations that rely on resources or are informal settlements or where the resources are to be extracted are directly affected by environmental change (Vasudevan& Mukherjee,2025). Their stories reveal the ways in which the issue of environmental crisis is integrated into local daily lives via changed way of life, shifting sceneries, and broken cultures. Subaltern ecologies thus focus the discussion on the ecological change on the local, small-scale environmental narratives.

The focus of this framework is everyday environmental experience. Subaltern ecologies concentrate on slow changes like soil erosion, water pollution, and seasonal shifts as opposed to concentrating on dramatic ecological events. Such processes define everyday life and social interactions and disclose environmental change as a continuous lived situation. Literature documents such experiences through portraying normal experiences of ecological uncertainty and thus broadens that which qualifies as environmental knowledge.

The issue of voice and representation is a very important one in subaltern ecologies. To a great extent, environmental discourse favors scientific knowledge and policy, diminishing experiential knowledge. Literary works provide some space in which the muted voices are heard, and the reader is exposed to ecological realities as experienced

by marginalized communities (Jabeen,2016). Meanwhile, silence is also an essential aspect to consider since narrative gaps can also be seen as structural exclusion or the inability to describe the loss of the environment.

Narrative is a kind of epistemology in the subaltern ecologies. Storytelling is not merely a description of the environmental circumstances, but it generates knowledge about human, land, and more-than-human worlds relationships. Literary narratives draw out ethical aspects of ecological life through metaphor, memory, and embodied perspective which can be missed in the technical discourse. The significance of cultural expression to the development of environmental knowledge is highlighted in this narrative epistemology.

Subaltern ecologies conceptualization thus refers to the understanding of literature as an area of creation, challenge, and dissemination of ecological knowledge (Chukwulobe et al., 2021). It reminds the ways of how the marginalized communities make environmental meanings in the form of storytelling and how these meanings can oppose the mainstream environmental paradigms. Subaltern ecologies as an analytical prism allow scholars to discuss literature as a form of representation but also as a type of ecological thought that is based on the experience of living.

5. Environmental Injustice in Literary Representation

Environmental injustice as a theme in literary creations by the Global South is often presented in a consistent set of recurring thematic patterns that can be used to show how ecological degradation is unevenly distributed. These depictions show that environmental crisis cannot be explained outside the context of issues of power, development and historical dispossession. Through projection of lived experience, literature reveals the social aspects of ecological change and reveals ecological violence that may still be hidden in the mainstream of practice.

The most outstanding theme of various literary texts is land dispossession (Wilson et al., 2024). Stories of loss of land are common in terms of development projects, conservation policies or extractive industries. These portrayals emphasize the fact that land is not only a resource but a place of identity, memory and continuity of cultures. Dispossession therefore brings about ecological and social discontinuities at the same time and when this occurs, it redefines the relationship between the community and the landscape. Displacement as represented in literature focuses on emotional, cultural, and historical aspects of environmental change beyond economic analysis.

Another important theme is extractive violence. Mining, deforestation and industrial growth are some common features in literature which change the landscapes and social arrangements. These stories show the work of extraction to be in the framework of unequal power relations in which the local population incurs ecological costs and uneven benefits are dispersed. Literature embodies the sensory and emotive aspects of the

extraction such as noise, pollution, and distortions to the environment, and thus makes the daily effects of the industrial process visible.

Water and resource struggle is also prominent literary representation of environmental injustice. Literature in many cases describes battles against water scarcity, irrigation, and resource sharing, and how scarcity transforms the nature of communities. Water is also turned into a material need and a symbolic indicator of inequality, which refers to even more general conflicts concerning development and governance (Rajesh,2025). Literature examines resource conflict and interrelates with gender roles, labor patterns and migration through narrative.

Climate precarity becomes a thematic concern of increasing interest especially in accounts of extreme weather, agricultural insecurity and vulnerability of the coastland. Instead of showing climate change as a far-off event, the literary texts reflect climate change as something that disrupts our everyday life. These portrayals focus on uncertainty, adaptation and resiliency, showing how communities deal with environmental change under restrictive circumstances.

The term of slow violence is particularly handy in analyzing the instances of environmental injustice described in literature. Slow violence is the types of violence that develop over time and are, in many cases, hard to detect or depict. The way of describing these processes is found in literature, where the emphasis is made on cumulative effects, generational impacts, and minor changes in the landscape. Slow environmental harm is legible through the act of literature narratives that focus on time, memory and embodiment.

In these thematic representations, literature shows that environmental injustice is not a material state, but a narrative experience. Storytelling uncovers the interpretation, memorization and resistance of ecological harm, thus adding to the rejection of environmental justice on wider scales. Through representations of dispossession, extraction, resource struggle, climate vulnerability and slow violence Global South literature adds to ecocritical inquiry and prefigures the lived worlds that constitute subaltern ecologies.

6. Narrative, Memory, and Ecological Belonging

The primary role of narrative in the process of formation of the sense of environmental experience, its memorisation and transmission within societies. Storytelling within the Global South literatures has been used as an environmental archive that stores information about the geography, seasonal patterns and ecological changes (Adeniyi&Ngozika,2023). Literary narratives render the emotional, cultural and sensory aspects of life in the environment unlike scientific records that focus on the measurable change. Communities use stories to record accounts of environmental disturbance, adjustment, and strength so that ecological information is not forgotten despite the changing of the landscapes themselves.

In these stories, landscape is something that is closely connected with memory. Places are not simply a location but they are depository of the personal and collective history. The impact of change on memory is often described in literary works to represent the way the environment is transformed to change familiar surroundings, to fade cultural identifiers and to interrupt the daily practices in relation to land and water. The deprivation of the ecological stability thus turns into the deprivation of continuity, on the identity and belonging. Memory enables literature to show the ecological change as a temporal process having links to the past ecological relations with the present crises and unpredictable future.

One of the themes in this narrative structure is the intergenerational ecological trauma. The environmental damage is usually progressive and the generations to come get a share of the resources that are damaged, their way of living distorted, and their culture crowds out. Literary representations emphasize how children have received already scarred landscapes of extraction, pollution or climate change (Hartnett,2021). These stories look into the future with emotional and ethical aspects of ecological inheritance, as the crisis of the environment is not merely a current state of affairs, but also a legacy of the past, which predetermines the future.

The relations with ecology are closely connected with cultural belonging. Numerous works of literature describe land and environment as part of community identification, spirituality and social order. Alteration of the ecological systems is also a threat to not only economic existence but also continuity of cultural existence. Literature emphasizes the production of belonging through relationships that continue to be practiced with place because of the aspects of rituals, oral traditions, and day-to-day interactions with landscapes. This viewpoint opposes abstract ideas of the environment and focuses on regard-relational learning and lived connection.

More-than-human relations also broaden this concept of ecological belonging. The Global Souths generally represent animals, plants, rivers, and landscape as active participants in narrative worlds as opposed to passive scenery. Interdependence and informed duty beyond the species line is brought out through such representations (Moulton&Salo,2022). Through predicting these relations, literary texts oppose the anthropocentric models and prompt readers to view ecological life as an interwebs of connected beings. The three terms of narrative, memory, and belonging make it clear that the experience of the environment is relational, embodied and culturally situated.

7. Indigenous Knowledge and Decolonial Ecologies

The indigenous knowledge systems provide alternative ecological systems based on established relations between people and the environments. Such systems tend to focus on balance and reciprocity and responsibility as opposed to resource exploitation. In literary manifestations, indigenous environmental ethics are manifested in the form of land care practices, collective decisions, and observing ecological restraints (Srija& Mahalakshmi,2025). These views disrupt conventional forms of development, which understand nature as something to be mined and instead understand ecological life as a process of relationship.

The ontology of relations is the core of ecological thought in decolonization. This worldview perceives human beings as included in the ecological networks and not outside of the ecological networks. Indigenous views of land and environmental relationships are often depicted in literature that reflects the indigenous perspective, where land is described as a living being and environmental relationships are reciprocal and not hierarchical (Rahman,2021). Such a strategy disrupts contemporary dualisms of nature and culture, indicating that ecological sustainability needs to rethink the organization of knowledge itself. Relational ontology is thus a philosophical and narrative structure that envisions alternative ecological futures.

Another important aspect of aboriginal ecology practice is community sustainability. Literary works tend to portray the aspect of collective stewardship, localized knowledge, and development of adaptive strategy through a process of generation. The practices emphasize sustainability as a continuous social process and not some technical solution. The methods of community-based collaboration anticipate cooperation, shared responsibility, and context-specific knowledge to explain how sustainability is based on daily practices and not only policy frameworks.

Of great importance in this context is the gendered knowledge of the ecology. Numerous stories represent the contribution of women in the control of water, agriculture, and home environment practices, and thus show how ecological knowledge is shared among the social roles (Rodriguez,2024). Such depictions undermine ideals of environmental knowledge remaining in the formal institutions only. The literature brings out the gendered labor and care practices by highlighting the complexity of the relation between ecological sustainability and social organization and everyday living.

A decolonial ecological vision is also critical of technocratic models of sustainability that put emphasis on efficiency, innovation, and scale of interventions by forgetting the local knowledge and history. The development project and the local ecological practices tension is revealed in literary works, which show how the technocratic way of doing things can reproduce inequality. Narrative is used to express indigenous and local views about

the alternative formulations of sustainability based on ethics, reciprocity, and cultural continuity. Decolonial ecologies have the effect of extending the environmental discourse in the sense that they preempt knowledge regimes that have been historically pushed to the periphery of global environmental governance.

8. Literature as Environmental Justice Practice

Literature is one such environmental justice practice in that it provides a space to observe, interpret and challenge environmental harm. Narrative enables writers to record experiences which still might be obscured in the formal discourse, such as slow ecological destruction, displacement, and daily exposure to environmental danger. This form of observation makes literature become a form of witnessing that maintains the marginalized views and modify the mainstream discourses on environmental progress.

Narrative activism develops when the story taking has to do something about power, responsibility and resistance. Community struggles against extraction, pollution, and resource inequality are frequently pointed out in literary texts, as an example of how narrative can be used to expand the environmental debate (Khanh Vi,2024). The process of humanizing ecological concerns and stirring up empathy and ethical consideration makes literature mobilize to make readers understand that ecological injustice is a social and political issue and not a technical one. Narrative activism thus brings a gap between cultural expression and discourse.

This process revolves around voice. Literature gives voice to the views which are often left out of the policy discourse, allowing marginalized groups to define ecological views in their own words. Meanwhile, the issue of the mediation, translation, and power is brought up in the literary representation, which leads to the critical consideration of the voices that are listened to and how they are positioned. Voice focus helps to understand literature as a disputable space in which environmental knowledge is discussed and in which power dynamics are noticeable.

Ethical imagination is one of the most important works of literature as far as environmental justice is concerned. Narrative enables readers to place themselves in the mindset of another person so that they can appreciate the existence of an ecological interdependence and responsibility. Literature discusses moral quandaries involving development, conservation and survival through the metaphor, characterization and plot (Sankaran,2021). This creative involvement enlarges the environmental debate adding an accent of caring, empathy and relational responsibility.

Noteworthy, alternative ecological futures are also conceived by literature. Instead of projecting environmental crisis as a disaster only, numerous writings follow opportunities

of adaptation, solidarity, and change. These futuristic speculations undermine deterministic accounts and emphasize the significance of creativity in ecological philosophy. Literature works can help develop the conceptual labor of environmental justice by imagining new relationships between peoples and spaces and as such, storytelling functions as a practice documenting the crisis and remaking ecological potential.

9. Illustrative Textual Readings

Examples of Global South writings offer an illustration of how the subaltern ecologies can be employed within particular narrative settings. These two illustrate how literary form, imagery and voice convey environmental injustice and herald lived experience.

The Hungry Tide by Amitav Ghosh is an exploration of political vulnerability of the environment in the Sundarbans. The future of the story predicts gravitational topography, floating islands, and unstable lives and livelihoods, focusing on ways fearing the changing environment collides with displacement and conservation politics (Roy,2019). Using several narrative approaches, the novel unveils conflicts between scientific knowledge, state policy and local ecological knowledge. Ecological images, tides, storms, mangroves, serve not only as setting but as a force of human experience which is a feature of the dimensions of environmental governance on which environmental justice is concerned.

Animal's people by Indra Sinha gives industrial disaster as a modern environmental fact and not a historical incident. The narrative voice, the voice that is informed by the body experience and marginalization in the society reveals how the environmental damage lives on even after public awareness is gone. The text provides a depiction of slow violence and unequal distribution of environmental risk by means of fragmented narrative and sense imagery. The novel anticipates the issues of responsibility, recollection, and survival and proves that the narrative voice can be used to express the environmental injustice within the influenced communities.

Oil on Water by Helon Habila explores the concept of extractive violence in the Niger Delta, a place where the landscape has been changed by oil exploration and political violence. The description of contaminated water, broken environments and militarized spaces that the novel brings forth demonstrates how extraction forms the environment and social life. There are competing views on development and resource control as presented by narrative attention about journalists, local communities, and activists (Egya,2020). The reading demonstrates that the problem of ecological degradation is no longer independent of issues of governance, opposition, and identity.

In all these, the literary depiction of subaltern ecologies is composed by the intersection of narrative voice, ecological imagery, and the issues of justice. These texts show that storytelling is able to capture complexity in the environment and prefigure inequality and experience. Ecocritical readings such as illustrative readings hence demonstrate how literature has a role to play in ecocritical analysis by exposing environmental injustice as material condition and narrative form.

10. Discussion: Rethinking Ecocriticism from the Global South

The views that are developed out of Global South literature profoundly restructure ecocritical inquiry because of the forwarding inequality, history and relational knowledge. Instead of considering environmental crisis to be a universal, these texts focus more on local experiences that expose the mediating nature of power structures on the ecological change. This turn enriches the environmental humanities by introducing the ecological analysis of the questions of development, colonial history, and social justice.

Problematic Global North structures do not constitute denial of previous ecocritical efforts but dismantling their premises (Vasudevan& Mukherjee,2025). The Global South viewpoints draw attention to the constraints of the viewpoints which neglect structural inequality, putting an emphasis on wilderness beauty or technological remedies. In its focus on experience, literature reveals that environmental knowledge is multiple, situational and typically contentious.

This rethinking process makes subaltern epistemology major contribution. Literary works teach us of the ways in which marginalized groups develop ecological knowledge by engaging in an everyday practice, memory, and narrative (Jabeen,2016). These forms of knowledge will make ecocriticism more interested in recognizing the existence of these forms, rather than institutional knowledge, and promote more inclusive analytical frameworks. This approach places literature as a highly critical location where other ecological comprehensions are expressed.

This change leads to an ethical reconsideration of sustainability. Instead of a technical goal, Global South literature approaches sustainability as a relationship practice that is built on the foundations of care, responsibility, and justice. This school of thought demands an environmental debate that is sensitive to historical responsibility and community experience and demands interdisciplinary strategies that ought to incorporate cultural studies with environmental policy discussions.

11. Conclusion

This chapter has asserted that subaltern ecologies offer a critical framework to the experience, narration and struggle of environmental crisis in the Global South literature.

Through the study of narrative, recollection and indigenous knowledge and thematic representations of environmental injustice, the discussion indicates that literature serves as an essential site in which environmental knowledge is generated and environmental justice envisioned.

The theoretical value of the chapter is in its placement of subaltern ecologies as a conceptual gap between the ecocriticism, postcolonial studies, and environmental humanities. It is a framework that highlights that ecological knowledge is informed by voice, the past, and social identity, which problems universal environmental discourses in which inequality is not acknowledged. Environmental harm is intertwined with cultural identity, collective memory, and ordinary life, as is reflected in literary texts, and these aspects can be considered in greater detail through the ecocritical analysis.

Subaltern ecologies are important as they project views that have historically been marginal to the discourse of environmentalism and bring to attention intellectual and ethical labor by Global South populations. This way of repositioning environmental humanities by prioritizing relational knowledge and lived experience poses the questions of responsibility and care as well as justice.

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Chapter 28: Caste-Based Inequality in Household Consumption Expenditure in India

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Abstract

The role of caste in determining socio-economic status in India is still evident despite constitutional and policy provisions and economic growth during the past decades. The persistence of caste-based inequality is a reflection of the deeply rooted social hierarchy in the Indian socio-economic setup. In this context, the present study aims at examining caste-based inequality in terms of household consumption expenditure using nationally representative data on households collected from the Ministry of Statistics and Programme Implementation. The data set is for the period from January to December 2024 and covers a total of 101,957 households in India. To understand economic well-being and living standards in terms of material consumption and access to goods and services, Monthly Household Consumption Expenditure is used as a proxy measure of household well-being. The results clearly demonstrate a hierarchical relationship in terms of expenditure on consumption between different caste groups in India. On average, it is found that households belonging to the General category have the highest expenditure on consumption, followed by Scheduled Tribe and Scheduled Caste households. This demonstrates that social stratification still affects economic outcomes in India. When controlling for important variables like household size, religion, and rural/urban locations, it is found that inequality in expenditure on consumption between caste groups still persists. The results also demonstrate that urban locations are positively related to total household expenditure, which is indicative of better access to markets and employment opportunities. However, it is also found that the relative inequality between caste groups does not change much. These results demonstrate that caste-based inequality in expenditure on consumption is not simply economic inequality but is closely related to social stratification and long-standing issues of social marginalization in India.

Keywords: Caste inequality; Consumption expenditure; Social stratification; Rural–urban divide; Inclusive development.

Introduction

Indian social and economic structure has traditionally been defined by the Indian caste system, a deeply rooted social stratification phenomenon that continues to affect socio-economic outcomes for Indians. The Indian economy has undergone a significant transformation since economic liberalization, globalization, and urbanization began to take hold of the Indian economy. However, concerns remain regarding the effectiveness of these changes in reducing economic inequality between castes.

Economic inequality between castes is a multi-faceted phenomenon that is not restricted to income inequality alone. Although income is a common metric used to define economic inequality between social groups, it is considered a less reliable metric of economic inequality between social groups compared to expenditure on goods and services consumed by households or Monthly Household Consumption Expenditure (MHCE). It is considered a more stable metric of economic inequality between social groups compared to income inequality between social groups.

Thus, understanding differences between Monthly Household Consumption Expenditure between castes is a valuable metric of economic inequality between social groups in India. Scheduled Castes (SC) and Scheduled Tribes (ST) communities, who were historically excluded from land ownership, education, employment, and access to credit markets, might experience a reduction in their levels of consumption expenditure compared to Other Backward Classes (OBC) and the General population. Although economic policies and welfare schemes were initiated to uplift the historically excluded communities, the question of whether caste-based differences exist in the levels of consumption expenditure needs to be addressed.

The rural-urban dimension makes this issue even more complex. It is generally assumed that cities offer better employment opportunities, remuneration rates, and access to public facilities. It is even suggested that urbanization helps break the traditional caste divide by offering better economic opportunities and social interactions. However, empirical studies indicate that caste-based inequalities persist even in cities due to segmentation in the labor market and unequal access to quality employment opportunities. It is thus important to test whether residence in cities reduces or widens caste-based consumption inequalities.

The majority of studies on caste inequality are based on past rounds of data from the National Sample Survey (NSS) data. Few studies have explored caste-based consumption inequalities based on the latest available data. It is particularly important to understand the current scenario in the post-pandemic period because economic shocks tend to affect socially vulnerable sections of society.

In this context, the present research aims to investigate the inequality in household consumption expenditure based on caste in India by employing data from the Household Consumer Expenditure Survey (HCES) 2024 carried out by the Ministry of Statistics and Programme Implementation (MoSPI). The research aims to assess whether statistically significant differences exist across different castes and whether caste continues to be an

important predictor of household consumption expenditure even after adjusting for other demographic and geographical characteristics like household size, religion, and rural/urban residence. The research also aims to ascertain the impact of residence in urban areas on inequality based on caste. This research aims to contribute to the overall debate on inequality in India by presenting contemporary empirical results. The results of the research are likely to have implications for the overall policy debate on reducing socio-economic inequalities across different social groups.

Literature Review

Expenditure in household consumption has been widely accepted as a strong indicator of economic well-being in developing countries, where income data tends to fluctuate and is often difficult to track. In their paper using NSS data, Angus Deaton and Jean Dreze (2002) prove that consumption is a more stable and relevant measure of material well-being in the economy. In the case of India, consumption-based studies have been instrumental in examining issues of poverty, inequality, and inter-group differences.

However, the economic inequality in India cannot be comprehended without the presence of the concept of caste. The classical perspective on the concept of caste developed by the social scientist B. R. Ambedkar was not only focused on the social dimension of caste but also on the graded inequality present in the economic and occupational dimensions of society. Thus, the contemporary perspective on the concept of caste is focused on the structural dimension of the concept rather than its social dimension.

Research studies on the concept of caste and its impact on the economic inequality in India have been conducted by several scholars. It has been argued by Ashwini Deshpande (2011) that the concept of caste is an economic concept and plays a significant role in determining the labor market and the returns on human capital. It has also been argued by Thorat and Newman (2010) that the structural barriers faced by the Scheduled Castes and Scheduled Tribes result in the low capacity for earnings and hence low levels of expenditure.

Moreover, using the NSS data to conduct distributional analysis indicates that SC and ST households have a disproportionate presence in the lower deciles of the consumption distribution. In fact, Yasuyuki Kijima (2006) found that there was continuity in caste differentials during the period of high growth in the 1980s and 1990s. This indicates that economic liberalization may not have an inherent capacity to address issues of social inequality. Furthermore, Arun Dubey and Shubhashis Gangopadhyay (1998) found that poverty and consumption continue to have a disproportionate presence among historically disadvantaged castes.

Recent studies have used a multivariate regression approach to examine whether caste effects continue to have explanatory significance after adjusting for household effects. For instance, Mohammad Azam (2016) found that even after adjusting for education and occupation, caste-based differentials continue to exist. This indicates the presence of

structural exclusion. V. K. Borooah et al. (2014) found that household effects exist, but caste effects continue to have an independent influence on poverty and consumption. This supports the structural inequality perspective.

The rural-urban dimension further adds to the complexity of the issue. In general, it is believed that urbanisation is linked to higher incomes, a more diversified labour market, and better infrastructural conditions. However, empirical studies have shown that caste differences persist in the face of urbanisation. In fact, Tapas Kundu (2019) shows that caste differences in consumption levels persist in India's urban areas, reflecting differences in the labour market and access to better-quality jobs. From a structural point of view, it further reinforces the idea that spatial mobility does not necessarily lead to social mobility.

Not only have researchers focused on the level of expenditure, but emerging literature is also exploring the qualitative dimensions of consumption. For example, Chloé Bellet and Elise Sihra (2016) discuss the role of status in consumption patterns among different castes, while Sharmila Choudhury et al. (2021) document caste differences in nutritional outcomes.

Methodologically, the focus of inequality research has shifted to the need to use sampling weights and appropriate econometric techniques to analyze nationally representative survey-based data. Deaton and Drèze's paper of 2002 highlights the need to use weighted estimates to obtain unbiased estimates of national-level inference. At the same time, using techniques such as ANOVA to obtain rigorous statistical tests of hierarchical differences before controlling for other variables is a viable option.

In spite of this substantial body of literature, there are a few gaps that need to be addressed. First, a lot of the empirical evidence is based on NSS survey round data and pre-pandemic survey-based evidence. It is likely that the pandemic might have affected consumption patterns, especially for vulnerable groups. Second, few studies have used a combination of mean comparison techniques, weighted multivariate regressions, and interaction analysis to examine the existence and persistence of caste-based inequalities.

Placed in an Ambedkarian and structural inequality context, the current paper conceptualizes the role of caste in the Indian society as an entrenched system in the distribution of economic resources. This paper employs the most recent available HCES 2024 data to examine whether caste-based consumption hierarchies exist once demographic and locational controls are taken into account, and whether living in an urban location reduces or reinforces structural inequality.

This paper contributes to the debate on inclusive growth and the limits of the market in promoting development in India by employing econometric techniques and the theory of graded social hierarchy.

Research Gap:

Despite the fact that a significant amount of literature has focused on the issue of caste-based inequality in India, there remain certain aspects of the issue that have not been

sufficiently addressed from the empirical and theoretical points of view with respect to the issue of disparities in consumption between social groups.

First, the majority of the literature on the issue of caste-based inequality in India has focused on the issue of income, poverty rates, or wealth inequality rather than the issue of household consumption expenditure, which is more indicative of the standard of living of people or their economic well-being.

Second, the majority of the literature on the issue of caste-based inequality in India has focused on the issue of caste-based inequality from the point of view of aggregate statistical analysis rather than the issue of inter-group differences through the application of post-hoc or multivariate statistical tests to the data, which would be more indicative of the hierarchical structure of the caste groups based on their consumption levels.

Third, there exists little research that specifically investigates whether caste differentials persist after controlling for household demographic and socio-religious characteristics in an era of economic growth and expansion of welfare benefits. It becomes imperative that we re-examine whether caste independently influences economic outcomes in light of policy and labor market changes.

Lastly, there are a number of empirical studies that have analyzed economic inequality in relative isolation from broader debates on structural and cultural marginalization. There exists a need to link econometric analysis with an understanding of caste as a deeply embedded system of social stratification.

This study helps bridge these gaps by providing new micro-data evidence of caste-based consumption inequality, quantifying differences between groups rigorously, re-examining the independent effect of caste in the new policy environment, and linking empirical analysis with broader debates on economic inequality and marginalization.

Objectives of the Study:

1. To examine whether there are statistically significant differences in monthly household consumption expenditure across caste groups.

2. To assess whether caste identity remains a statistically significant determinant of household consumption expenditure after controlling for demographic and locational factors such as household size, religion, and rural–urban residence.

3. To analyze whether urban residence mitigates or widens caste-based disparities in household consumption expenditure.

4. To evaluate the broader implications of caste-based consumption disparities for inclusive development and policy formulation.

Research Questions

1. Are there statistically significant differences in monthly household consumption expenditure across caste groups?

2. Does caste remain a significant determinant of consumption expenditure after controlling for household size, religion, and rural–urban location?

3. Does urban residence reduce or widen caste-based consumption disparities?

4. What are the broader implications of caste-based consumption gaps for inclusive development?

Research Methodology

Study Area Study Area:

The study covers the entire country of India. Since caste-based inequality is a nationwide structural issue, a national-level dataset is appropriate for capturing regional, social, and demographic diversity. The analysis includes both rural and urban households across different states and union territories of India, ensuring comprehensive representation of social groups.

Time period:

The study is based on cross-sectional data covering the period from January 2024 to December 2024. The data represent household-level information collected during this period and provide a glimpse of contemporary caste-based consumption inequality in India.

Sources of Data:

The study uses secondary data obtained from the Ministry of Statistics and Programme Implementation (MoSPI), Government of India. Specifically, the data are drawn from the Household Consumer Expenditure Survey (HCES) 2024. The dataset contains information on 101,957 households, making it nationally representative and statistically robust. It includes detailed information on monthly household consumption expenditure, social group classification, household size, religion, and rural–urban residence. The large sample size enhances reliability and strengthens the empirical validity of the findings.

Research Design:

The study adopts a quantitative research design using cross-sectional secondary data. It is empirical and explanatory in nature, aiming to examine differences in consumption expenditure across caste groups and to determine whether caste remains significant after controlling for other socio-economic factors. Statistical and econometric techniques are applied to test hypotheses and answer the research questions. The design is suitable for identifying patterns of inequality and understanding structural disparities in consumption levels.

Variables and Their Construction:

The study uses household-level cross-sectional data from the Household Consumer Expenditure Survey (HCES) 2024 conducted by the Ministry of Statistics and Programme

Implementation (MoSPI). The analysis is based on 101,957 households across rural and urban India.

1. Dependent Variable: The dependent variable is Monthly Household Consumption Expenditure (MHCE). It measures the total monthly expenditure incurred by a household on goods and services. This variable is continuous in nature and serves as a proxy for household economic well-being and living standards. Higher consumption expenditure generally reflects better economic status and access to resources.

2. Independent Variable: The primary explanatory variable is Social Group (Caste Category). It is a categorical variable classified into four groups: Scheduled Tribes (ST), Scheduled Castes (SC), Other Backward Classes (OBC), and Others (General category). For regression analysis, dummy variables are created with one group treated as the reference category. This allows the estimation of relative differences in consumption expenditure across caste groups.

3. Control Variables:

Household Size: A continuous variable representing the total number of members in the household. It captures demographic effects on consumption, as larger households typically have higher aggregate expenditure needs.

Religion: A categorical variable indicating the religious affiliation of the household (e.g., Hindu, Muslim, Christian, Others). Dummy variables are generated to control for socio-cultural differences that may influence consumption behavior.

Sector (Rural–Urban Residence): A binary variable distinguishing rural and urban households. This variable captures locational differences in income opportunities, price levels, and access to markets and services.

Interaction Term (Social Group × Sector): To examine whether urban residence mitigates or widens caste-based disparities, interaction terms between caste categories and sector are included in the extended regression model.

Justification for Variable Selection:

The selection of variables is guided by both theoretical considerations and empirical relevance. Monthly Household Consumption Expenditure is widely used in development economics as a reliable indicator of economic well-being, especially in contexts where income data may be underreported. It reflects actual living standards and purchasing capacity. Caste (Social Group) is the central variable of interest because caste-based inequality is a deeply rooted structural feature of Indian society. Including this variable allows the study to directly measure disparities associated with social stratification.

Household size is included because consumption requirements increase with family size, and failure to control for it may bias caste comparisons. Religion is incorporated to account for socio-cultural and community-level differences that may influence economic behavior and resource access. Rural–urban residence is included because spatial location significantly affects employment opportunities, wages, cost of living, and access to infrastructure.

Finally, the interaction between caste and urban residence is justified to examine whether urbanization reduces or reinforces social inequality. Since urban areas often provide better economic opportunities, it is important to test whether these opportunities are equally accessible across caste groups.

Results and Discussion

Social Group in the dataset represents the officially recognized caste categories used in large-scale Indian household surveys. Specifically, Group 1 refers to Scheduled Tribes (ST), Group 2 refers to Scheduled Castes (SC), Group 3 represents Other Backward Classes (OBC), and Group 9 denotes the General (Others) category. These categories capture historically disadvantaged and socially stratified groups within Indian society and are widely used in empirical research to examine inequality and socio-economic disparities.

One-way ANOVA and Test and Bonferroni post-hoc tests

```
. oneway Monthly_Consumer_Expenditure Social_Group, tabulate

                    Summary of
Social_Grou |  Monthly_Consumer_Expenditure
          p |      Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |  13512.969   7770.5098       13,534
          2 |  11934.986   6380.1402       17,499
          3 |  12929.473   7319.0368       42,112
          9 |  15515.702   9837.5747       28,812
------------+------------------------------------
      Total |  13567.084   8134.6388      101,957

                        Analysis of Variance
    Source              SS         df       MS            F      Prob > F
------------------------------------------------------------------------
Between groups      1.7318e+11       3   5.7725e+10     895.30      0.0000
 Within groups      6.5735e+12  101953   64475715.4
------------------------------------------------------------------------
    Total           6.7467e+12  101956   66172348.8

Bartlett's test for equal variances:  chi2(3) =  5.0e+03  Prob>chi2 = 0.000
```

Table 1: one-way ANOVA Result & Bonferroni post-hoc tests

To examine whether statistically significant differences exist in Monthly Household Consumption Expenditure (MHCE) across caste groups, a one-way ANOVA was conducted. The one-way ANOVA results reveal statistically significant differences in monthly household consumption expenditure across these caste groups ($F = 895.30$, $p < 0.001$). The mean expenditure figures show a clear hierarchical pattern. General category households (Group 9) report the highest average monthly consumption (₹15,515.70), followed by ST households (₹13,512.97) and OBC households (₹12,929.47), while SC households (₹11,934.99) record the lowest average consumption. The Bonferroni post-hoc tests further confirm that these differences are statistically significant across all pairwise comparisons. This indicates the presence of substantial caste-based disparities in economic well-being.

Multiple Regression Model

```
. reg Monthly_Consumer_Expenditure i.Social_Group Household_Size i.Religion i.Sector
```

Source	SS	df	MS		
Model	1.6115e+12	12	1.3430e+11	Number of obs	= 101,957
Residual	5.1351e+12	101,944	50371975	F(12, 101944)	= 2666.08
				Prob > F	= 0.0000
				R-squared	= 0.2389
				Adj R-squared	= 0.2388
Total	6.7467e+12	101,956	66172348.8	Root MSE	= 7097.3

Monthly_Cons~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Social_Group						
2	-572.0366	91.54543	-6.25	0.000	-751.4645	-392.6088
3	715.5652	82.2325	8.70	0.000	554.3906	876.7399
9	3105.056	86.36682	35.95	0.000	2935.779	3274.334
Household_Size	1630.278	11.63937	140.07	0.000	1607.465	1653.091
Religion						
2	-1682.855	68.22346	-24.67	0.000	-1816.572	-1549.138
3	3003.198	101.4444	29.60	0.000	2804.368	3202.027
4	4870.834	161.4761	30.16	0.000	4554.343	5187.325
5	3842.774	448.2575	8.57	0.000	2964.195	4721.353
6	2224.758	214.7966	10.36	0.000	1803.76	2645.757
7	4569.682	5018.74	0.91	0.363	-5266.985	14406.35
9	861.478	277.1501	3.11	0.002	318.2673	1404.689
2.Sector	4438.251	45.97003	96.55	0.000	4348.15	4528.351
_cons	3717.7	92.44572	40.21	0.000	3536.507	3898.892

.

Table 2: Multiple Regression Model Result

To assess whether caste remains significant after controlling for household size, religion, and rural–urban location, a multiple regression model was estimated.To examine whether caste remains significant after accounting for other socio-economic factors, a multiple regression analysis was conducted controlling for household size, religion, and rural–urban residence. The regression results demonstrate that caste identity continues to be a statistically significant determinant of consumption expenditure. Compared to the reference category (ST), SC households spend ₹572 less per month, OBC households spend ₹716 more, and General category households spend ₹3,105 more, all statistically significant at the 1 percent level. This suggests that caste-based disparities persist even after controlling for demographic and locational characteristics.

Interaction Model

To test whether urban residence modifies caste-based disparities, an interaction model between Social Group and Sector was estimated.

```
. reg Monthly_Consumer_Expenditure i.Social_Group##i.Sector Household_Size i.Religion
```

Source	SS	df	MS	Number of obs	=	101,957
				F(15, 101941)	=	2156.54
Model	1.6252e+12	15	1.0834e+11	Prob > F	=	0.0000
Residual	5.1215e+12	101,941	50239899.7	R-squared	=	0.2409
				Adj R-squared	=	0.2408
Total	6.7467e+12	101,956	66172348.8	Root MSE	=	7088

Monthly_Consumer_~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Social_Group						
2	-17.34304	105.4713	-0.16	0.869	-224.0654	189.3793
3	1076.573	93.2748	11.54	0.000	893.756	1259.391
9	2725.458	103.5926	26.31	0.000	2522.418	2928.498
2.Sector	5125.827	136.7052	37.50	0.000	4857.887	5393.768
Social_Group#Sector						
2 2	-1701.505	175.9061	-9.67	0.000	-2046.279	-1356.732
3 2	-1107.335	152.9779	-7.24	0.000	-1407.17	-807.5008
9 2	263.5203	160.8758	1.64	0.101	-51.79418	578.8348
Household_Size	1631.673	11.62903	140.31	0.000	1608.88	1654.466
Religion						
2	-1626.679	68.33792	-23.80	0.000	-1760.621	-1492.738
3	2941.199	102.6488	28.65	0.000	2740.008	3142.389
4	4866.056	161.3999	30.15	0.000	4549.714	5182.398
5	3600.965	448.0101	8.04	0.000	2722.871	4479.059
6	2280.161	214.7159	10.62	0.000	1859.321	2701.002
7	4495.885	5012.174	0.90	0.370	-5327.913	14319.68
9	858.739	276.8097	3.10	0.002	316.1956	1401.283
_cons	3532.334	97.52086	36.22	0.000	3341.195	3723.474

.

Table 3: Interaction model Result

The results show that urban residence significantly increases household consumption expenditure. However, the interaction model indicates that the urban advantage is not equally distributed across caste groups. For SC and OBC households, the interaction terms are negative and statistically significant, implying that although urban residence raises overall consumption, it does not completely eliminate caste-based gaps. In contrast, the General category continues to maintain a strong consumption advantage in urban areas

The findings suggest a clear caste-based hierarchy in consumption levels, with SC households being the most disadvantaged and General category households being the most economically advantaged. The persistence of statistically significant caste effects, even after controlling for household size, religion, and location, highlights the structural nature of socio-economic inequality in India. These results have important implications for inclusive development policies, indicating the need for targeted interventions to reduce caste-based disparities in economic well-being.

Broader Implications

The empirical results indicate clear and statistically significant differences in monthly household consumption expenditure across caste groups ($p < 0.001$). The General category reports the highest average consumption, while Scheduled Castes record the

lowest, with Scheduled Tribes and OBC households lying in between. This pattern reflects a distinct caste-based hierarchy in economic well-being.

The regression analysis further confirms that caste remains a significant determinant of consumption even after controlling for household size, religion, and rural–urban residence ($R^2 \approx 0.24$). Scheduled Castes continue to show lower consumption levels compared to the reference group, whereas the General category maintains a strong positive advantage. This suggests that caste-based disparities are not fully explained by demographic or locational factors and reflect deeper structural inequalities. Although urban residence significantly increases overall consumption levels, it does not completely eliminate caste-based gaps. The benefits of urbanization are uneven across social groups, indicating that urban growth alone cannot ensure equality in economic outcomes.

The findings highlight persistent structural inequality and underline the need for targeted policies, inclusive urban development strategies, and long-term investments in education and asset creation to reduce caste-based economic disparities.

Policy Implications

Targeted Income and Employment Generation Programs – The government should design focused employment schemes and livelihood programs for historically disadvantaged caste groups, particularly Scheduled Castes and marginalized communities. Expanding access to skill development, entrepreneurship support, and formal sector employment can help reduce structural income gaps reflected in lower consumption levels.

Strengthening Inclusive Urban Policies – Since urban residence increases overall consumption but does not eliminate caste disparities, urban development strategies must address intra-urban inequality. Policies should ensure equal access to affordable housing, sanitation, healthcare, education, and decent employment opportunities for marginalized caste groups within urban areas.

Caste-Sensitive Social Protection Mechanisms – Welfare schemes such as food security programs, direct benefit transfers, health insurance, and pension schemes should incorporate caste-based vulnerability indicators to improve targeting efficiency. This will help reduce immediate consumption shortfalls among disadvantaged households.

Investment in Education and Human Capital Formation – Long-term reduction of caste-based disparities requires substantial investment in quality education, vocational training, and digital literacy. Improving access to higher education and technical skills can enhance productivity and earning capacity across generations.

Conclusions

This study examined caste-based disparities in monthly household consumption expenditure in India using nationally representative HCES 2024 data. The results show statistically significant differences across caste groups, with the General category reporting the highest consumption and Scheduled Castes the lowest. Even after controlling for household size, religion, and rural–urban residence, caste remains a significant determinant of consumption, indicating the persistence of structural inequality.

Although urban residence increases overall consumption levels, it does not fully eliminate caste-based gaps. The findings suggest that economic growth and urbanization alone are insufficient to ensure inclusive development. Targeted policy interventions, caste-sensitive social protection, and long-term investments in education and asset creation are essential to reduce enduring consumption inequalities in India.

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Chapter 29: The Reef as Metaphor: Ecological Fragility and Postcolonial Disillusionment in Romesh Gunesekera's *Reef*

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Abstract

The environment or the natural world has always been standing as the guardian, the provider and the silent observer of human society. As the time passes, nature silently and painfully changes its shape according to the actions of mankind. Among the milestone events of human civilization, the colonial enterprise is one such inevitable moment of human history. The overarching deep rooted influence of colonialism always lingers as the shadow over the earlier colonies. However, this influence is not only confined to the cultural history, along with that it ends up changing and shaping the natural landscape of its colonized nations. In most of the postcolonial works the collective study of human and natural world is frequently overlooked. The postcolonial novel *Reef*, by Romesh Gunesekera has beautifully depicted the drastic changes of colonialism over the human and natural world in the context of Sri Lanka. This paper metaphorically demonstrates the imagery of declining marine ecosystem in comparison to the political unrest of post-independent Sri Lanka. Through the perspectives of ecological postcolonial criticism, the paper examines the coral reef as the central metaphor of decaying natural world and the disillusioned human world. This paper emphasizes upon the importance of incorporating aftermath of colonialism in natural world as well as the human society. The theory of postcolonialism and blue humanities are used in order to study the marine ecosystem and its connection to human memories, exile and the sense of belongingness. The paper employs Donna Haraway's theoretical concept of blue humanities in order to study how reef as a nonhuman agent actively contributes in the construction of human identity, memory, culture and social relations.

Keywords: Ecocriticism, Postcolonialism, Blue Humanities, Romesh Gunesekera, Reef

Introduction

Change is the only inevitable and permanent phenomena of this world. Human race has been continuously evolving or changing from its original existence. Colonialism is one such milestone events of human history which has completely restructured the whole notion of the colonized land. In the contemporary era of postcolonialism, it becomes essential to revisit the colonial experiences and understand the process of becoming a postcolonial nation. However, the anthropocentric study of postcolonialism often overlooks the consequences of colonialism in the natural world. The simultaneous changings of human world and natural world, is necessary to take into account to have a comprehensive and complete understanding of postcolonial identity. Literature always provides an encompassing view of its subject. Through the multidisciplinary study of postcolonialism and environmentalism in literary criticism we can gain a nuanced perspective of postcolonial narrative. The act of balancing and healing the colonial exploitation and building an authentic identity as nation become a major matter of concern for the once colonized land. Under the pressure of development environment often becomes the scapegoat in postcolonial nations. The postcolonial ecocriticism as a theoretical branch of literary criticism provides the necessary lens to examine the underlying intersectionality between postcolonialism and environmentalism. In the book *Postcolonial Ecocriticism: Literature, Animals, Environment (2006)*, by defining the role of postcolonial ecocriticism, authors Helen Tiffin and Graham Huggan say that the aim is "to make exploitation and discrimination of all kinds, both human and nonhuman, visible in the world; and …to help make them obsolete" (p.16). They also illuminate upon the fact that it is necessary to rectify the past wrong of western understanding of considering human as animal or savage for both human and natural world.

Sri Lankan postcolonial as well as diasporic writer, Romesh Guneshekera (1954) the author of *Monkfish Moon,* has aesthetically depicted an ecological and postcolonial elegy of Sri Lanka through his debut novel *Reef* (1994). *Reef*, a historical fiction set in Sri Lanka and London, represents the postcolonial political crisis of 1970's as well as the declining ecosystem of Sri Lankan landscapes. The novel centers around two major characters Mister Salgado and Triton while representing the past and present of Sri Lanka simultaneously. The political unrest of 1971 which compelled them to escape from Sri Lanka to England represents the disillusioned and impending dystopian world of Sri Lanka during the postcolonial era. Fragmented memories of past are continuously recalled through flashbacks. Mister Salgado's constant warnings and observations of declining coral ecosystems stand as strong reminder of ecological destruction throughout the novel. Rob Nixon's term 'slow violence' represents the gradual decline and the catastrophe of the natural world. The novel presents ocean, the natural world not as a silent observer but as an active reservoir of human history and memory.

The newly emerged field of blue humanities is used to move beyond an anthropocentric study to a wider realm where the significance of marine life is tried to give due recognition. In an essay on blue humanities, Serpil Oppermann describes it, "as a transdisciplinary field, the Blue Humanities explores human-water interactions through socio-cultural, literary, historical, ethical, theoretical, and ecological perspectives, while also engaging with related scientific data on oceanic…systems." As "the seas are no longer the vast unknowable and uninhabitable spaces of past imaginations; they are living systems whose entanglements with human cultures and economies are both intimate and planetary in scale" (Alaimo 4), thus it is highly necessary to conduct the study inclusively.

The work has been highly discussed as diasporic fiction, however from the lens of postcolonial environmentalism it has not been studied much. This paper tries to explore the underlying reality of postcolonial Sri Lanka from a multidisciplinary perspective of postcolonial ecocriticism and blue humanities, while adhering to the idea that the human and non-human world are intricately connected. It emphasizes upon the indistinguishable connection between the marine life and the people of Sri Lanka in Gunesekera's *Reef*.

Methodology:

This study employs a qualitative research methodology, as it is highly centered on examining, interpreting and critically analyzing a literary text through the lens of theoretical framework. It does not incorporate any kind of field study and data collection. The study is based on the close reading of the source book, which is *Reef* by Romesh Gunesekera. It is grounded in a multidisciplinary approach; it adopts the theoretical lenses of postcolonial ecocriticism and blue humanities to study comprehensively the underlying reality of postcolonial Sri Lanka as presented in the text.

Entangled histories of Land, Sea and Subject: Rethinking Postcolonial Identity in relation to marine life in Gunesekera's *Reef*

The whole enterprise of colonialism was never centered on a particular subject. Instead, it is a ubiquitous event, which eventually ends up changing the whole body of a colonized land. Its effect is so overarching and deep rooted, that even in the days of postcolonialism it still working visibly. From human world to natural world the impact of colonialism is inevitable. However, it is seen that contemporary postcolonial studies often carry an anthropocentric study while overlooking the natural world around it. In order to acquire an elaborate understanding of postcolonial identity, it is necessary to expand the focus beyond the Anthropocene. The reshaping of natural body in colonized land has been continuously running from colonial to postcolonial period. The reordering of physical landscapes, marine life, coastlines, and the changing ecosystems actively contribute in the formation of postcolonial identity and to the sense of belonging. A feeling estrangement can be seen in the relation between human and non-human world since the emergence of colonial reign in the colonized land, which can be termed as "distanced ecology".

Colonialism does not only impose a sense of inferiority among the natives but also changes their perspective towards their surroundings, the natural world. From worshipping, celebrating nature to cut them down brutally in the name of civilization, native people have gone through a complete scattering of their traditional belief system and practices. This urgent necessity leads to the emergence of work like *Postcolonial Ecocriticism: Literature, Animals, Environment* (2006) by Graham Huggan and Helen Tiffin. This is a masterpiece work which helps in carrying out an interdisciplinary study encompassing the human and natural world in the postcolonial period.

Among all the postcolonial narratives Romesh Gunesekera's novel *Reef* stands significantly for its coherent representation of postcolonial environmental realities of Sri Lanka. The novel is narrated by a first-person narrator named, Triton, a Sri Lankan man, now running a restaurant in London for nearly twenty years. In the very first section of the novel, titled as "The Breach", we are introduced a seamless connection between the present and the actively awaking past of Triton. The title itself works as a metaphor for the section as well as the novel; the word 'breach' generally refers to a physical gap or an opening line, which symbolizes the gap or the rupture that the People of Sri Lanka faced in the postcolonial era. It represents the broken connection with their tradition, customs and the very Sri Lankan identity. The conversation between two Sri Lankan men in London in broken English, vividly describes the rupture and their postcolonial hybrid identity. In marine life the word 'breaching' refers to the act of coming out of water with at least 40% of their body. This existence between air and water symbolically represents the Sri Lankan Diaspora in England, who are living an 'in-between' space according to postcolonial critic Homi Bhabha. Gunesekera describes an ecological elegy throughout the novel which becomes evident in the very first section, when Triton laments about Sri Lanka, "I could see a sea of pearls. Once a diver's paradise. Now a landmark for gunrunners in a battle zone of army camps and Tigers" (p.12). Triton's nostalgic lamentation depicts paradoxical existence of Sri Lanka in postcolonial era. The land which used to be celebrated for its scenic beauty with natural treasures, now turns into a hotspot of communal violence and bloodshed. The loss of Sri Lankan paradise represents the disillusioned world of postcolonial era. The transition from the sea of pearls to the sea of violence demonstrates the brutal and inevitable reality, that change forever the whole Sr Lankan identity. Although the novel restrains itself from documenting extended historical events, but it keenly records the minute changes over human and natural world. The slow and silent declination of natural world represents the harsh reality of human world. As in the book, *Slow Violence and the Environmentalism of the Poor* (2011), Rob Nixon has coined the term 'slow violence' to describe such "violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (p.2). In the postcolonial nations the gradual declination of environment is often overshadowed under the light of

development and growth, or under the pressure of ongoing socio-political violence among the people.

In the novel we receive the constant reminder of decaying nature. Mister Ranjan Salgado, a marine scientist, an oceanographer who studies, "the legions under the sea, the transformation of water into rock, - the cycle of light, plankton, coral and limestone- the yield of beach to ocean" (p.34). He is the person who takes account of every major minor change in the marine life which represents the doings of its people. Mister Salgedo, repeatedly defines coral reef not as a stone but as a living and slow growing organism. He continuously tries to make people understand that the reef takes centuries to formulate and how it may vanish in a blink for careless activity of man. His anguish over the 'slow-violence' upon the marine life becomes visible when he says that even a minor change can bring danger to the very delicate reef, he states to Dias, "if the structure is destroyed, the sea will rush in. The sand will go. The beach will disappear." And without sea, without the beach and the marine life Sri Lankan identity will be incomplete. The representation of fragile and vulnerable layers of reef depicts the helplessness of natural world Infront of human cruelty. Gunesekera criticizes materialistic approach towards nature in postcolonial era throughout the novel; he describes how dynamite fishing, unmindful anchoring and commercial activities can lead towards the marine life degradation. This precariousness of reef, or the natural world also represents the fragility of human identity. In the novel we can see a complete upside down of the social hierarchy, for instance, Triton a servant boy of Sri Lanka turns out to be well reputed chef in London. That represents the relation between the declining ecosystem and the degrading socio-cultural practice of Sri Lanka. The incident of Mr. Dias' disappearance reflects the vulnerability of the elite class during the political unrest and mass murdering. The elite class used to be respected ones but with the declining social system they became the most vulnerable section of the society. Due to such condition Mister Salgado and Triton also decided to move to England, it represents the impending dystopian future of postcolonial Sri Lanka.

The growing sea erosion and its impact on the lifestyle of people reflects the interconnected degradation. In a conversation among Mr. Salgado, Miss Nili and Robert in the chapter, "A Thousand Chapters", Robert shockingly questions, "Erosion. Sea-erosion. You said the sea will reduce the size of the beaches on the south coast…Has it happened? How much? Has it already changed the way of life in the villages?" (p.141). Through the conversation novelist tries to bring the matter the audience for their serious attention, also while critiquing the ongoing unmindful commercial activities in the marine life. In the subsequent event we get to see the uprising communal violence, where the narrator described the horrible scene of gun shooting at the Dehiwala bridge; a rich man was openly killed by an ice-cream seller in broad daylight. It demonstrates the total degradation of human and natural world simultaneously. Thus, the novel challenges the traditional readings of postcolonial studies which believes the political disruption and

socio-economic turmoil as the central concerns of postcolonial identity. Colonial exploitation widely affected the human as well as the natural world. *Reef* showcases that, by excluding the history of exploitation in the natural world from human lived experience, one cannot have a complete understanding of postcolonial identity. It makes us understand that in order to implement a sustainable growth in postcolonial world, it is necessary to take into account each human, non-human, major and minor wound of colonial era.

In the chapter, "A Thousand Fingers", the worried voice of Mr. Salgado, while commenting on the arrival of foreign tourists represents the voice native leader awakening his people about the upcoming danger of being colonized. He says, "they will ruin us. They will turn us all into servants" (p.121). His words depict impending danger which will change the whole temperament of Sri Lanka forever. That is the voice mixed with fear, pain and helplessness. Gunesekera's urge for the radical purification of Sri Lanka becomes clear, when Mr. Salgado says, "our country really needs to be cleansed, *radically*. There is no alternative" (p.121). It reflects the underlying turmoil, the chaos and a distorted reality which needs urgent care and radical nourishment. The novel shows that achieving the political freedom from the colonizer's was not enough for Sri Lanka to organize its scattered parts as a united nation. The inner strength, unity of its people are what necessary. However, like the decaying nature, Sri Lankan society has also lost its unity, mutual understanding and respect towards each other, which eventually lead to the communal violence and hatred. Gunesekera has minutely represented the tension throughout the novel.

Beyond the Anthropocentrism: A critical study of *Reef* through the lens of Blue Humanities.

History of human evolution is constantly accompanied by its natural setting. In the novel also nature plays a significant role in shaping human identity, memory and cultural heritage. Triton, now an English chef, still holding on to his memory of past. Triton's past memory of Sri Lanka is not only some happy moments with his people, but a distinct memory which has been heavily filled the natural aroma of Sri Lankan landscapes. Like Triton, all diasporic memories carry the unique lived experiences of homeland. For people like Triton, Mister Salgado, the memory of homeland carries the memory of sea of pearls, the salty sea water, the exotic sea food, the coral reefs, and the mesmerizing oceanic beauty. Nostalgia of past is always seemed to be accompanied by its relation to the natural world. Mr. Salgado's identity as a direct researcher of coral reef in Sri Lanka provides him a special memory, without the existence of the ocean or that natural landscape, his memory, his identity everything is incomplete. The novel beautifully represents the interdependent relation between human and the non-human world, and shows that without one another their existence becomes futile.

The concept of blue humanities stands against an anthropocentric view of the world; it tries to dismantle the human centered worldview by bringing towards the significance of marine ecosystem. The novel *Reef* portrays that the coastal life is not just a passive setting but as an equally living organism. As Mr. Salgado defines the reef as a slow living organism that takes centuries to form. The impact of growing commercialization, trade, colonial activities and postcolonial migration everything equally influences in the marine life as well as the human society. The dysfunctional, disillusioned postcolonial society of Sri Lanka parallels with the degrading marine ecosystem. Triton's keen observation of the coastal life such as the changing nature of reef, the populations and varieties of fish, and the frequency of storm everything indicate the ongoing disturbance on the ecosystem. Simultaneously we get to see several instances of ongoing turbulence and tension in the human society as well. Like the structure of reef, the postcolonial identity is also a cumulative of multiple factors like personal and collective lived experiences; histories of displacement and exploitation etc. In the book *Staying with the Trouble,* Donna Haraway brings a fresh "more-than-human" perspective to understand the reality. Her theoretical concept of '*naturecultures'* disrupts the binary opposition of nature/culture. She proposes a new worldview where human history and natural history are not separate but an indistinguishable entity. Her theory believes that postcolonial identity is not just a collection of human trauma and political turmoil; it is a collective experience of human and natural world. This intimacy of human nature relation is not uncommon in other postcolonial narratives as well. For example, in Jean Rhys' *Wide Sargasso Sea*, we can see the intense relation and the sense of belongingness directly come from the natural world. The journey of the protagonist from Antoinette Cosway to Bertha Mason, the mad woman in the attic, was not very simple. She has to untie herself from her origin to become the other in England, whereas her sense of self is very much rooted in the wilderness of Caribbean landscapes. Similarly, in the novel *Reef,* we find that the character's memory of homeland is heavily rooted with the ocean life. This construction of memory and identity are a product of "sympoiesis" (making with) as Haraway defines. It shows that the postcolonial identity is never self-contained but a collective body. Land, sea, air, everything is entangled in the lived experience of mankind. The novel gives special attention to the food practices in a Sri Lankan household, for instance different kinds of sea food items like "parrot fish", "crabs and crayfish" are common and unique items to their meals. These memories of sea food, different spices are very much regional lived experience of Sri Lanka. The narrative provides a vivid description regarding how a particular natural landscape can shape the food habits and overall way of living in general. In the beginning of the novel itself Triton recalls that Mr. Salgado loves sea food. Through Triton's past memories of Sri Lanka before twenty years, we are introduced to the character of Mr. Salgado whose identity, from food habits to profession is very much rooted in the oceanic surrounding of his homeland. Thus, the novelist vibrantly represents the intertwined human-nature relation throughout the novel *Reef*.

Conclusion:

In a nutshell, *Reef* is a brilliant masterpiece incorporating multiple aspects of human life in the context of Sri Lanka. From history to fiction, from politics to personal, from home to outside, from food to gun, from love to hatred, from sea to land, it has beautifully encapsulated all the complex notions of Sri Lankan history of colonialism. The novel can be considered as a mirror or a gateway to Sri Lankan history of colonialism and its aftermath. Although the work can be studied from multiple perspectives, yet the paper is restricted to study it from the perspective of postcolonial ecocriticism and blue humanities. It is the need of the hour to examine and revisit our history from a more flexible and inclusive lens; that is why the paper makes an attempt to contribute to the understanding of postcolonial history from a wider and inclusive perspective so that the complexities towards sustainable growth can be handled properly. The novel sends a message to the global audience that mutual understanding and respect, communal harmony and peaceful coexistence of human and natural world are the greatest necessities for a harmonious existence. At the same time, it also demonstrates that neither the human world is self-contained nor the natural world is complete without human. As Gunesekera presents and Haraway urges every existence should be equally valued and respect one another's significance.

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Chapter 30: Indigenous Knowledge–Based Phytochemistry for Drug Discovery and Sustainable Healthcare

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Abstract

Indigenous knowledge systems (IKS) have played a significant role in the foundation of traditional healthcare practices among various community-based people. Since ancient times, these traditional practices have represented a rich culture of remedies that developed through centuries of observation or ritualistic belief as well as the transformation of knowledge from one generation to another. In recent years, the utilisation of medicinally important traditional wild plant-derived phytochemical substrates for the development of drug therapies has gained significant attention among scientists or researchers. With this context, this book chapter explores the role of indigenous ethnomedicine and phytochemistry in highlighting their significance in modern drug discovery and sustainable healthcare. In rural regions, individuals rely almost entirely on local traditional medicines for their healthcare, as they typically live in isolated areas where hospitals and modern medical services are not readily accessible. This chapter also aims to focus on ethnobotanical approaches to document the role of different primary and secondary metabolites, such as alkaloids, flavonoids, terpenoids, etc., to identify indigenous healthcare practices and plant-based therapeutic applications. Furthermore, the chapter examines both traditional and modern phytochemical extraction techniques as well as advanced analytical tools for in-depth understanding of phytochemical composition and their physiological or morphological distribution. The chapter also attempts to formulate a bridge of knowledge to identify prominent keywords and trending areas of research and evaluate the development of research trends through methodical examination. Key challenges, including scientific validation, standardisation, quality control, and the erosion of traditional knowledge, are critically discussed. The chapter concludes by discussing the need for interdisciplinary research and integrative frameworks to effectively harness indigenous phytochemistry for future drug discovery and sustainable global healthcare systems.

Keywords: Ethnopharmacology, Traditional Knowledge, Secondary Metabolites, Research Trends.

1. Introduction

The health standards of a nation denote the social, economic, political, and ethical welfare of its everyday inhabitants. The health of a country's population directly influences its economic and social development (Guite, 2010). Traditional or indigenous medicine includes the understanding and techniques utilized for diagnosis, prevention, and treatment whereas much of this indigenous knowledge relates to the characteristics of natural substances, particularly medicinal plants, animal components, and minerals (Sindiga, 1995). A shared characteristic of these medical knowledge traditions is that they are oral practices. Their understanding has been transmitted through generations orally and is overseen by the community, which views it as sacred in essence. Moreover, traditional medicine includes a wide range of diagnostic and therapeutic approaches, featuring physical, mental, and spiritual treatments (Guite, 2010). The utilization of these methods is significantly shaped by the prevalent culture and beliefs within a specific community. A significant portion of traditional and indigenous medicine has been utilized for many generations and has been transmitted across generations (WHO 2000). Therefore, traditional/indigenous medicine is not a fixed set of knowledge as it keeps evolving alongside the practices of the individuals or communities that possess and apply it (Correa, 2000: 242). Indigenous Medicine is essential in health-care and serves as the sole affordable treatment option for impoverished individuals and those in isolated communities**.** According to the World Health Organization, a plant that has compounds applicable as therapeutic agents for the semi-synthetic creation of new medications is categorized as a medicinal plant. Lately, medicinal plants have received considerable attention and recognition in scientific studies for their preservation and advancement worldwide, along with the development of different biotechnological tools that assist in extracting and producing various phytochemical products of medicinal value. According to the World Bank report on the health care model in South Asia, people in these countries mainly rely on products derived from plants for medicinal purposes (Raj et al., 2018). Global health organizations have observed that more than 80% of people worldwide use traditional plant-based treatments to improve and maintain their health. At present, the utilization of plants and their extracts in formulating herbal remedies establishes the foundation for modern therapeutic disciplines, enabling humans to create an empirical healthcare system.

2. Materials and method

The chapter utilizes a literature-focused analytical method, referencing established research on Indigenous Knowledge–Based Phytochemistry for Drug Discovery and Sustainable Healthcare. Pertinent academic publications were discovered via recognized scholarly platforms, such as Google Scholar, Scopus, Web of Science, and ResearchGate. The search of literature was performed utilizing targeted keywords and expressions like indigenous knowledge, phytochemistry, pharmacognosy, healthcare models utilizing

traditional plants through indigenous knowledge, and future research directions regarding phytochemical constituents for medicine development. Chosen publications were meticulously reviewed and assessed according to their significance to the ecological environment, the utilization of plant-derived resources, and the importance of secondary metabolites in the assessment and identification of promising compounds for novel drug development. Focus was directed towards research that records the connection between traditional knowledge systems and phytochemical studies, especially those underscoring the healing potential of medicinal plants and their bioactive components. The data obtained from these academic sources was meticulously collected and arranged to provide a documented scientific summary of the use of plant secondary metabolites in the creation of new therapeutic agents. Significant emphasis was placed on merging indigenous knowledge systems with phytochemical studies, offering a clear scientific viewpoint on how traditional plant knowledge aids in contemporary drug development and future pharmacological investigation.

3.Importance of Ethnopharmacology in the advancement of plant-derived medicine

Throughout early human history, various purposes have utilized plants (Süntar, 2020). Lately, the pharmaceutical sector has shifted its attention back to nature, resulting in notable alterations in the utilization of plants and plant-based products for developing diverse medications (Phillipson, 1999a). In this context, ethnopharmacology has developed as an interdisciplinary and multidisciplinary approach for discovering drugs, involving the observation, characterization, and examination of the biological effects of traditional treatments (Cordell and Colvard 2005; Patwardhan 2005). By employing scientific methods to investigate the impacts of extracts or natural compounds on experimental models, ethnopharmacology has gained modern importance beyond merely the empirical aspects of traditional knowledge. The ethnopharmacology research approach is frequently employed in developing countries across Asia, South America, and Africa, where traditional healing knowledge exists (Süntar, 2020). Investigation into conventional medicinal flora provides essential knowledge for managing community health and emphasizes underappreciated indigenous natural resources (Pieroni and Privitera 2014). Research on medicinal plants aids in discovering biologically active substances, therapeutic effects, and possible uses in disease prevention and management. These studies also aid in validating conventional healing methods through phytochemical, pharmacological, and clinical investigations. Through the documentation and analysis of medicinal plants found locally, researchers can identify important bioactive compounds that could act as potential candidates for the creation of new pharmaceutical drugs. Additionally, exploring indigenous medicinal plants raises awareness regarding the ecological and economic importance of these resources, fostering their preservation and sustainable utilization. Conventional knowledge guides the selection of potential species, improving the likelihood of finding biologically active compounds.

4. Significance of phytochemistry in connecting traditional and contemporary medicine

Phytochemicals, derived from the Greek term phyto for plant, are naturally occurring bioactive compounds in plants that provide defense against diseases and various types of harm. Phytochemicals have been shown to positively impact human health (Saxena et al., 2013). For centuries, people have employed herbal supplements as treatments in conventional ways. The use of phytochemicals and the progress of phytomedicine have a rich historical background characterized by many trials and errors (Djordjevic, 2017). The knowledge of phytomedicines has been utilized in different manners throughout various cultures to treat and prevent a wide range of diseases (Pranskuniene et al. 2022). Prior to the progress of modern medical knowledge, people depended on homemade treatments, followed traditional practices, and used different strategies to treat and prevent diseases. Many cultures still support traditional medicine, and many individuals use phytomedicines (Jyoti et al. 2011; Parkash et al. 2018). For centuries, plant-based medicine has been the primary means of treatment in rural areas of Africa (Mothibe & Sibanda, 2019). Plants such as Aloe, Cannabis, Opium, Moringa, and Hibiscus, among others, have been historically employed for their medicinal properties (Xego et al. 2021). The practice of Indian Ayurveda includes more than 20,000 types of medicinal plants (Pandey et al. 2011). In recent years, Ayurveda has gained international acclaim and is utilized around the world (Atanasov et al. 2015). In China, the traditional medical approach known as Chinese Herbal Medicine (CHM) is widely utilized, producing around 40 billion USD in annual revenue (Wu et al. 2021).

5. Plants as a source of secondary metabolites

The existence of various chemicals in plant extracts, either in their pure form or natural state, holds considerable promise for the identification of new drugs (Cos et al., 2006). Plants are an essential resource for discovering new medicinal products for drug development, and their secondary metabolites are unique sources for pharmaceuticals and food additives. The significance of the extensively spread pharmacological effects of medicinal plants relies heavily on their phytochemical components. Plants contain a wide range of secondary metabolites that serve as defense strategies against herbivores, competing plants, and microbes (Sasidharan et al., 2011). Typically, secondary metabolites display a diverse array of biological and pharmacological characteristics that greatly enhance the therapeutic capabilities of medicinal plants. These substances, which encompass primary categories like alkaloids, flavonoids, terpenoids, phenolics, tannins, and glycosides, are produced by plants as a component of their adaptive and defensive strategies against environmental stresses, pathogens, and herbivores. While not directly participating in primary metabolic functions like growth and reproduction, secondary metabolites hold a crucial ecological role and exhibit various bioactive characteristics. Numerous compounds showcase notable antioxidant, antimicrobial, anti-inflammatory,

antidiabetic, anticancer, antiviral, effects.Because of these various bioactivities, secondary metabolites from plants have become important resources for creating therapeutic agents and pharmaceutical medications.They often interact with the main targets inside cells, such as proteins, biomembranes, or nucleic acids. The diverse multitarget functions of numerous secondary metabolites can explain the therapeutic application of complex extracts from herbal plants (Croteau et al., 2000). The economic worth of these secondary metabolites has sparked considerable interest in their production and in exploring methods to enhance their production via tissue culture technology in recent years. A solid grasp of the chemical composition of plants enhances the understanding of their possible medicinal advantages.

6. Different types of secondary metabolites and their role

Phenolic: Phenolics represent the most extensive category of secondary metabolites in plants, characterised by the presence of one or more phenol groups which affect the colour and flavour of plant products as well as showcasing pharmacological properties like anti-inflammatory, phytoestrogenic, and insecticidal activities.

Tannin: Tannins are polyphenolic substances that can cause proteins to precipitate. They serve as a defence mechanism for plants and are utilised in the leather tanning industry by cross-linking proteins to enhance resistance to microbial decay.

Alkaloid: Alkaloids are basic compounds derived from plants that contain nitrogen and exhibit significant physiological activity; they influence ion channels, enzymes, and neurotransmission, frequently resulting in toxic or psychoactive effects

Terpenes: Terpenes are hydrocarbons derived from isoprene, categorised by five-carbon units. They play roles in plant defence, allelopathy, attracting pollinators, and serving as precursors for plant hormones such as gibberellins and ABA.

Coumarin: Coumarins and benzopyranone derivatives are commonly found in plants, particularly in fruits and flowers; they contribute to defence mechanisms and exhibit significant biological and pharmacological properties.

7. Technique for isolation and obtaining phytochemicals

Currently, phytochemistry has become one of the leading interdisciplinary research areas focused on examining the diverse chemical characteristics and processing abilities of plants, particularly in drug development, utilizing plant-derived chemicals. Plants utilized

in traditional medicine possess a diverse array of compounds that can be effective in treating both chronic and infectious illnesses (Duraipandiyan et al., 2006). In this context, phytochemistry primarily explores the fascinating domain of phytochemicals and bioactive compounds generated by plants through intricate biochemical pathways. Grasping the chemical compositions of phytochemicals is essential for phytochemical research. Various advanced analytical techniques, including nuclear magnetic resonance (NMR) spectroscopy, mass spectrometry (MS), and X-ray crystallography, have revolutionized our ability to identify, classify, and characterize phytochemicals (Sasidharan et al., 2011; Altemimi et al., 2017). NMR spectroscopy provides detailed information about the molecular structure, functional groups, and interactions of phytochemicals. Mass spectrometry enables precise determination of molecular weight and fragmentation patterns, which assists in identifying unknown compounds and analyzing complex plant extracts. Similarly, X-ray crystallography offers highly accurate three-dimensional structural information of crystalline molecules, allowing scientists to understand the spatial arrangement of atoms within phytochemicals. The application of these advanced analytical methods has greatly accelerated phytochemical research by improving the accuracy of compound identification and supporting the discovery and development of novel plant-derived therapeutic agents

8. Significance of Phytochemistry in Sustainable Health Frameworks

Herbal remedies are flourishing in modern medicine. Often called an 'alternative' therapy, it has seen a resurgence in popularity thanks to a new wave of practitioners seeking to avoid synthetic drugs. Celebrated for its gentle, comprehensive approach, plant-based medicine is believed to operate in harmony with the human body (Saxena et al., 2013). The use of natural therapies in healthcare settings is commonly preferred because of public perceptions that these treatments are traditional and free from additives. Plant-derived therapeutics play a crucial role in improving cost-effective healthcare by offering accessible, culturally appropriate, and possibly cheaper options or additions to conventional drugs (Sharma et al). Influenced by well-known traditional approaches such as Ayurveda, Chinese medicine, and European herbal practices, these therapies continue to shape modern treatment approaches as governments aim to protect and integrate traditional knowledge into structured healthcare systems (Atanasov et al. 2015). Scientific validation through in vitro and in vivo studies and clinical trials has aided in discovering bioactive compounds, clarifying mechanisms of action, and assessing safety and effectiveness, although challenges such as limited standardization, insufficient large-scale evidence, and toxicity evaluation remain. In clinical environments, medical professionals are progressively integrating herbal remedies alongside traditional treatments for common and ongoing conditions, as case studies show their safety, efficacy, and cost-effectiveness, thus elevating their significance in patient-focused and holistic care. in addition to traditional therapies for managing both acute and chronic health issues. Evidence from

numerous clinical observations and case studies indicates that many plant-based treatments show significant safety, therapeutic effectiveness, and cost efficiency when utilized correctly. The integration of herbal medicine into healthcare systems signifies an increasing acknowledgment of traditional knowledge and its possible role in contemporary therapeutic approaches. Often, these solutions enhance conventional medical therapies by aiding in symptom relief, boosting patient health, and lowering treatment expenses. As a result, the incorporation of herbal treatments is becoming increasingly significant in patient-focused and holistic healthcare methods, which prioritize not just disease treatment but also the enhancement of overall physical, mental, and social wellness

9. Healthcare models in communities utilising medicinal plants

Medicinal plants are gaining more recognition in contemporary global conservation and development initiatives, a trend that has roots in ancient history (Van der Merwe et al., 2001). Conventional medicine serves as a significant asset for the creation of new drugs (Iwu, 1994). Exploring, utilizing, and conserving these ethnobotanical resources is vital for restoring and preserving traditional and indigenous knowledge (Reddy, 2012; Payyappallimana & Fadeeva, 2013). In India, where 65 percent of the populace depends exclusively on indigenous medicinal plant knowledge systems, and 70 percent live in rural areas struggling to access and afford contemporary allopathic medicines, established classical traditions such as Ayurveda, Unani, and Siddha have a considerable number of practitioners. Community organizations can provide important and health-enhancing information to environmental scientists and practitioners via health projects. Particularly, healing plants ((Mugisha Emmanuel, n.d.). Community-centered healthcare models that incorporate medicinal plants focus on culturally appropriate, engaged approaches for preventing diseases and delivering primary care, particularly in rural and underserved regions. These models merge the wisdom of elders and herbalists with structured educational efforts such as workshops, community training sessions, the development of localized educational materials, the establishment of cooperative demonstration gardens, and the creation of herbal enterprises (Raj et al., 2018). Collaboration between local communities, healthcare providers, educational organizations, business executives, and policymakers is essential for enhancing healthcare services and securing the enduring viability of conventional health systems. These collaborative models combine community expertise with scientific and institutional backing, facilitating efficient documentation, conservation, and responsible use of medicinal plants. Community involvement fosters understanding of preventive health measures and supports the medicinal application of plant-derived treatments based on conventional health practices. Training efforts and capacity-building initiatives improve local abilities in recognizing, growing, and sustainably utilizing medicinal plants. Simultaneously, these collaborations protect indigenous wisdom while enhancing public health results and encouraging culturally

suitable healthcare methods. Ethnomedicine is a significant healthcare strategy that can benefit future generations by fostering the sustainable use of natural resources. Indigenous communities' traditional medicinal systems are primarily rooted in a profound knowledge of local biodiversity and ecological harmony (Tripathi, 2019). Over generations of observation and experience, communities have discovered how to use medicinal plants, animal products, and various natural resources in manners that frequently reduce environmental harm and promote resource conservation. This sustainable connection with nature supports ecological balance while guaranteeing the ongoing availability of medicinal resources

10. Challenges and future research trends

Health is a crucial element of human life, shaped by various sociocultural and physical influences. Ethnomedicine embodies a healthcare approach among tribal groups where individuals utilize herbal and animal-based remedies for different ailments (Souza et al., 2018). Although it is mainly rooted in ethnicity and magic, there is a lack of scientific methods and efficient management approaches (Erickson, 2007). However, this traditional wisdom is increasingly endangered by widespread urbanization, industrial expansion, and resource depletion. Since ethnomedicinal practices are greatly dependent on wild plants and animals, the loss of biodiversity directly affects their viability. A deficiency in identity and knowledge regarding plant-derived chemical derivatives poses a challenge for traditional communities. Furthermore, the knowledge is limited to a specific group of revered specialists and is mainly beneficial for minor concerns instead of significant chronic ailments such as cancer, diabetes, or hypertension (Tripathi, 2019). The future of ethnomedicine encounters specific challenges because of various inherent limitations. In numerous traditional societies, healing wisdom is confined to a limited number of skilled healers or elders, restricting its broader dissemination within the community. Furthermore, the cultural traditions linked to ethnomedicine are frequently specific to certain areas and might not be acknowledged or embraced universally in various locations. Due to these obstacles, the sustainable future of ethnomedicine demands supportive and integrative strategies. Within the Indian healthcare landscape, medical pluralism and Complementary and Alternative Medicine (CAM) have become more significant (Tripathi, 2019). Reducing reliance on natural resources, teaching tribal youth about its benefits, and encouraging its adoption as a career option are vital components of linking ethnomedicinal knowledge with modern medical practices.

11. Conclusion

Ethnopharmacology and phytochemistry collectively provide a strong scientific foundation for creating plant-derived medicines by linking ancient wisdom with modern drug development techniques. Traditional medicinal systems aid in identifying bioactive

compounds, while phytochemical research enables the extraction, characterization, and validation of secondary metabolites that provide therapeutic advantages. Historical wisdom has established the foundation for modern medicine and will remain an essential resource for future medications (Siddiqui et al. 2014). Medicinal plants remain essential for sustainable and community-centered healthcare, particularly in resource-limited regions; nonetheless, challenges like biodiversity loss, lack of standardization, inadequate comprehensive clinical validation, and erosion of indigenous knowledge must be addressed. Improving interdisciplinary research, conservation techniques, and policy integration is essential to ensure the secure, effective, and sustainable application of plant-based therapeutics in today's healthcare systems. Nonetheless, in many areas worldwide, knowledge of traditional medicine has declined and disappeared due to rapid industrialization and the decline of cultural identities, particularly in developed countries (Genc¸ler O¨ zkan and Koyuncu 2005). Minimizing over-reliance on natural resources while guaranteeing their sustainable use is a crucial action in safeguarding ethnomedicinal knowledge and biodiversity. Numerous medicinal plants utilized in traditional medicine practices are gathered straight from their natural habitats, potentially resulting in overharvesting and the diminishing of precious species. Thus, it is essential to encourage sustainable harvesting methods, the cultivation of medicinal plants, and management strategies focused on conservation to sustain ecological balance and guarantee the long-term availability of these resources. It is equally crucial to inform tribal youth about the cultural, healing, and financial significance of ethnomedicinal knowledge. Indigenous communities have a profound legacy of herbal healing methods that has been passed down verbally across generations. Integrating ethnomedicinal education into community training programs and local educational efforts allows younger generations to gain a greater appreciation for traditional healthcare methods and their significance in modern society. Promoting the idea of ethnomedicine as a viable career option for tribal youth can enhance the connection between traditional knowledge and contemporary medical practices. Cultivating medicinal plants, developing herbal products, offering community healthcare services, and conducting ethnobotanical research can create sustainable livelihoods and help preserve traditional knowledge systems. These initiatives empower local communities economically while aiding the integration of traditional herbal medicine with contemporary healthcare methods, fostering cultural preservation and sustainable development

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Chapter 31: The Body Remembers: Indigenous Embodied Knowledge and Women's Pathways to Sustainable Well-Being

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Abstract

Mainstream sustainable development structures in the Global South have majorly emphasized upon the technological inventions , economical growth and infrastructural development, but that has led to marginalising the cultural, psychosocial, and embodied dimensions of well-being.Within these frameworks, women mostly from the indigenous , rural and socio economically backward backgrounds are often relegated to the position of passive beneficiaries rather than active producers of knowledge. This is further accentuated by the dominance of the Western epistemological stances that fundamentally privilege the place of the cognitive, the biomedical , and the technocratic approach to health and sustainability over and above their lived, experiential forms of knowing. This chapter presents an argument that women's body awareness practices offer a significant, although non-acknowledged, indigenous knowledge system that obtains sustainability from the milieu of the marginalised regions of the Global South. The argument is located theoretically on the decolonial agendas of the development theories, indigenous knowledge studies, and psychological studies of body awareness. The framing of body awareness is not recognised as one of the recent therapeutic disciplines, rather practises like body awareness, regulation of breathing, somatic regulation , and rhythmic movement can be recognised as indigenous knowledge systems that date back. It also seeks to emphasize that embodied practices are essential in helping individuals gain emotional control and sustainably develop adaptive coping mechanisms to maintain oneself under conditions of inequality and stress and other limiting formal health care facilities. Such practices are essential for achieving and supporting an agenda of desirable and sustained development practices.The chapter also presents more of its positions and perspectives regarding how far or to which extent embodied indigenous knowledge might impact or shape an agenda of supporting and achieving an agenda of long-term and desirable and sustained

developmental practices and policies. More concretely, it argues that to achieve an agenda of desirable and sustained developmental practices and policies, it is essential to reclaim and restore embodied indigenous knowledge and that it is an imperative and an essential prerequisite to decolonizing underdevelopment and to substantially and sustainably developing an agenda that seeks to address and ensure social justice.

Keywords: Indigenous Knowledge Systems, Body Awareness, Sustainable Well-Being,Marginalized Women, Global South

Introduction

The contemporary global context is marked by escalating sustainability crises that require urgent, transformative responses. Climate change, biodiversity degradation, widening socio-economic inequalities, and the depletion of natural resources highlight the intricate and interconnected character of present-day challenges. Addressing such complexity necessitates rethinking the scientific models that have traditionally guided development and sustainability efforts. For many decades, Western scientific paradigms largely grounded in positivism and empiricism have shaped global approaches to knowledge production and policy formulation (Sillitoe, 2020). Although these paradigms have driven remarkable technological progress, they are frequently critiqued for their reductionist orientation, which often sidelines alternative epistemologies, particularly Indigenous and other endogenous knowledge systems (Dei, 2021).

Endogenous knowledge traditions across Africa, Asia, and Latin America provide holistic, contextually grounded understandings of reality. These systems emphasize interconnectedness among human beings, the natural environment, and, in many cases, spiritual dimensions of life. Rooted in long-standing cultural practices, they have supported community survival and resilience for generations (Chilisa, 2019). Despite their enduring relevance, such knowledge systems have historically been marginalized within global scientific discourse, largely due to colonial hierarchies that elevated Western epistemologies as universally superior (Ndlovu-Gatsheni, 2020). This epistemic exclusion has limited the integration of valuable insights that could enhance inclusive and sustainable development outcomes.

This article seeks to examine the relationship between endogenous knowledge systems and Western scientific traditions, exploring how their integration might reshape science to better respond to the complexities of sustainable development. By engaging with the epistemological foundations of both approaches, it advocates for a more pluralistic conception of science one that recognises Indigenous knowledge as a legitimate and indispensable contributor to sustainability.

The importance of this discussion lies in its potential to unsettle dominant models of knowledge production. Broadening the definition of science to include endogenous epistemologies could promote solutions that are more locally grounded, culturally responsive, and environmentally sustainable. Moreover, it could contribute to a more equitable redistribution of epistemic authority, enabling Indigenous communities to participate meaningfully in global scientific and policy dialogues (Pereira & Funtowicz, 2019). This perspective resonates with contemporary calls for epistemological pluralism in development theory, which acknowledge that diverse ways of knowing are essential for designing effective and inclusive development strategies (Escobar, 2020).

As the global community continues to seek viable pathways toward sustainability, it becomes increasingly clear that no single knowledge framework can adequately address the breadth of contemporary challenges. Bringing Western scientific paradigms into dialogue with endogenous knowledge systems presents an opportunity to reconceptualize science not as a fixed and homogeneous enterprise, but as a dynamic, evolving practice capable of responding to complex global realities (Mazzocchi, 2021). In doing so, this article contributes that we should bring Western science and Indigenous knowledge together. Science should not be seen as only one way of knowing. By including different knowledge systems, we can create solutions that are more local, culturally sensitive, fair, and sustainable.

Review of literature

Barudin (2024), in "*Weaving Threads of Collective Liberation"* published in Race and Yoga, examines the Indigenous Yoga Collective (IYC) as a model of decolonial healing praxis. Emerging from the First Nations Women's Yoga Initiative, the IYC integrates trauma-informed yoga with Indigenous and South Asian spiritual traditions to address colonial and intergenerational trauma. The study highlights how the collective fosters cultural reclamation, embodied healing, and cross-cultural solidarity while resisting the commodification of yoga. Barudin positions the IYC as a community-led, culturally grounded framework for collective liberation and decolonial wellness.

Macal, C. (2024) examines the embodied transformative memory of GuateMaya Mujeres Resistiendo–Los Angeles (GMR-LA), a grassroots group of Guatemalan war survivors and diaspora women. Using a decolonial feminist ethnographic approach, the study employs body mapping as a counter-cartographic and healing method to explore connections between body, memory, and intergenerational trauma. Centering oral and embodied testimonios, the article presents body mapping as a decolonial tool for justice, cultural memory, and collective healing grounded in a body–mind–spirit framework.

BlackDeer, A. (2023) argues that both feminism and social work have historically been complicit in colonial systems that perpetuate white supremacy and systemic violence against Indigenous peoples. The article calls for feminist social work to meaningfully address these harms through an Indigenous decolonial feminist framework grounded in experiential, cultural, and embodied knowledge. Decolonial feminism in social work centers Indigenous sovereignty and collective liberation defined by Indigenous communities themselves. The work urges the field to critically strategies for social change and commit to embodied decolonization aligned with social work's core goal of social justice.

Dieng, R. (2023) reviews the *Talking Back: African Feminism in Dialogue* interview series with 15 African feminist activists, policymakers, researchers, and artists. The piece highlights how African feminists connect activism, knowledge production, and solidarity while confronting patriarchy, colonialism, racism, capitalism, fundamentalisms, and heteronormativity. It emphasizes the role of feminist scholarship and lived experience in reshaping political and economic systems and redefining social contracts across Africa and the diaspora through decolonial and transformative praxis.

Dei, G. J. S. (2021) explores the impact of teaching science in English to rural primary students in Zimbabwe and examines teachers' attitudes toward using the Indigenous language chiShona. Using classroom observations and interviews, the study found institutional and attitudinal barriers to Indigenous language instruction. Many teachers favored English-only teaching, sometimes silencing students' voices, while others used code-switching. Barriers to full chiShona instruction included lack of materials, restrictive language policies, and negative attitudes. The study recommends policy reform, development of Indigenous learning resources, and changes in teacher education to support Indigenous languages in STEM education.

1. Decolonising Sustainability: From Extractivism to Embodied Justice

Conventional sustainable development rests on colonial logics: nature as resource, "pristine" wilderness separate from people, and progress measured by growth and technocratic indicators . These frames devalue Indigenous and local practices of land care, water management, and subsistence that are often more adaptive and biodiverse (Mehta , 2025).

Decolonial approaches in development studies, feminist political ecology, and Indigenous epistemologies insist that environmental crises are inseparable from colonial histories of dispossession, racial capitalism, and gendered violence (Sultana, F. ,2020). Sustainability thus becomes not only an ecological but also an epistemic and political project: a struggle over whose knowledge counts and whose bodies are rendered expendable (Zaragocin et.al ,2023).

Southern feminist scholarship "reclaims knowledge from the margins" by foregrounding gendered governance, care, labour, and digital innovation as terrains where women contest extractive development and re-make sustainability from lived experience. Rooted-South feminisms explicitly link patriarchy, coloniality, capitalism and terracide, the destruction of Earth through concepts like territory–body–land, where the body and land are inseparable sites of history, memory and struggle (Villareal, 2023).

2. Embodied Indigenous Knowledge and Territory–Body–Land

Latin American decolonial feminist geographers articulate cuerpo–territorio (body–territory) as a method and ontology: bodies and territories form an inseparable unity, marked by histories of violence and resistance (Noroña, 2024) . Through participatory drawing of bodies and landscapes, women map how mining, agribusiness, or policing are inscribed simultaneously on their land and flesh, producing co-created, publicly legible knowledge for advocacy (Zaragocin et.al ,2023).

Similarly, Rooted-South feminisms in Abya Yala describe a *territory–body–earth* in which history is read on the scars and textures of both land and flesh, and where reproductive and care work become foundations for regenerating life rather than mere sites of exploitation (Villareal, 2023). These onto-epistemologies challenge modern dualisms (mind/body, nature/culture) and recast Earth as a living relational subject.

3. Women's Body Awareness and Decolonial Healing

3.1 Body mapping and intergenerational trauma

Body mapping, developed in health work and expanded by Latin American decolonial feminist geographers, visually traces memories, pain and resilience on the body's surface (Macal, 2024). GuateMaya women survivors of war and diaspora, for example, co-create "healing cartographies" that connect scars, illnesses and affect with histories of state violence and displacement (Macal, 2024).

This decolonial method centres oral and embodied *testimonios*, guided by body–mind–spirit perspectives, and affirms women's own body awareness as diagnostic and healing knowledge, not just as clinical data (Macal, 2024). Through collective mapping, women reclaim their bodies as archives of history and sites of justice-seeking.

3.2 Indigenous feminist Gikendaasowin and movement

Indigenous *Gikendaasowin* (knowledge) locates theory and method in Indigenous women's experiences of physical activity and movement (McGuire-Adams, 2020). In sport and health disciplines, this knowledge challenges universalist, biomedical understandings of "fitness" by foregrounding sovereignty, community, ceremony and land-based practices . Movement becomes a decolonial practice through which women enact well-being, reconnect with territories, and transmit teachings.

Similarly, decolonial healing initiatives like the Indigenous Yoga Collective bring Indigenous and South Asian women into trauma-informed yoga spaces that reconnect body, spirit and land, while resisting the commodification and whitening of yoga (Barudin, 2024). These practices treat women's body awareness as a site of cultural reclamation and cross-cultural solidarity against colonial trauma (Barudin, 2024).

3.4 Embodied decolonisation and social work

In social work, Indigenous decolonial feminism reframes practitioners and scholars as knowledge keepers in right relation to communities and lands. Embodied decolonisation means grounding practice in place-based politics, historical accountability and relational worldviews, where experiential and cultural knowledge is valued alongside peer-reviewed research (BlackDeer, 2023).

Inviting Elders into classrooms, centring story, and prioritising generational wisdom enact a shift from abstract "unknowing" to embodied, accountable knowing (BlackDeer, 2023). This reorients social work toward Indigenous sovereignty and collective liberation.

4. Black and African Feminist Ecologies of Embodiment

Black feminist spatial imaginaries connect race, gender, ecology and space to reframe environmental justice (Zaragocin et.al ,2023).. Black feminists highlight how control over Black women's reproductive bodies, exposure to toxins, and displacement are interlinked forms of environmental and reproductive injustice. Justice is reimagined as reclaiming bodily and spatial autonomy in degraded environments, centring those "who know no one knows" (Ducre, 2018) .

In Ecuador, emerging Black feminisms question development itself while building a Black feminist political ecology that contests state gender policy and highlights Afro-Ecuadorian women's struggles over land, water and care work . Their practices exceed "gender mainstreaming," revealing development as a racialised, gendered regime and foregrounding alternative eco-political futures grounded in Black women's experiences (Zaragocin et.al ,2023).

Across Africa, feminist interviews and movement histories show how activists link knowledge production, organising and love to challenge patriarchy, capitalism, colonialism and fundamentalism. These "poetics of knowing, organising and loving" are bodily and affective practices that reshape political economies and ecologies from below (Dieng,2023).

Conclusion

Across the literature, there is clear agreement that dominant, Western, technocratic models of sustainability are insufficient and deeply shaped by colonial histories, marginalising Indigenous and other endogenous knowledge systems

Indigenous and local knowledges are described as holistic, relational, intergenerational, and place-based, supporting long-term ecological stewardship, social cohesion, and cultural survival across sectors such as land and water governance, health, food systems, and education.

When these knowledges are treated as co-equal with Western science, rather than as raw data to be extracted, outcomes in conservation, resource management, and sustainability education become more context-specific, culturally grounded, and socially just. Integrative approaches in curricula and community projects show improved student identity, learning, and local empowerment.

However, attempts at "integration" often reproduce epistemic injustice: power imbalances, tokenism, and scientism continue to devalue Indigenous authority and worldview. Scholars therefore call for epistemological pluralism and decolonial practice redefining rigor, reforming institutions and policies, ensuring Indigenous self-determination over knowledge, and building long-term, reciprocal partnerships.

In sum, bringing Western science into genuine dialogue with Indigenous and feminist decolonial epistemologies is presented not just as ethical, but as necessary for effective, equitable sustainability: it widens what counts as science, centers embodied and land-based knowledges, and supports more just, resilient futures.

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Chapter 32: Integrating Financial Management Practices into Tourism Development Strategies

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Abstract

Tourism has emerged as a significant driver of economic growth, employment generation, and regional development across both developed and developing economies. However, the sustainability and competitiveness of the tourism sector increasingly depend on the effective integration of financial management practices into tourism development strategies. This study examines how financial planning, budgeting, capital structuring, investment appraisal, risk management, and revenue optimization can be systematically embedded within tourism policy frameworks and organizational strategies. The paper adopts a conceptual and analytical approach, synthesizing existing literature on tourism economics, public finance, and corporate financial management to develop an integrated framework linking financial governance with tourism development objectives. It argues that tourism projects often face financial inefficiencies due to inadequate cost control, weak financial forecasting, poor access to capital, and limited performance monitoring mechanisms. By incorporating strategic financial tools such as cost-benefit analysis, public-private partnership financing models, sustainable investment planning, and financial risk assessment, tourism destinations can enhance resource allocation efficiency and long-term viability. The findings suggest that aligning financial management practices with sustainable tourism goals improves investment outcomes, strengthens institutional accountability, and enhances economic resilience against market volatility and external shocks. The study further highlights the role of financial inclusion, green finance, and digital payment systems in promoting inclusive and sustainable tourism growth. The paper concludes that integrating financial management into tourism development is not merely an administrative function but a strategic imperative for ensuring competitiveness, sustainability, and socio-economic impact in the evolving global tourism landscape.

Keywords: Tourism Development, Financial Management, Sustainable Finance, Investment Planning, Revenue Management, Economic Sustainability.

1. Introduction

Tourism is one of the fastest-growing sectors globally, contributing significantly to GDP, employment, and regional development. Tourism as a multifaceted and dynamic, significantly contributes to the economic prosperity, cultural exchange and social development of nations worldwide industry. The role of travel and tourism as a catalyst for economic growth is increasingly acknowledged, particularly in emerging conomies like india. (Roshnee Rita, 2025) But despite its economic importance, tourism projects often face financial inefficiencies due to weak cost control, poor forecasting, and limited access to capital. These challenges undermine sustainability and competitiveness, particularly in developing economies where tourism is a vital growth engine. In tourism, where demand is seasonal and often unpredictable, accurate financial planning ensures that destinations can anticipate fluctuations and allocate resources effectively. Financial planning provides the foundation for tourism projects by forecasting revenues, estimating costs, and aligning financial resources with strategic objectives. Budgeting is also essential for monitoring expenditures and preventing cost overruns, which are common in large-scale tourism infrastructure projects. Transparent budgeting practices also enhance accountability, reduce corruption risks, and build trust among stakeholders, including investors and local communities. Tourism budgeting is done considering the projects which often require significant capital investment and structuring.

Capital structuring involves determining the optimal mix of debt, equity, and alternative financing mechanisms such as public-private partnerships (PPPs) or blended finance. A well-structured capital base diversifies funding sources and reduces dependency on public funds introducing investment appraisal techniques, including Net Present Value (NPV), Internal Rate of Return (IRR), and cost-benefit analysis which are critical for evaluating the viability of tourism projects. These tools help policymakers and investors assess whether projects will generate sufficient returns and contribute to long-term development goals. Tourism is highly vulnerable to external shocks such as pandemics, natural disasters, and geopolitical instability. Risk management tools such as insurance, contingency planning, and scenario analysis enable destinations to prepare for uncertainties and safeguard financial stability.

These shortcomings give rise to revenue optimization strategies, such as dynamic pricing and yield management, maximize profitability by adjusting prices based on demand patterns. The adoption of digital payment systems further enhances efficiency, expands market participation, and supports financial inclusion, particularly for small-scale tourism enterprises. Tourism is economically significant but financially vulnerable. The Financial management practices like budgeting, investment appraisal, risk management are underutilized in tourism projects.

2. Literature Review

Tourism Economics and Development

Tourism has long been recognized as a catalyst for regional development. Dwyer, Forsyth, and Spurr (2016) emphasized that tourism contributes significantly to GDP growth and employment, but its volatility requires strong policy and financial frameworks. Sharpley (2020) argued that sustainable tourism must integrate economic, social, and environmental dimensions, highlighting the need for financial governance to balance growth with sustainability. More recently, Rita and Ramachandran (2025) analyzed tourism finance in Indian states, showing that financial planning and investment strategies directly influence tourism's role in regional economic development.

Financial Management in Tourism

Financial management practices are central to tourism viability. Ran Qin (2023) identified unique challenges in tourism financial management, including seasonality, uncertainty, and compliance with tax regulations. The study concluded that effective cost control, fund management, and investment decisions are crucial for maintaining financial health in tourism enterprises. Earlier, Gursoy, Chi, and Lu (2019) highlighted that weak financial forecasting and poor capital access often undermine tourism projects, stressing the importance of integrating corporate finance principles into tourism development.

Sustainable Finance and Tourism

Sustainable finance has emerged as a critical dimension of tourism development. OECD (2021) said that green bonds and impact investment models are increasingly used to fund eco-tourism and conservation projects. Sharpley (2020) reinforced this by linking sustainable finance to long-term competitiveness in tourism destinations. Case studies from Costa Rica demonstrate how green finance supports conservation-based tourism, aligning financial returns with environmental goals. Moreover, digital payment systems have been shown to expand market participation, particularly in Asia, where mobile wallets facilitate financial inclusion for small-scale tourism vendors.

Tourism Management Perspectives

Hubaratti (2023) conducted a literature review of tourism management, noting that tourism intersects with commerce, sustainability, and entrepreneurship. The study emphasized that financial governance is often overlooked in tourism management frameworks, despite its critical role in ensuring resilience and competitiveness. This aligns with Rita and Ramachandran (2025), stating that financial inefficiencies, such as inadequate cost control and weak monitoring limit tourism's potential as a driver of regional development.

To conclude Sustainable finance mechanisms (green bonds, PPPs, digital payments) are increasingly recognized as essential for inclusive and resilient tourism growth in tourism but There is a gap in previous researches integrating corporate financial governance into tourism policy frameworks. So, there is a scope for future work to be done on this.

2.1 Tourism Economics and Development

Tourism has long been recognized as a driver of socio-economic development. Scholars highlight its role in infrastructure expansion, employment generation, and foreign exchange earnings. However, tourism demand is highly volatile, making financial resilience a critical factor in long-term sustainability.

Financial Management in Tourism

Financial management encompasses planning, capital structuring, cost-benefit analysis, and revenue optimization. Studies show that many tourism projects fail due to weak financial planning and over-reliance on public funding. Effective financial governance ensures projects are viable and scalable.

Sustainable Finance and Tourism

Emerging literature emphasizes green finance, impact investment, and financial inclusion as tools for sustainable tourism. Public-private partnerships (PPPs) are increasingly used to mobilize capital for infrastructure while ensuring accountability. Digital payment systems also expand market participation and improve transparency.

3. Methodology

This study adopts a conceptual and analytical approach, synthesizing literature from tourism economics, public finance, and corporate financial management. The methodology involves:

36. Reviewing scholarly articles, policy documents, and case studies.
37. Identifying gaps in financial management practices within tourism projects.
38. Proposing an integrated framework linking financial governance with tourism development objectives.

This paper argues that financial management must be strategically integrated into tourism development strategies. By embedding financial planning, budgeting, investment appraisal, and risk management into tourism policy frameworks, destinations can achieve

efficient resource allocation, institutional accountability, and resilience against external shocks such as pandemics, geopolitical instability, or climate change.

3.1 Objectives

The main objectives of this research paper

1. To study the framework that integrates financial management practices into tourism development strategies.
2. To evaluate the role of innovative financial mechanisms promoting inclusive and sustainable tourism growth.

4. Integrated Framework for Financial Management in Tourism

Financial Planning and Budgeting

Tourism projects require robust financial planning to forecast revenues, manage costs, and allocate resources. Budgeting ensures accountability and prevents cost overruns, particularly in large-scale infrastructure projects.

Capital Structuring and Investment Appraisal

Access to capital is a major challenge. PPPs, blended finance, and sustainable investment models diversify funding sources. Investment appraisal techniques such as NPV and IRR help evaluate project viability and long-term returns.

Risk Management

Tourism is vulnerable to external shocks. Financial risk assessment tools, insurance mechanisms, and contingency planning enhance resilience. Scenario analysis and stress testing can prepare destinations for crises.

Revenue Optimization

Dynamic pricing, yield management, and digital payment systems improve revenue streams. Financial inclusion through mobile banking ensures broader participation, particularly in rural tourism markets.

Table 4.1: Financial Management Tools In Tourism Development

Financial Tool	Application in Tourism Projects	Expected Outcomes
Financial Planning	Forecasting revenues, cost allocation	Improved budgeting accuracy
Budgeting	Monitoring expenditures, preventing overruns	Accountability, transparency
Capital Structuring	PPPs, blended finance, equity vs. debt	Diversified funding sources
Investment Appraisal	NPV, IRR, cost-benefit analysis	Viability assessment
Risk Management	Insurance, contingency planning	Resilience against shocks
Revenue Optimization	Dynamic pricing, yield management	Maximized profitability

Table 4.1 outlines the core financial management tools that can be systematically integrated into tourism development strategies. Each tool addresses a specific dimension of financial governance and contributes to the overall sustainability and competitiveness of tourism projects.

Implementation of integrated Financial management tools with tourism to promote sustainability, real life case studies.

4) Financial Planning – Bali, Indonesia Tourism authorities in Bali implemented long-term financial planning to balance seasonal demand with infrastructure investment. By forecasting peak and off-peak revenues, they allocated funds toward sustainable transport and waste management systems. This proactive planning reduced environmental strain while maintaining profitability.
5) Budgeting – Barcelona, Spain The city of Barcelona introduced strict budgeting controls for tourism-related infrastructure projects, particularly around the expansion of cultural heritage sites. Transparent budgeting practices allowed for better monitoring of public funds, reduced corruption risks, and ensured that projects stayed within financial limits while enhancing visitor experiences.
6) Capital Structuring – European Resort PPPs In several European countries, resorts and airports were financed through Public-Private Partnerships (PPPs). For example, Portugal's airport expansion projects used BOT (Build-Operate-Transfer) models, where private investors funded construction and operated facilities before transferring ownership to the government. This diversified capital sources and reduced reliance on public debt.

7) Investment Appraisal – Costa Rica Ecotourism Costa Rica applied cost-benefit analysis and NPV calculations to evaluate ecotourism projects. By quantifying both financial returns and environmental benefits, policymakers ensured that conservation-based tourism initiatives were financially viable while supporting biodiversity. This appraisal process attracted impact investors interested in sustainable returns.
8) Risk Management – Caribbean Tourism Caribbean destinations, highly vulnerable to hurricanes, adopted insurance schemes and contingency funds to mitigate financial risks. Jamaica, for instance, established a disaster risk financing mechanism that allowed rapid recovery of tourism infrastructure after natural disasters, ensuring resilience and continuity of operations.
9) Revenue Optimization – Mobile Payments in Asia In countries like Thailand and Vietnam, small-scale tourism vendors adopted mobile wallets and QR-based payment systems. This expanded access to tourism markets, reduced transaction costs, and allowed dynamic pricing strategies. Revenue optimization through digital payments also promoted financial inclusion, enabling rural communities to benefit directly from tourism.

Integrating financial management into tourism strategies yields multiple benefits:

4. Efficiency in resource allocation: Cost-benefit analysis ensures investments generate maximum socio-economic returns.

5. Institutional accountability: Transparent budgeting reduces corruption and inefficiency.

6. Resilience against volatility: Risk management tools safeguard projects against shocks.

7. Sustainability: Green finance aligns tourism with environmental and social objectives.

Challenges include limited financial literacy among stakeholders, inadequate access to capital in developing economies, and resistance to adopting new financial technologies.

Table : 4.2 Tourism & Financial Management Data (2019–2023)

Year	International Tourist Arrivals (millions, global)	Tourism Receipts (USD trillion, global)	India Foreign Exchange Earnings from Tourism (USD billion)	Key Financial Notes
2019	1,460	1.48	29.96	Peak pre-pandemic year; strong revenue optimization
2020	400	0.49	6.15	Severe decline due to COVID-19; risk management crucial
2021	460	0.65	8.79	Gradual recovery; investment appraisal for revival projects
2022	960	1.04	16.97	Strong rebound; capital structuring via PPPs in tourism infra
2023	1,300	1.35	23.37	Near full recovery; focus on revenue optimization and resilience

Sources: . UN Tourism Statistics Database (global arrivals & receipts) Ministry of Tourism, Government of India Annual Reports (foreign exchange earnings)

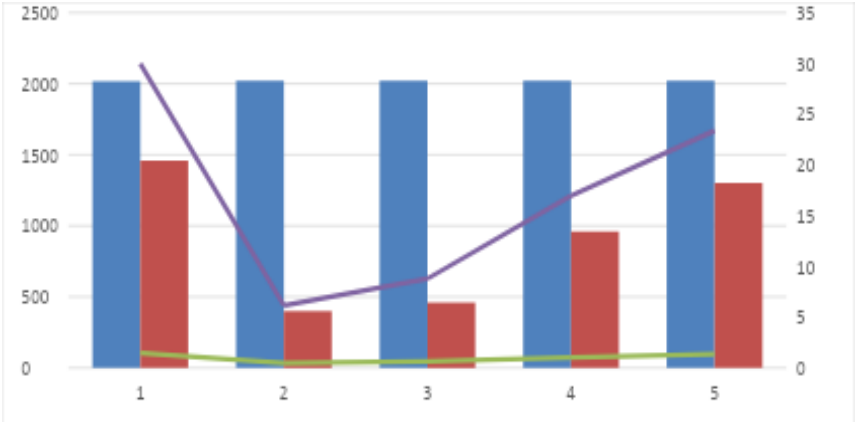


Figure 4.2

Table and figure 4.2: provides the details of international tourist arrivals, there receipts and foreign exchange earnings for the last five years. During the year 2019, it was the high point before the pandemic, showing strong profitability. The year 2020–2021 highlight the importance of risk management and contingency planning due to the pandemic. 2022–2023 demonstrate recovery, with capital structuring (PPPs, blended finance) and investment appraisal guiding sustainable growth.

Table 4.3: Public Private Partnership Models In Tourism

PPP Model	Example Application	Advantages	Challenges
Lease Agreements	Airport retail spaces	Steady revenue for government	Limited innovation incentives
Joint Venture	Eco-tourism lodges	Shared risk and expertise	Governance complexity
Concession Agreements	Theme parks	Private investment in infrastructure	Regulatory oversight required
Build-Operate-Transfer (BOT)	Resort development	Private efficiency, eventual public ownership	Long-term contracts, risk allocation

Table 4.3 highlights the different PPP models commonly applied in tourism infrastructure and service development. Each model represents a unique arrangement between public authorities and private investors, balancing efficiency, accountability, and risk-sharing.

Build-Operate-Transfer (BOT) In BOT models, private investors finance and construct tourism infrastructure (such as resorts or airports), operate it for a fixed period to recover costs and profits, and then transfer ownership to the government. This model ensures efficiency in construction and operation while ultimately securing public ownership. However, long-term contracts can create challenges in risk allocation and regulatory oversight.

Joint Ventures Joint ventures involve shared ownership and management between public and private entities. They are particularly effective in eco-tourism projects, where local governments contribute land or regulatory support, while private investors provide capital and expertise. The advantage lies in shared risk and innovation, though governance complexity can arise due to differing objectives.

Lease Agreements Under lease agreements, private operators manage tourism facilities (such as airport retail spaces or hotels) for a fixed period, paying rent to the government. This provides steady revenue for public authorities while allowing private firms to innovate in service delivery. However, the incentive for long-term investment may be limited since ownership remains public.

Concession Agreements Concessions grant private firms the right to operate tourism services (e.g., theme parks, transport systems) for a defined period. These agreements encourage private investment in infrastructure and service quality, while governments retain regulatory control. The challenge lies in ensuring that concession terms are fair and that public interests are safeguarded.

Integrative Significance

PPP models are vital for mobilizing capital in tourism development, especially in contexts where public funds are insufficient. They allow governments to leverage private expertise and investment while maintaining oversight. The choice of model depends on project scale, risk profile, and policy objectives, but all aim to enhance efficiency, accountability, and sustainability in tourism infrastructure. PPP Financing in Tourism Infrastructure (Europe) depicts that PPP models have successfully funded airports and resorts, balancing public accountability with private efficiency. Also, Green Finance in Ecotourism and Sustainable investment planning has supported conservation-based tourism, aligning financial returns with environmental goals. Paving the way for Digital Payments in Asia like Mobile wallets and QR-based payments have expanded access to tourism services, especially among small-scale vendors.

Table 4.4: Finance Mechanism In Tourism

Mechanism	Application	Benefits	Limitations
Green Bonds	Funding eco-lodges, conservation projects	Aligns finance with sustainability	Requires strong monitoring
Impact Investment	Community-based tourism	Social and environmental returns	Difficult to measure outcomes
Microfinance	Supporting small tourism enterprises	Promotes inclusivity	Limited scalability
Digital Payment Systems	Mobile wallets for rural tourism	Expands market participation	Infrastructure dependency

Table 4.4 illustrates the diverse financial mechanisms that support sustainable tourism development by aligning economic objectives with environmental and social goals. Green bonds provide long-term funding for eco-lodges and conservation projects, ensuring that capital flows directly into environmentally responsible initiatives, though they require rigorous monitoring to maintain credibility. Impact investment channels resources into community-based tourism, generating both financial returns and measurable social benefits, though outcomes can be difficult to quantify. Microfinance plays a crucial role in empowering small tourism enterprises, particularly in rural areas, by promoting inclusivity and entrepreneurship, although its scalability remains limited. Finally, digital payment systems—such as mobile wallets and QR-based transactions—expand market participation, reduce transaction costs, and enhance transparency, but they depend heavily on reliable infrastructure. Collectively, these mechanisms demonstrate how sustainable finance can diversify funding sources, foster inclusivity, and strengthen resilience in tourism economies, while also highlighting the challenges of implementation and monitoring.

Conclusion

To conclude the research study envisaged integrated framework that systematically embeds financial management practices, such as financial planning, budgeting, capital structuring, investment appraisal, risk management, and revenue optimization into tourism development strategies, thereby enhancing efficiency, sustainability, and competitiveness in the sector. The tables mentioned in the study are based on conceptual summary which helps in evaluating the role of innovative financial mechanisms (including cost-benefit analysis, public-private partnerships, green finance, digital payment systems, and financial inclusion) in strengthening institutional accountability, improving investment outcomes, and promoting resilient, sustainable tourism growth across diverse economic contexts. Tourism development cannot be sustainable without robust financial management. Integrating financial planning, investment appraisal, risk management, and revenue optimization into tourism strategies is a strategic imperative. Aligning financial governance with sustainable tourism goals enhances competitiveness, ensures long-term viability, and maximizes socio-economic impact. Future research should focus on empirical case studies that test the proposed framework in diverse tourism contexts.

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Chapter 33: Human-Wildlife Conflict and Indigenous Ecological Ethics in Assam: Toward Participatory Conservation and Community-Centered Coexistence

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Abstract

The human-wildlife conflict occurrence in Assam India constitutes a complicated social and environmental disaster which stems from colonial historical effects and postcolonial conservation methods and the ongoing exclusion of indigenous ecological knowledge. The study investigates the political ecology and historical development of human-wildlife conflict in Assam while focusing on traditional ecological knowledge and ethical systems used by indigenous groups which include the Bodo Mising Karbi and Adivasi Tea Tribe communities. Our research demonstrates that centralized technocratic conservation methods have destroyed traditional systems and territorial rights which resulted in the loss of local wildlife coexistence methods. We suggest that conservation should adopt participatory methods together with community-based strategies which respect indigenous rights while combining traditional ecological knowledge with policy development and establishing partnerships for shared governance. The study shows how self-regulating adaptive systems function properly when their design matches the particular requirements of the region. The synthesis helps to decolonize conservation discussions while it develops fair methods for coexisting with wildlife in areas that contain high biodiversity.

Keywords: Human-wildlife conflict HWC Political ecology Traditional Ecological Knowledge TEK Indigenous governance Decolonizing conservation

1. Introduction

Human-wildlife conflict (HWC) in Assam, located in northeastern India, has intensified over recent decades because of habitat fragmentation and agricultural expansion and the complex legacies of colonial and postcolonial conservation policies. The Asian elephant (Elephas maximus) and one-horned rhinoceros (Rhinoceros unicornis) and Bengal tiger (Panthera tigris) represent Assam's distinct megafauna which exists alongside indigenous groups that depend on the region's forests and floodplains for

their cultural and economic existence. Contemporary conservation dialogue treats HWC as an engineering challenge which needs technical solutions through boundary establishment and compensation programs and protected area exclusion yet it fails to acknowledge indigenous peoples' ecological understanding and ethical principles and their indigenous land rights.

This paper uses political ecology to show how power dynamics and historical events and governmental systems shape HWC results in Assam. We showcase the traditional ecological knowledge (TEK) and indigenous ecological ethics of Bodo Mising Karbi Adivasi (Tea Tribe) communities because their knowledge about their local environment has been ignored by conservation organizations. The loss of traditional institutions and territorial rights has disrupted established human-wildlife management systems which have existed for many years thus leading to increased conflicts.

We propose that participatory conservation and community-centered approaches grounded in indigenous rights recognition and TEK integration through policy frameworks and collaborative governance structures create better pathways for achieving equitable results and effective coexistence. The interdisciplinary synthesis enables decolonization of conservation discourse while developing methods which protect both biodiversity and human dignity.

2. Background and Theoretical Foundations

2.1 Political Ecology of Conservation in Assam

Political ecology examines the connections between political and economic and social elements through their effects on environmental change since power determines who can access resources and environmental knowledge and conservation results. The political ecology of conservation in Assam exists as a complex system which connects colonial history to postcolonial state development and the global conservation movement's fortress conservation approach through which protected areas restrict human access and resources.

The period from 1858 to 1947 saw colonial powers in India create forest reserves and commercial logging operations and game reserves that showed preference for British hunting and timber operations which resulted in changes to both natural environments and how people interacted with animals. Elephants, which had been present in local traditions and daily life, became controlled by European powers who established central management systems that excluded local ways of life [2]. The Indian state after colonial rule adopted this system which they developed into national parks and wildlife sanctuaries through the Wildlife Protection Act of 1972. The initiatives designated to safeguard endangered species resulted in the forced removal of indigenous peoples and the

outlawing of their traditional resource practices and the creation of military operations to protect conservation areas [7].

In Assam, Kaziranga National Park and other protected areas face widespread conflict because of conservation needs and economic demands from local communities. Kaziranga security forces use shoot-on-sight procedures against people suspected of poaching which creates a military environment that protects wildlife but causes problems for nearby residents [7]. The political-ecological situation explains why technical solutions to environmental issues do not work because they fail to solve the fundamental problems which lead to conflicts over land and governance and local control of resources [1], [2].

2.2 Indigenous Ecological Ethics and Traditional Ecological Knowledge

Indigenous ecological ethics describe the ethical systems which indigenous communities utilize to establish their connections with nature. Indigenous peoples establish their ethical systems through three core principles which exist in their cultural beliefs: the people share all things with others and need to protect nature for their future descendants. The body of traditional ecological knowledge (TEK) includes all the knowledge and practices and beliefs which indigenous peoples in different regions have developed through their direct experience with nature across many generations.

The indigenous ecological ethics and TEK framework establishes alternative methods to research and control human-wildlife interactions which occur during HWC events. Many indigenous cultures believe that animals share the same space with humans because they see animals as their living relatives and their community members and their community members who exist in their shared environment. The existence of these viewpoints helps people to live together peacefully because it creates understanding and acceptance and enables them to develop ways which protect both wildlife and their way of life [1].

The conservation policy needs to include TEK but epistemological hierarchies which favor Western scientific knowledge and organizational systems which give power to select people and historical land dispossession events which have diminished indigenous control of their land and resources have obstructed this process.

3.Environmental History of Human–Wildlife Conflict in Assam

3.1 Precolonial and Colonial Elephant Management

The environmental history of human-wildlife relationships in Assam establishes a continuous pattern of peaceful coexistence which faces interruptions during times of heightened conflicts that occur when political and economic systems undergo transformation. Ethnohistorical research identifies parallel systems of elephant

management: centralized, state-sponsored systems associated with imperial authority, and localized, community-based practices in which elephants were embedded in livelihoods, ritual, and identity[2]

The people of precolonial Assam found elephants to be both culturally and economically significant. Indigenous groups developed extensive observational expertise about elephant behavior and seasonal patterns and their needs for specific environments which allowed them to live in harmony with elephants without causing harm to their agricultural fields or their people. The systems of natural resource management which existed before colonial rule faced destruction because the colonial authorities established forest reserves and allowed commercial logging to occur and they introduced centralised systems for managing wildlife. The British colonial administration prioritized timber extraction and the establishment of game reserves for hunting which resulted in the military Australian land claims and the traditional practices of indigenous people using resources[2] .

3.2 Postcolonial Conservation and Territorial Dispossession

The postcolonial era marked two developments in Assam which included expanding protected areas and establishing fortress conservation as an institutionalized practice. The Kaziranga National Park of 1974 and Manas National Park of 1990 and various wildlife sanctuaries were created to safeguard endangered animal species. The conservation initiatives resulted in displacing native people and forest-dependent groups who lost access to traditional resource rights while their everyday activities of grazing and fishing and non-timber forest product collection became illegal.

Ethnographic and historical accounts trace socioecological ruptures displacement, deforestation, and colonial/postcolonial land-use changes that reconfigured landscapes and intensified encounters between people and elephants, thereby undermining customary access and practices [1], [2]. The expansion of tea plantations and agricultural settlements and infrastructure development efforts created multiple areas where elephant habitats became disrupted, which forced elephants to move nearer to human settlements, which resulted in increased instances of elephants damaging crops and property and causing injuries to people.

The militarization and securitization of iconic parks creates exclusionary narratives which present wildlife protection as their main focus while treating nearby communities as criminals or marginalized groups, which creates difficulties for local people who want to defend their territory and access to resources [7]. The political-ecology dynamics demonstrate that conservation initiatives lead to dispossession and marginalization practices which create HWC problems that intensify instead of solving them.

4. Indigenous Communities and Their Ecological Worldviews

4.1 Adivasi (Tea Tribe) Perspectives on Elephant Coexistence

The Adivasi people known as the Tea Tribe descend from workers who were brought to Assam during British colonialism to work in tea plantations. Adivasi communities have developed detailed ecological knowledge and place-based values which enable them to live close to elephants despite their historical marginalization and socioeconomic challenges. Recent ethnographic research documents Adivasi worldviews that frame elephants as socially meaningful actors and emphasize empathy, shared marginalization, and cohabitation rather than exclusion [1].

The Adivasi people present their stories about elephants which demonstrate their understanding of elephant behavior through seasonal movements and feeding patterns and human interactions. Community members use their observational knowledge to predict elephant movements which they follow by implementing adaptive methods such as changing their agricultural timings and using noise and fire to scare away elephants and monitoring their activities during dangerous times. The Adivasi people view shared marginalization with elephants because both groups face land dispossession and habitat destruction and conservation practices that exclude them from protected areas [1].

The empathetic approach to framing people develops into a complete contrast with conservation methods which focus on technical solutions because these methods see elephants as issues that require management through barriers or compensation solutions. Adivasi ecological ethics demonstrate that coexistence between communities and their environments can exist when communities gain control over their territories and their knowledge receives acknowledgment and conservation policies address the fundamental causes of conflict instead of treating its immediate results [1].

4.2 Bodo, Mising, and Karbi: Gaps in Documentation

The existing literature presents extensive Adivasi documentation, yet the provided sources fail to establish links between particular documented customs and environmental practices of the Bodo Mising and Karbi groups. The research shows how conservation research studies suffer from two issues which result in both marginalization and underrepresentation problems. The Bodo Mising and Karbi indigenous groups in Assam maintain their unique cultural traditions through different languages and customs which define their native lands. The communities have extensive traditional ecological knowledge about forest management and animal behavior and sustainable resource practices according to both anecdotal evidence and policy reports, but there is not enough systematic ethnographic research to document their knowledge. Researchers must work directly with these knowledge holders by using collaborative methods which protect

intellectual property rights and allow communities to share their knowledge with others through documentation and distribution processes.

4.3 Religious and Cultural Dimensions of Tolerance

Community attitudes towards wildlife conservation and human-wildlife coexistence depend on religious and cultural beliefs which determine how people interact with animals. The local communities at Pobitora Wildlife Sanctuary and Kaziranga National Park link elephants to the Hindu deity Ganesha, which gives elephants sacred status and leads to mating protection. The one-horned rhinoceros links to religious traditions and environmental sustainability principles which increase tolerance toward wildlife and create methods for people to either avoid or move animals away from their area.

The religious organizations establish cultural foundations which enable different groups to live together peacefully and use this foundation to create environmental protection regulations. Communities can develop stronger backing for environmental protection when they implement conservation programs which include religious customs and purpose-driven educational activities that teach the spiritual importance of wildlife to their inhabitants. Conservation methods need to use adaptive and participatory approaches because religious and cultural beliefs change based on different situations.

5. Conservation Models Today Fail to Include Indigenous Knowledge People

5.1 Contemporary environmental protection methods

In Assam use engineering solutions which treat human-wildlife conflicts as technical problems which engineers can solve through their expertise. The common methods of intervention include using electric fencing and trenches as physical barriers and creating compensation programs which address both crop losses and human injuries and implementing translocation and culling methods to control problematic wildlife. The measures provide temporary solutions but they fail to recognize the historical factors and local values which determine human interactions with wildlife [1].

Technocentric systems use centralized power to make decisions while they restrict local input and depend on outside specialists for assistance. The system selects measurable results as its main concern which leads to an exclusion of non-measurable aspects, including local knowledge integration and community empowerment and social equity. The programs do not succeed in resolving the fundamental causes of conflict because they follow habitat destruction and land theft and the breakdown of traditional leadership systems [1],[2].

The analysis of Assam conservation projects shows that official policies together with limited community involvement create barriers which prevent local residents from taking part in conservation efforts because government regulations and centralized control systems dominate their work activities [5]. While compensation programs offer monetary support to victims they cannot bring back lost work opportunities or help victims who experience psychological distress from ongoing wildlife encounters. Electric fencing shows some success in preventing crop damage at particular sites however it fails to control the complete environmental factors which attract elephants into farming zones.

5.2 Militarization and Securitization of Protected Areas

The security measures together with military operations which protect Assam's national parks especially Kaziranga National Park create an exclusive conservation system that protects natural resources. Kaziranga has achieved worldwide recognition for its successful protection of the one-horned rhinoceros because this achievement brings major threats to local communities. The park uses armed personnel who possess shoot-to-kill power against suspected poachers which has led to multiple cases of illegal killings and violations of human rights [7].

The military strategy creates an atmosphere which makes people afraid and keeps them out of protected areas because officials treat local residents as dangerous elements who might harm wildlife instead of viewing them as conservation partners. The authorities have designated indigenous people and forest-dwelling communities as criminals who depend on park resources for survival while they face eviction and violent punishment from law enforcement. Conservation practices that rely on security measures create an environmental framework which upholds colonial and postcolonial beliefs which depict indigenous groups as primitive and detrimental to ecological preservation [7].

The conservation activities at Kaziranga National Park have lost their social acceptance through military operations while their peace has been lost with local communities who worked to conserve it.

5.3 Erosion of Traditional Institutions and Territorial Rights

The process of indigenous conservation perspectives becoming marginalized begins with the decline of traditional institutions and territorial rights. Local governance practices, which include village councils and clan resource management and spiritual leadership, have historically managed human-wildlife interactions through their power to control resource use and solve disputes and preserve community harmony. The colonial and postcolonial state-building activities have systematically dismantled these local systems by implementing centralized bureaucratic structures, which fail to address the specific requirements of local populations and their environments.

The loss of territorial rights affects indigenous communities because their identity and their way of life and their traditional ecological knowledge depend on their connection to specific territories. People have lost the ability to connect with their ancestral lands because of displacement and resource use limitations and the establishment of protected areas which occurred without community agreement, which has led to the destruction of both TEK and indigenous ecological ethics connections between people and their environment.

The political-ecology dynamics show that compensation payments and technical solutions cannot resolve the problems because they do not address the essential land and governance rights and location-based authority rights which determine how conflicts will end. HWC management needs both technical solutions and the restoration of indigenous territorial rights and the acknowledgment of traditional governance systems and the establishment of legal and institutional frameworks which empower indigenous people to manage conservation efforts.

6. Comparative Governance Systems: Lessons from Autonomous Infrastructure

The concept of adaptive governance, which responds to local needs, is demonstrated through our analysis of autonomous calibration systems that operate in wastewater treatment facilities. Use Scispace Deep Search on multi-agent reinforcement learning for total nitrogen in full-scale wastewater treatment plants [1]. The autonomous calibration systems establish new treatment settings by monitoring incoming wastewater patterns, which enables intelligent systems to operate their water treatment facilities without operator intervention, according to their design.

The technological demonstration brings a valuable comparison that explains how community-based conservation governance systems function. The wastewater treatment plants use autonomous calibration systems to adjust their treatment processes according to the local environmental conditions and their actual sewage flow and contamination levels, which allows them to operate without needing outside help, while community-based conservation systems depend on local communities to use their power and resources and understanding to manage their natural resources.

The main finding about autonomous infrastructure systems shows that effective governance needs to respond to local conditions while developing adaptive abilities and using real-time feedback systems. Wastewater treatment requires facilities to monitor incoming water quality throughout the treatment process because this helps them achieve optimal nitrogen removal and other operational goals. Conservation efforts require people to understand that HWC exists as a changing current matter which needs different solutions instead of one standard rule or centralized control. HWC management needs

governance systems which exist within specific local environments and which people use to meet their needs while dealing with environmental and social changes.

The comparison illustrates how independence and self-governance hold great value. The design of autonomous calibration systems lets them operate without needing continuous outside control because they use their internal sensors and algorithms and feedback systems to ensure they remain functional. Community-based conservation systems become successful when communities control their land through secure land tenure and the legal acknowledgment of their governance rights and access to resources and technical assistance. Community-based governance allows conservation policies to use local knowledge and community relationships which build resilient social networks for long-term survival.

7. Participatory Conservation and Community-Centered Approaches

7.1 Documented Community-Based Initiatives in Assam

The existing conservation systems rely on technocentric methods which exclude people from their implementation yet Assam has established participatory methods which involve local communities to implement traditional ecological knowledge together with their existing administrative authority. The Manas region Golden Langur project established local non-governmental organizations together with village Forest Committees and village-based Forest Protection Forces which helped to establish protection systems that decreased illegal logging and poaching while increasing local participation in langur habitat conservation. The initiative demonstrates that community-based governance structures can use local knowledge together with social networks and collective action to achieve conservation results which benefit both wildlife and human populations.

The Manas region implemented regional awareness campaigns together with Self Help Groups and community protection forces which enhanced community forest protection duties while reducing habitat destruction. The local religious beliefs and environmental ethics of the area surrounding Pobitora Wildlife Sanctuary established a tradition of peaceful coexistence between humans and rhinos in their natural habitat which demonstrates how cultural values can work together with official protective measures. The elephant conservation project in Assam demonstrates that various parties and indigenous methods together with local knowledge should become essential components of everyday management processes instead of depending on outside technical solutions. The villagers who live near Kaziranga National Park use their traditional drive-away techniques while they demand active solar fencing and compensation systems that enable farmers to take part in their implementation.

The combination of participatory governance and local institutions together with their protection of traditional ecological knowledge creates a system that reduces conflicts and aids conservation when policies allow communities to participate and they acknowledge past land loss.

7.2 Integrating TEK into Policy Frameworks

Conservation organizations must adopt new scientific beliefs and organizational methods and new power dynamics to establish TEK as a core element of their conservation efforts. Key principles include: recognition of TEK as legitimate knowledge on par with Western scientific knowledge; co-production of knowledge that involves communities in all stages of research, planning, and implementation; legal and institutional recognition of indigenous rights to land, resources, and self-governance; capacity building and resource support for community-based conservation initiatives; and adaptive management approaches that allow for experimentation, learning, and adjustment over time.

7.3 Legal Recognition and Territorial Rights

Effective participatory conservation requires that indigenous territorial rights receive legal acknowledgment. The Forest Rights Act of 2006 in India establishes legal rights for forest-dwelling communities to manage and safeguard their forest resources. The implementation process has faced challenges because communities encounter bureaucratic barriers while forest departments and conservation authorities show opposition to their needs.

Authors argue that utilizing place-based cohabitation systems together with establishing official recognition of local rights will enable HWC organizations to develop fair and operational solutions [1], [2]. The system needs legal changes together with institutional shifts and ongoing skill development for community groups and methods for ensuring accountability while resolving violations of rights. The United Nations Declaration on the Rights of Indigenous Peoples and the Convention on Biological Diversity both establish international standards that stress the necessity of indigenous rights together with their role in conservation efforts.

8. Discussion: Toward Coexistence and Resilience

8.1 Political Ecology and Indigenous Ethics Synthesis

The combination of political ecology with indigenous ecological ethics creates a strong framework which helps people understand and solve HWC problems that exist in Assam. Political ecology examines how power dynamics together with historical events and government systems determine the results of conflicts while demonstrating how

indigenous communities face disadvantages because of colonial pasts and postcolonial national development and international conservation practices. Indigenous ecological ethics provide people with different ethical systems together with workable methods that help control human-wildlife interactions through their focus on reciprocal relationships and family ties and responsibilities based on specific locations.

The effective HWC management needs to handle the two parts of conflict which include both habitat loss and land dispossession and socioeconomic inequality and indigenous knowledge and governance systems that not yet included in current institutional practices. The solution requires organizations to stop relying on technocentric mitigation solutions and start using participatory conservation methods which protect indigenous rights and combine traditional ecological knowledge with government regulations and establish shared decision-making systems.

The concept of coexistence emphasizes the need to move beyond zero-sum framings of conservation versus development or wildlife versus people. Humans and wildlife share the same landscapes according to coexistence which requires conservation efforts to consider both human needs and wildlife needs. Resilience defines how socialecological systems handle disturbances while maintaining their core functions and distinct identities through their ability to adapt. The process of building HWC resilience demands two essential actions which include developing adaptive capacity in communities together with ecosystems and establishing governance structures that respond to community needs through flexible and inclusive approaches.

8.2 Challenges and Future Directions

Participatory conservation shows potential but it encounters difficulties because of power disparities and limited resources and different community needs and unpredictable environmental conditions and opposing values and interests. Research should focus on documenting Bodo Mising and Karbi traditional ecological knowledge through ethnographic research and studying participatory conservation projects over time and analyzing political ecology processes in conservation governance and conducting intersectional research on human-wildlife conflict and examining how climate change affects human-wildlife conflict patterns.

9. Conclusion

The human-wildlife conflict problem which exists in Assam requires more than technical solutions that include barriers and compensation and enforcement. The situation represents a complex ecological crisis which originated from colonial systems and postcolonial conservation methods and the continuous oppression of indigenous ecological knowledge and land rights. This study analyzed the political ecology and

environmental history of human-wildlife conflict in Assam while showing Adivasi Tea Tribe communities' indigenous knowledge and ethical principles and Adivasi Tea Tribe communities' knowledge gaps about Bodo Mising and Karbi peoples' traditional practices.

The present conservation models which use technocentrism, militarization and exclusion as their basis have destroyed traditional institutions while they have also damaged the traditional methods which enabled people to live together with wildlife in their local environments. Our research shows that community-based conservation programs which operate in Assam should establish indigenous rights recognition as their foundation while they need to include traditional ecological knowledge and three-party governance systems to achieve better results and sustainable growth. The autonomous calibration systems of wastewater treatment systems create a fundamental principle which shows that effective governance needs to adapt to local conditions while it needs to develop capacity for change and use instantaneous feedback. Community-based conservation systems need to empower communities with governing rights through resource distribution and knowledge access just like autonomous water systems function properly when they use local conditions to operate without needing outside assistance. The conservation policies in Assam and other regions need to shift from fortress conservation toward participatory conservation while they should use holistic socioecological methods instead of technocentric mitigation and create systems which enable people to coexist with each other. The process needs technical and institutional changes together with ethical and epistemological changes which must eliminate colonial systems while they acknowledge indigenous rights and empower people who have lived with wildlife through many generations.Only through true transformation can we build conservation systems effective for biodiversity, while simultaneously dignifying human justice and rights.

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Chapter 34: Digital Carbon Credit Aggregation Platform for MSMEs

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Abstract

Micro, Small, and Medium Enterprises are the keystones to the industrial economy in India, but they have a very pronounced low involvement in the carbon credit markets regardless of its high contribution to the emission reductions. This paper explores the ways in which an integrated carbon credit trading window will address the basis of the challenges faced by MSMEs in obtaining carbon credit markets. The paper suggests using digital system of aggregation of carbon credits, which would include several MSMEs so that the economics of entering the market would be changed. It shows that a combined trading window is capable of opening the path to sustainable revenues to the smaller units, creating a clean energy implementation, and significantly enhancing the goals of Environmental, Social, and Governance. The results suggest that by transferring the costs of verification to the groups of participants instead of charging every individual them, the MSMEs with relatively small emission-reducing capacities can enter the market and make profits.

Keywords: Carbon credits; MSMEs; aggregation platform; ESG; carbon markets.

1. Introduction

The purpose of the paper identifies the major barriers to entry of Indian MSMEs into carbon credit markets as high verification fees, minimum volumes, and varying documentation levels that lock out MSMEs even though this group has large potential in reduced emissions. By proposing a digital aggregation platform and unified trading window, it demonstrates how pooling small-scale reductions can slash per-unit costs, automate processes, and enable direct market access for sustainable revenues. International endeavors to curb climate change are increasingly relying on a market-based approach which offers financial incentives to curb the emission of greenhouse gases. A typical example of such approach is carbon markets, which are led by Clean Development

Mechanism and Article 6 of the Paris Agreement [1]. Those markets enable those entities which have reduced their emissions to levels lower than stipulated values to sell credits reflecting their performances. A carbon credit represents one metric ton of carbon dioxide equivalent that has been prevented or eliminated in the atmosphere. Companies that exceed their emissions quotas can buy credits so as to compensate their carbon footprints thus by hypothetically leading to a win-win situation where reduction of emissions is to be made wherever it will be most economical. However, the functioning of carbon markets is a more complex reality. Though the large institutions and utility scale renewable energy project are involved and gain their benefit, sixty million Micro, Small and Medium Enterprises (MSMEs) in India are mostly left out of the markets [4].

Carbon credits would help increase returns on investment of clean-energy projects and this may hasten the uptake of such investing. This is a significant failed market in the area of sustainability. On the issue of ESG, there has been an increased understanding of how we should act in a more inclusive way on climate change issues whereby the gains go around the society in a fair and equitable way, as opposed to the benefits benefiting the already advantaged members. Carbon markets that marginalize most enterprises and claim to offer an incentive in the minimization of emissions fail to meet the ESG standards. Carbon markets that do not cover most of the businesses but claim to induce a reduction in the emission do not fit in the ESG requirement; the social aspect of the ESG requires that the small companies and underprivileged people be assisted. Existing sets of carbon market designs go against both these principles.

The solution suggested in this research is based on the idea of a so-called carbon credit trading window, a digital market that would combine the emission reduction opportunities of many MSMEs and offer them a single marketplace where these small-scale suppliers and corporate buyers can find certified offsets. The platform addresses the problem of the minimum-volume threshold by pooling emission reductions. It reduces the paper work of documentation on individual enterprises by automation of the monitoring and reporting through digital means [2]. More importantly, direct market connectivity between MSMEs and corporate buyers removes the information asymmetry besides this, the buyers and sellers can also see the price ranges on displaying market-clearing prices, past price tendencies, volumes of transactions, and more. The application of these tools enables the two to arrive at improved decisions in purchases/sales made compared to using the quotes of the brokers or negotiated prices and removes the third-party facilitator that can otherwise make their fair value claim.

2. Carbon Credit Fundamentals

A carbon credit refers to an unwanted amount of carbon dioxide (CO_2) of one metric ton, or any similar amount, released during a specified period. Some of the activities that

can be used to create this kind of credits include renewable electricity generation whereby reliance on the traditional fossil fuel has been minimized; installation of energy-saving systems that will decrease the energy expenditure as compared to the past averages; use of fuels that are more environmentally friendly and sequestration of carbon dioxide through forestry programs. Compliance markets are also due to legal requirements that command individual entities to limit emissions or purchase offsets, such as the recently established Carbon Credit Trading Scheme in India, which sets intensity of emissions on the energy-intensive industries. In contrast, voluntary markets entail firms buying credits to meet internally stipulated sustainable goals, consumer expectations or to meet exportation requirements [3]. Both types of market are premised on similar underlying mechanisms such as measurement, verification and certification, but differ in the essential framework of governance.

There should be baseline setting when finding the quantum of carbon credits that can be assigned to a project. To create an imaginary scenario, a 100 percent renewable electricity solar rooftop installation would produce credits equivalent to the aggregate estimated CO_2 footprint of the same amount of conventional electricity that would have otherwise been generated in its absence. The advocates of a project should outline a baseline using officially accepted methodologies, which depend on the type and location of a project. After the adoption of the emission-reduction activity, the tracking systems capture the performance realized at any moment in time; the results are compiled into regular reports, which are submitted to a third party of independent nature to verify the results.

There are two forms of carbon market in the world. The compliance markets are a creation of government regulations that mandate some organizations to reduce the number of emissions or by acquiring offset. The recently introduced Carbon Credit Trading Scheme in India [3] is an example of this type of program where the industry with a strong intensity of energy usage is given a parameter to operate by voluntary markets, on the other hand, are where businesses, as a form of self-imposed sustainable practices, buy the carbon credits as an element of making their customers happy or even achieving their export markets.

Verification expenses work well in the case of large-scale businesses. Photovoltaic plant with capacity of 100 megawatts (capable of reaching hundreds of thousands of ton-equivalent of annual emissions reductions) can support pervasive verification protocol due to the resultant credit revenue far exceeding the verification expenses. This economic justification, however, cannot be said to apply to micro-, small, and medium-enterprise (MSME) actors. A small company that creates a few hundred tons of annual emission reductions may obtain small returns on carbon credits in the market at its current prices but its verification costs may eat up most of the income. This natural mismatch of

fixed verification costs and small volume of credits is a major economic harness which can effectively lock out MSMEs out of carbon markets.

The low limits of the volumes required by many registries compound this [6]. The reason some of these thresholds exist is partly to determine administrative efficiency processing registration and issues of tiny volumes of credit is work proportionate to environmental impact. Nonetheless, such efficiency considerations do not consider the aggregate potential of aggregating a large number of small sources.

This predicament is worsened by the minimum volume requirements made by many registries. Individual MSME decreases may seem insignificant but when both individuals are added together in a thousand units the impact to the accumulative level is worth attention, hence the need to re-examine threshold policies to be able to accommodate the small players.

3. The Role of Aggregation in Market Access

Instead of considering each enterprise as a separate project which deserves its own verifying, aggregation techniques bring many similar-type emission cutting projects together as pools, where collectives of such projects are verified. This apparently simple transformation changes the economics of being in the market overall.

Looking at the cost of verification alone denotes the value of aggregation. Under the traditional methods, auditors are required to travel to every project site, look into site-specific documents, check monitoring equipment availability and give personalized reports. In contrast, the cost of verification of a pool of fifty similar enterprises is added up, reduced perhaps by compact operations, by using standardized documents and by carrying out auditing using a sample, instead of at the location, which results in the cost per enterprise dropping dramatically. Such cost division makes the practice cost-effective to those firms which cannot afford to spend on individual verification cost [7].

A unit textile can give a low amount of emission cuts to meet the minimum credit issue requirements but fifty units of textile will easily exceed these levels without any problem. The pooled volume methodology allows registries to work out with large volumes of credits allowing that credit to be made available with individual enterprises still being allowed to take part in a relative proportion of the actual reductions they make.

Other than economic gains, there are ancillary gains of aggregation. Verification is made easier by standardized methodologies in similar businesses that enable auditors to focus on profound knowledge on particular types of interventions rather than is made more complex by various project settings. There is also improved quality control as when

the processes are used by all pools, the chances of deviations would be reduced. The concept of risk diversification is intrinsic, as an example, when similar businesses have standardized approaches, they can be easier checked as the auditors can concentrate on a deeper understanding of specific intervention approaches than on a case-by-case approach when each project was unique. This also improves quality control as all pools have standardized means by which they are controlled therefore reducing chances of inconsistencies in that, the performance variation among individual participants is reduced by simply being a part of large pools.

However, aggregation itself has some challenges. The process of fair allocation should create a scenario whereby every enterprise is given a fair proportion of credits with respect to its contribution thus avoiding the negative impacts of aggregation structure. The prevailing governance systems need to be transparent when sensitive enterprise data is shared through the aggregation systems, issues of data security and privacy arise to a priority. The issues can be handled with the correct design of the platform, however, they must be addressed clearly and not automatically addressed and build confidence in the process, which benefits the participants, and not just the intermediaries. The quality assurance procedures should ensure that non-optimal performers do not provide a bad image of the whole pool. Moreover, the issue of data security and privacy attains utmost importance when the sensitive enterprise information is relayed over the aggregation frameworks.

4. Trading Window Model

The trading window is a type of market interface where aggregated MSME carbon credits meet the corporate demand. Although aggregation processes may alleviate constraints in the supply side of the economy pertaining to credit creation, the trading window also includes demand-side constraints by creating some fair and efficient connection between suppliers and purchasers of credit. Even though such brokers prove to be invaluable, they also create high transaction costs to MSME-generated credits entering the markets through aggregation platforms, which highlights the point of the need of a straighter forward method.

An efficient trading window has a number of functionalities. First of all, it brings about transparency since it lists the available carbon credits and other relevant characteristics- such as vintage, verification standard, geographic origin, sector and project type. Corporate buyers have been able to browse the site like any other commercial products, with filters being specified according to express preferences or needed requirements. Secondly, the trading window standardizes the transactions through template contracts the parties would not have to negotiate everything and start at the bottom and negotiate each minor detail, but they would select the list of predetermined

options of possibilities of the pricing mechanisms, delivery time, documentation needs and risk-sharing. The standard agreements used reduce the costs of transactions involved to a great extent, and the balance is maintained by the parties involved supplier and buyer in the creation of the balanced terms which outline the terms in a clear but allowable flexibility. Instead of opening up negotiation table on each minor detail, the parties choose in a catalogue of already existing alternatives on definition of pricing mechanisms, delivery schedule, documentation requirements, and risk sharing. Thirdly, the site provides the quality assurance by showing the verification credentials, audit reports, and performance histories. This openness enables the credits provided by MSMEs to compete with those provided by larger projects because of similar levels of stringency applied during the verification processes.

Application service providers coordinate movement of payments, credit transfer between registries and documents are generated using minimum human supervision. The transaction of credits between Z platform accounts into buyer accounts, and the distribution of revenue among MSMEs likely gatherings as revenue-sharing formulae are automatically initiated with the confirmation of payment made by a purchaser, with both systems causing money transfers to occur between accounts simultaneously. This automation reduces delays, eliminates mistakes, and ensures revenue disbursement to all parties in time.

Lastly, the trading window is a marketplace and at the same time a market maker that provides liquidity which would otherwise not exist and removes friction in the process of connecting buyers and sellers. This will enable MSMEs to interact in dimensions that would otherwise have been unproductive in traditional carbon market frameworks by lowering transaction expenses, enhancing transparency among participants and standardization of transaction protocols.

5. Sustainability and ESG Implications

When focused on the environmental perspective, the fact that micro- and small-enterprise (MSME), entities can be empowered to participate in carbon markets has numerous benefits. Direct emission abatements are those that come about the participating firms adopting clean-energy technologies and practices. Whilst there may have been this same sort of project without the presence of carbon-credit revenues, the improved economic feasibility allows interventions to be deployed sooner and be expanded in their application. Among the direct participants, there are demonstrative effects that are diffusive throughout MSME communities, it has been shown that extra sources of revenue could upgrade internal rates of return on the clean energy investments to a point where it

will change projects turn into marginal to appealing to the corporate decision making since successful cases motivate peer actors to take similar routes [5].

More importantly, aggregation strategies bring about mitigation possibilities that would otherwise be hibernated. The MSME sector in India is a large group of potential and actual emission abatement capacity but traditional carbon markets structures are not able to utilize it. Such avenues through which the industry can participate in and earn the benefits of these markets are bona fide additional as they would result in the environmental benefits that would not otherwise arise in the face of the present-day practices. The social aspect of ESG is more appeasing in aggregation-based trading windows. Financial inclusion is one of the social objectives in development. Formal finance barriers restrict the development and capacity of many MSME organizations in terms of growth and resilience. Carbon credit revenues are a testable source of revenues that allow building credit scores and allows companies to establish positive relationships with other traditional financial properties by engaging in different platforms. These inclusive effects are of particular consequence to those enterprises that are available in underserved or marginalized communities.

The idea of aggregation is ridden with equity considerations. The current carbon markets are skewed towards the cash benefits of large businesses and utility scale reduction incentive at the expense of smaller businesses which do not benefit but also play a role in abating the emissions. Aggregation platforms that serve deliberately MSMEs that are absent in the traditional markets can address the disparity in burden-benefit allocation, and can potentially create efficiencies due to its expanded engagement with the marketplace. The outcomes of employment and livelihood exist in various ways. Direct employment is created because sustained or increased operations of the enterprise, supported by an increased level of competitiveness. Platform designing should clearly presuppose gender equity because women-related businesses often face additional obstacles likewise, the aggregation platforms created in service to companies based in economically disadvantaged communities or based on underserved and oppressed communities may be social impact-oriented in addition to yielding beneficial environmental impacts to access to financial sources and markets. Aggregation efforts which focus on outreach especially those targeting women entrepreneurs and supply of customized capacity building and fair participation mechanisms can both promote gender equity and achieve Environmental Sustainable Development Goals (ESDGs).

On governance fronts, the demands of transparency and accountability, which are a required element to revive both social and environmental custodianship on the ESG guideline, are congruent with the infrastructural architecture of digital aggregation systems. Using block chain or similar transparent record-keeping systems to provide an audit trail of emission reductions, validation builds and the revenue allocation ensures that

stakeholders are more likely to trust it and remind that the benefits of utilizing the platform are distributed to final beneficiaries and not intermediaries. Credits acquired by means of MSME aggregation platforms are provided as added value to corporate buyers with an ESG objective; on top of compensating inventory emissions, the credits feature stories about supporting small business, improving financial inclusion, and justifiable development [9]. By presenting social co-benefits of their acquired carbon-credit in sustainability disclosures, marketing information, and in their stakeholder communications, firms can add to their corporate reputation beyond the mere issue of offsetting.

The aggregation of the trading windows with ESG-principles and its success final depends on the technical and economic viability of the aggregation mechanism and the further communication of its ancillary and more general values on a potential participant and buyer level. Corporate purchasers of credits raised in aggregation mechanisms enjoy magnified social returns that are related to inclusionary involvement. Based on this, investors and government officials should consider MSME aggregation platforms as a cornerstone to a range of sustainable development objectives, and not an isolated gateway to carbon markets.

6. Implementation Challenges

One major issue that comes with financial sustainability over the long term will require to have reached the scale in which transaction-driven revenue will be able to cover operation costs this brings up a classic chicken and egg dilemma. of aggregation platform is that the initial stages of implementation will require subsidization or grant funding to build the platform, create operational capacity, and subsidize first movers. The scale at which the operational costs are covered by the revenue on a transaction-based volume of transactions is required to be a long-term fiscal sustainability.

Close observation of the changing policies is vital to the achievement of regulation integration. The Carbon Credit Trading Scheme in India is still developing, and the exclusion criterion of the international voluntary market is subject to change, therefore the platform should be quite flexible to adapt its performance to the dynamic regulations; however, at the same time, there should be stability to allow those participants who appreciate predictability of the processes in their operations [8]. Early and active involvement in policy-making and standard-setting organizations can help to predict the possible changes and possibly shape the policy in line with aggregation strategies.

Successful platform development requires time, systematic efforts, sequencing of activities that entail the creation of platforms, investing in upstream capabilities then seek

to grow them swiftly, provide them a chance to learn and adapt as they go, and ensure that the needs and experiences of users are central to platform development.

7. Conclusion

This research paper looks at the potential of unified trading windows based on the principles of aggregation to eliminate the inherent barriers, prohibitive verification costs, complicated documentation demands, minimum volume requirement, and long verification process that bar MSMEs in carbon markets [11].

In terms of institutions, finance, and regulation, the circumstances, which are essential in determining successful application of the aggregate based trading window models, play a major role in defining their implementation. However, with the willingness of the stakeholders to establish aggregation platforms through considered tactics, patient capital and user-centric design, then these pitfalls can be avoided. The incorporation of carbon market access features into the existing MSME support programs potentially could take advantage of preexisting relations and eliminate the necessity to implement separate capacity-building programs [10]. The inclusive platforms will result in market development due to the demand-side policies requiring or promoting companies to source credits on inclusive platforms.

It is recommended that development institutions and potential operators of the planned platform foster trust by maintaining quality governance, taking reasonable investment in capacity building of the players, offering high service support, environmental soundness, fostering relationships with corporate buyers as vigorously as those with suppliers. The success is dictated by generating true value to both sides of the supply or demand instead of focusing on either aspect.

Incumbent adopters first position themselves as trailblazers of inclusive climate action and also have a competitive advantage in price [12].

However, the analysis on this case shows that it is not only possible but the potential value remains very huge. There is a chance to turn the carbon markets into the schemes of democratizing the climate financing, promoting the development of enterprises, and the attainment of a comprehensive inclusivity in environmental sustainability.

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Chapter 35: The cultural and traditional values of Mising tribal Community of Assam by practicing Sustainable livelihood.

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Abstract

The Mising Tribal community, the second largest indigenous group in Assam, India, is widely recognized for its profound relationship with nature and its sustainable way of life. Primarily inhabiting the riverine regions of the state, the Mising people have developed a resilient socio-cultural framework rooted in ecological knowledge, traditional values, and community-based livelihood practices. This paper examines the interrelationship between sustainable livelihood practices and cultural resilience within the Mising community. It explores how responsible use of natural resources, reliance on agricultural produce for religious rituals, and adherence to ancestral customs contribute to the preservation of their cultural identity. The study highlights the role of indigenous ecological knowledge systems in maintaining harmony between human life and the natural environment. Furthermore, the research analyzes the significance of traditional practices such as weaving and farming, which not only ensures economic sustainability but also reinforces cultural continuity. Despite the gradual influence of modernization, the Mising remains deeply anchored in its traditional values and cultural heritage, consciously limiting dependence on artificial and environmentally harmful inventions. By foregrounding the community's sustainable engagement with nature, this study underscores how the Mising people exemplify and indigenous model of development that prioritizes ecological balance, cultural authenticity, and intergenerational continuity.

Keywords: Mising Tribe, Traditional Values, Sustainable, Culture, Indigenous, Nature.

Introduction

The Mising Tribal community of Assam known for its humble livelihood is considered as second largest tribe in Assam, India. It also known as 'Miri" in the constitution of India (1). They are Mongoloid Tribe who inhabit in the riverine areas of Lakhimpur, Dibrugarh, Tinsukia, Sivsagar, Jorhat, Golaghat, Nagoan, Sonitpur and

Darrang districts of Assam. In Mising Tribal community, most of the people are cultivators rooted in nature. They are known for their kind personality and for retaining their tradition and culture in a sustainable way. The Misings worship *'Donyi Po:lo'* which translates to Sun and Moon. They have a strong belief that Sun and Moon are the supreme God on Earth. They offer prayers to the Sun and Moon, which shows the tribe's spontaneous connection towards mother nature. They are also known for using natural resources in their daily lives including housing, food, and culinary knowledge systems. Human beings have evolved over time with technology and progressing towards artificial advancements. However, the mising tribal community rooted in nature, even as they embrace technology as a part of their lives. In this World, traditional values are fading away, and cultural symbols are being replaced by the influence of dominant cultures. This phenomenon is indeed reflected in this tribe, where the onslaught of modernization and globalization has led to a blending of cultural identities. Nevertheless, many of the villagers continue to hold steadfast to their ancestral heritage, ensuring that their unique traditions and customs are preserved for future generations. In today's World, technology has become an overwhelming force that dominates human lives, often with harmful consequences for the environment. While it drives progress and innovation, it frequently exploits natural resources, contributing to various destruction of ecosystems. The Mising community recognized the dangers of environmental degradation early on and have consistently chosen a path of harmony with nature, avoiding actions that contribute to destruction. It shows their approach to sustainable living. The Mising community's spiritual connection with nature is evident in their reverence for the Sun and Moon as divine entities. Despite being exposed to various external religions, some Mising have adopted aspects of these faiths while remarkably retaining their indigenous practices. They have managed to preserve their traditional rituals at the forefront, seamlessly blending external influences with their ancestral customs. However, it should be noted that they have ensured their identity remains intact amidst external influences. Having said that, it is undeniable that the elders in the community have a profound impact on preserving their own roots. They have always priorities preserving traditions by avoiding any external disturbance; they have managed to safeguard their traditions, customs, values from erosion. This deliberate effort has enabled the community to maintain harmony and cohesion, allowing their unique identity to flourish. The elders' wisdom in striking a balance between and external modernity has been instrumental in preserving the Mising way of life. Moreover, the role of oral traditions and storytelling among the community is pivotal in preserving their cultural roots and collective memory. Through generations, elders have passed down myths and historical accounts, encapsulating the community's values and struggles. These narratives educate, instill moral lessons, and reinforce cultural identity. It is often accompanied by tadeonal music and dance, serving as a powerful medium for transmitting ancestral wisdom, ensuring the community's history and traditions remain relevant. By prioritizing their indigenous rituals, safeguarding their language, traditional values, cultural symbols and cherishing oral storytelling, they have

maintained a harmonious balance with nature. Their approach serves as a poignant reminder of the importance of cultural preservation and sustainable living, offering valuable lessons in adapting to change without losing one's roots. In a world, where dominant cultures often overshadow indigenous identities, the Mising community stands tall, challenging the hegemony by embracing their unique heritage. By keeping this close to nature and roots, they've shown their cultural values aren't just relevant but vital. In doing so, they have established a powerful narrative: that own culture matters, and in its preservation lies strength.

Literature Review:

1. Antonio Gramsci (2) in his book *Prison Notebooks (1935)* talks about the concept of 'cultural hegemony', where he explains how people who are in power maintain power through societal norms, values and beliefs. They basically imposed these norms through ideology and institutions, for instance: media, families, and religious institutions. He further explains that another sets of people who are in power but have a strong value must challenge the ruling class by practicing their own organic ideologies and traditional and cultural values. The Misings follow the same vein by challenging the dominant culture they have developed their own cultural values which might have gone extinct if they have not been practicing in their daily lives and activities.
2. Pahari Doley (3) in her article (2014) 'Changing Cultural Practices Among the rural and Urban Mising Tribe of Assam, India' presents the description of Mising Tribe of Assam and focuses on the problems and challenges faced by the tribe due to flood and land erosion. Her focus is on changing cultures among the tribes and conducting database research between both urban and rural populations. Moreover, she included data on a survey that was conducted in 2001 and 2002.
3. Jayanta Doley (4) in his article 'Folk Culture and Tradition of the Mising Community: A case study in Assam' (2015) examines the folk culture and traditions of the Mising community of Assam, highlighting their unique identity through festivals like Ali-Aye-Ligang and Po:rag, rich folk songs and dances, distinctive food habits, and spiritual beliefs centered on spirit worship called Uie. He observes that while the Mising have absorbed certain Hindu and Vaishnavite practices due to prolonged contact with mainstream Assamese society, they continue to maintain their core traditional customs and indigenous belief systems. However, Doley also notes that modernization, urbanization, and acculturation are increasingly eroding their traditional folk culture and way of life.
4. Jharna Morang (5) in her article ' A review on the social life of Mising Tribe in Assam'(2020) provides a comprehensive review of the social life of the Mising tribe of Assam, highlighting their identity as a riverine Mongoloid community whose traditional animistic beliefs, agricultural festivals like Ali-Aye-Ligang and

Po:rag, and unique marriage systems collectively define their rich socio-cultural existence. She observes that while modernization and the influence of Vaishnavism have gradually eroded several traditional rites and rituals, core institutions like the Kebang and Murong continue to serve as pillars of democratic governance and community unity.

5. Bhupen Gogoi and Meghali Chetia(6) in their article ‘ A study on Folk Culture of the Mising Community in North-East India’ (2020) examine the folk culture of the Mising community of Northeast India, noting that while their rich traditions of animistic beliefs, agrarian festivals, folk songs, and distinctive material culture remain significant markers of identity, the forces of acculturation, modernization, and prolonged contact with mainstream Assamese society have increasingly eroded these traditional practices, making their urgent documentation and preservation essential.
6. H Charah(7) in his article ‘ A Study on Mising Tribe’ studies the Mishing tribe of Assam, tracing their origins as hill dwellers of Tibeto-Burman stock who migrated to the Brahmaputra plains between the 12th and 13th centuries, and notes that their rich animistic beliefs, distinctive stilt houses, agrarian festivals, and weaving traditions collectively define their cultural identity. He observes that while the Mishing have largely maintained their traditions, increasing contact with mainstream Assamese society and the influence of Vaishnavism have gradually brought changes to their religious practices and way of life.

Methodology:

This research paper is based on books published by a particular society. This work is fundamentally dependent on articles and oral tales from local people from Mising Community.

Discussion:

In a World dominated by artificial inventions and modern architecture, the Mising tribe stands out for its steadfast reliance on natural resources. They continue to build their house using bamboo and wood, materials that have been integral to their culture for generations. The Mising tribal community holds a deep-rooted faith in *Donyi Polo,* a nature-based belief system that profoundly influences their agricultural practices. In accordance with this philosophy, they cultivate their crops entirely without the use of chemical inputs, instead placing their trust in the natural order and protective wisdom passed down by their ancestors. This ancestral knowledge governs how they preserve and nurture their seeds, reflecting a spiritual and cultural connection to the land that has endured across generations.

Uses of bamboo in building Mising Tribal House

Their traditional house is known as *'Sang Ukum'* which means bamboo house in English, is a testament to their harmonious coexistence with nature. This ecofriendly approach not only reflects their resourcefulness but also underscores their commitment to preserving the environment. Their approach to sustainable livelihood is deeply rooted in their harmony with nature. In various activities, including farming, they opt for products produced by nature, which serves as their ultimate solution for growing food. For instance, by choosing to use wooden ploughs instead of modern tractors, they minimize their reliance on fossil fuels and reduce their carbon footprint, contributing to a healthier environment. This traditional farming method allows them to maintain soil health, preserve biodiversity, and promote ecological balance. The use of natural products and tools is a testament to the tribe's resourcefulness and their commitment to living in sync with nature.

Art and Craft using natural resources

A significant and deeply cherished aspect of Mising tribal culture 8, 9)) is their rich and enduring tradition of art and craft, which is intimately intertwined with their daily way of life and cultural identity. The community demonstrates remarkable skill and creativity in crafting a wide range of functional items primarily from bamboo, a natural resource that is available in their surrounding environment. These handcrafted items serve a variety of practical purposes in everyday life, including harvesting paddy, picking vegetables, storing food, carrying agricultural produce, and numerous other domestic and agricultural activities that form the backbone of their subsistence lifestyle, handcrafted such as '*Korai', 'Epo', 'Do:la', 'Dukuli'* etc. What makes this tradition more beautiful is the inclusive and participatory nature of the craft making process, as both men and women actively engage in the creation of these bamboo products. This shared involvement not only strengthens the social fabric of the community but also ensures the knowledge, techniques, and skills associated with this ancient craft are passed down from one generation to the next, preserving the cultural heritage of the Mising people. Elders play a vital role in transmitting these skills to younger members of the community, ensuring the continuity of the invaluable tradition in the face of modernization and changing lifestyles. Beyond its profound cultural and social significance, bamboo craft also serves as an important and reliable source of livelihood for many families within the community. A considerable number of individuals and households generate a meaningful income through the sale of these intricately handcrafted products, both within their local communities and in border regional markets. For many families, the proceeds from selling bamboo crafts serve as a vital means of meeting their daily needs, supporting their children's education, and ensuring the overall economic wellbeing of their households. In this way, the tradition of bamboo craft not only preserves the cultural legacy of the Mising

people but also plays a crucial role in sustaining their economic resilience and self-reliance.

Use of natural resources in festivals and rituals

A remarkable testament to the Mising community's commitment to environmental sustainability is their longstanding practice of utilizing natural tree leaves in their daily lives, festivals, community gatherings, and sacred rituals. Among the most prominently used are the leaves of the takuk trees locally known as '*takuk anne*', as well as banana leaves, both of which hold significant cultural and practical value within the community. These leaves are employed in a variety of purposes, serving as natural plates, food wrappers, and ceremonial vessels during festivals, communal feasts, and religious rituals, seamlessly blending cultural tradition with ecological mindfulness. What is particularly admirable about this practice is that the Mising community has consciously and consistently upheld this tradition even in the contemporary era, at a time when the world is increasingly grappling with the devastating consequences of plastic pollution and the overreliance on artificial, non-biodegradable materials. By continuing to use naturally available leaves in place of plastic plates, disposable containers, and other synthetic materials, the Mising people have demonstrated a profound and unwavering commitment to sustainable living that many modern societies are only now beginning to recognize and aspire towards. This indigenous practice of replacing artificial inventions with naturally occurring, biodegradable alternatives is not merely an act of cultural preservation but also a deeply conscious and meaningful contribution to global environmental well-being. The deliberate avoidance of plastics and other harmful materials reflects a worldview that prioritizes harmony with nature over convenience and consumption. In doing so, the Mising community serves as an inspiring model of ecological wisdom and sustainable living, offering valuable lessons to the broader world about how deeply rooted cultural practices can play a transformative role in addressing some of the most pressing environmental challenges of our time. Their way of life thus stands as a powerful reminder that true sustainability is not a modern innovation, but rather an ancient philosophy that indigenous communities have practiced and preserved for centuries.

The Traditional Fireplace

One of the most fascinating and culturally significant aspects of Mising domestic life is their traditional fireplace, known as 'Meram,' which serves as the heart and soul of every Mising household. The Meram is carefully and skillfully constructed using mud, a natural and locally available material, and is thoughtfully surrounded by bamboo, once again reflecting the community's deep and enduring relationship with the natural resources of their environment. Far from being merely a functional cooking space, the Meram occupies a central and sacred place within the home, serving as a gathering point for family members and a symbol of warmth, nourishment, and togetherness that lies at the very core

of Mising domestic and social life. *Meram* is made of mud and surrounded by wood to protect the mud from falling and bamboo-crafted structures that are carefully arranged in different layers above the *Meram*. These elevated bamboo structures, known as *'Pe:rab'* and '*Rabbong*,' are skillfully handcrafted by members of the household and serve a variety of important practical purposes in daily life. The *Pe:rab* and *Rabong* are primarily used for drying and preserving fish, a dietary staple of the Mising community, as well as for storing and preserving a wide range of other food materials, agricultural produce, and household items. The gentle and consistent heat rising from the fireplace below creates an ideal natural environment for drying and preserving these materials, demonstrating a sophisticated and time-tested understanding of natural processes that has been refined and passed down across countless generations. The use of the Perab and Rabong above the Meram is a brilliant example of indigenous ingenuity and resourcefulness, as it makes optimal use of the available space within the household while simultaneously harnessing the natural heat of the fireplace for preservation purposes. This eliminates the need for any artificial or chemical-based methods of food preservation, further underscoring the Mising community's commitment to living in harmony with nature and avoiding reliance on modern synthetic alternatives. Every element of the Meram, from its mud foundation to its intricate bamboo framework, is sourced entirely from the natural environment, leaving minimal ecological impact and reflecting a way of life that is inherently sustainable and environmentally conscious. Beyond its practical utility, the Meram holds profound cultural and symbolic significance within Mising society. It is around this sacred fireplace; families gather to share meals, exchange stories, pass down ancestral knowledge, and strengthen the bonds of kinship and community. The traditions, rituals, and daily practices associated with the Meram are deeply embedded in the cultural memory of the Mising people and represent a living and breathing expression of their unique identity, heritage, and worldview. The continued presence and use of the Meram in Mising households today, even in the face of rapid modernization and changing lifestyles, is a powerful testament to the resilience of their cultural traditions and their unwavering commitment to preserving the wisdom and practices of their ancestors. In this way, the humble Meram stands not only as a fireplace but as a profound symbol of the Mising people's deep-rooted connection to their culture, their community, and the natural world that sustains them.

Fishing: a way of sustainable livelihood

From the very earliest days of their ancestral history(10), the Mising people have been intrinsically and inseparably connected to the practice of fishing, a tradition that has not only defined their cultural identity and shaped their way of life, but has also stood as one of the most enduring and powerful examples of sustainable living practiced by any indigenous community in the region. This deep and abiding relationship with fishing

traces its origins to the very moment when the Mising people first migrated from the hills and settled on the fertile plains of Assam, choosing to establish their homes and communities along the banks of the mighty rivers that gracefully wind through the landscape of the region. It was from this pivotal and transformative moment in their collective history that fishing ceased to be merely an occasional or supplementary activity and instead became the very foundation of their existence, serving as the primary and most reliable source of food, livelihood, and sustenance for the entire community. The rivers that bordered their settlements were not simply bodies of water to be exploited for human convenience, but were regarded as sacred lifelines, generous and living providers of nourishment, and irreplaceable elements of the natural world that the Mising people held in the highest reverence, gratitude, and spiritual regard. What is particularly remarkable about the Mising community's relationship with fishing is the profoundly sustainable way this practice has been conceived, conducted, and preserved across generations. Unlike modern industrial fishing practices that are characterized by overexploitation, environmental degradation, and the indiscriminate use of harmful chemicals and technologies, the Mising approach to fishing has always been guided by a deep sense of ecological responsibility, restraint, and respect for the natural balance of the river ecosystems upon which they depend. The community has historically relied on traditional, non-invasive fishing methods and tools that are crafted entirely from natural materials such as bamboo and other locally available resources, ensuring that their fishing activities leave the smallest possible ecological footprint on the rivers and the diverse aquatic life they sustain. This conscientious and measured approach to harvesting natural resources reflects an indigenous philosophy of living within the means of nature rather than exploiting it beyond its capacity to regenerate and sustain itself, a philosophy that modern environmental science is only now beginning to fully appreciate an advocate for on a global scale. As the generations passed and the Mising community grew and evolved, fishing remained an unwavering constant in their way of life, deeply embedded in the cultural consciousness of every man, woman, and child within the community. Unlike many traditional practices that have gradually faded or diminished in the face of modernization and changing socioeconomic conditions, fishing has retained its central and indispensable role in Mising society and continues to be a living and vibrant tradition in Mising villages to this very day. The sight of Mising fishermen setting out towards the rivers in the early hours of the morning, armed with their traditional fishing tools and guided by the knowledge passed down by their forefathers, remains a familiar and cherished part of everyday life in these communities, serving as a powerful reminder of the unbroken thread that connects the present generation to their ancient ancestors. This continuity of practice is itself a form of sustainability, as it ensures that the ecological knowledge, cultural values, and responsible attitudes towards natural resource management that have been developed over centuries continue to inform and shape the community's relationship with the rivers and the environment. Moreover, beyond its role as a means of sustenance and livelihood, fishing occupies a place of profound cultural,

spiritual, and social significance within the Mising community, and it is precisely this cultural embeddedness that has made it such a sustainable practice over the centuries. When a community fishes not merely for profit or commercial gain but out of deep cultural reverence, spiritual obligation, and communal responsibility, it naturally develops and adheres to norms and practices that prevent overexploitation and ensure the long-term health and productivity of the natural resource. It is a cherished and time-honored tradition for all the villagers to come together and participate in communal fishing activities during major festivals and auspicious occasions, setting aside their individual pursuits and uniting as one community in a shared act that is simultaneously practical, celebratory, and deeply symbolic. These communal fishing events are conducted with great care and reverence, following the customs, rituals, and ecological protocols that have been established and maintained by the community's ancestors, ensuring that the rivers are never overfished and that the aquatic ecosystems are given the opportunity to recover and replenish between fishing seasons. The seasonal nature of fishing further adds a rhythmic, cyclical, and inherently sustainable quality to Mising life, with the arrival of the fishing season being met with great anticipation, enthusiasm, and communal energy. The fact that the Mising community fishes according to the natural rhythms and seasons of the river, rather than engaging in year-round, indiscriminate harvesting, which reflects their sophisticated ecological understanding and their commitment to allowing fish populations to breed, grow, and replenish themselves naturally. When the season for fishing arrives, the entire community mobilizes in a spirit of collective participation, with members of all ages and backgrounds making their way to the rivers to engage in this beloved tradition. The knowledge of when, where, and how to fish is itself a form of invaluable indigenous wisdom and sustainable resource management that has been carefully observed, refined, and transmitted across generations, encompassing a deep understanding of river ecosystems, fish behavior, seasonal migration patterns, and the traditional tools and techniques that have proven most effective and least harmful to the environment over centuries of practice. This intimate and carefully cultivated knowledge of the natural world is a testament to the Mising people's extraordinary powers of ecological observation and their remarkable ability to live in a state of dynamic, respectful, and mutually beneficial harmony with their environment. The sustainability of Mising fishing practices is further reinforced by the community's traditional food culture, in which fish serves as the cornerstone of the daily diet and features prominently in most of the meals prepared in Mising households and villages. By centering their diet around locally caught, freshwater fish rather than relying on commercially produced, chemically treated, or industrially processed food products, the Mising people maintain a food system that is not only deeply rooted in their cultural identity but is also remarkably low in its environmental impact and carbon footprint. The various traditional methods of preparing, cooking, and preserving fish that have been developed and refined over generations speak to the depth and creativity of the community's relationship with this remarkable natural resource, with each method carrying its own cultural significance and reflecting the ingenuity of Mising

culinary traditions. From freshly caught fish prepared in traditional styles to dried and preserved fish stored using the natural heat of the Meram fireplace, every aspect of the Mising fish-based food culture is characterized by a minimal reliance on artificial inputs, chemical preservatives, or energy-intensive technologies, making it a model of sustainable food practice that holds valuable lessons for the wider world. In this way, the fishing tradition of the Mising people is far more than an economic activity, a means of obtaining food, or a cultural ritual, it is a comprehensive and holistic system of sustainable living that harmoniously integrates ecological responsibility, cultural identity, communal solidarity, spiritual reverence, and economic self-reliance into a single, unified way of life. At a time when the world is confronting unprecedented environmental crises, including the rapid depletion of freshwater resources, the collapse of aquatic ecosystems, and the devastating consequences of industrial food production, the sustainable fishing practices of the Mising community offer a profoundly important and timely reminder that indigenous communities have long possessed the knowledge, wisdom, and cultural frameworks necessary to live in true harmony with the natural world. Their enduring and living tradition of sustainable fishing thus stands not only as a source of immense cultural pride for the Mising people themselves, but also as an invaluable contribution to the global conversation on sustainability, environmental stewardship, and the urgent need to develop more responsible and regenerative relationships between human communities and the natural ecosystems that sustain all life on earth.

Conclusion:

In conclusion, the Mising tribal community of Assam presents a remarkable and living example of indigenous sustainable living that has been carefully preserved and practiced across countless generations. Through their unwavering faith in Donyi Polo, their use of natural resources to build houses, their nature-based belief system, the Mising people have cultivated a profound spiritual and cultural relationship with the natural world that has directly shaped and guided every aspect of their daily lives, from their chemical-free agricultural practices and seed preservation methods to their ingenious use of locally available natural resources. Their rich traditions of bamboo craft, the use of natural leaves such as *Takuk Aane* and banana leaves as alternatives to plastic, the culturally significant Meram fireplace with its traditional *Perab* and *Rabbong* structures, and their centuries-old practice of seasonal and community-based fishing all collectively reflect a holistic and deeply conscious model of living that harmoniously balances cultural identity, economic self-reliance, and ecological responsibility. These practices demonstrate that the Mising community has long embodied the principles of sustainability that the modern world is only now beginning to urgently recognize and pursue. At a time when the global community faces unprecedented environmental challenges, the indigenous wisdom and ecological practices of the Mising people offer invaluable lessons and inspiration. It is therefore essential that their cultural heritage and traditional knowledge systems are

documented, respected, and drawn upon as vital contributions to the global conversation on sustainability, environmental stewardship, and the collective responsibility of humanity to preserve and protect the natural world for generations yet to come.

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Chapter 36: The Efficacy of a Reparative Education Funding Model in Reversing Inter-Generational Inequality in the Sri Lanka Plantation Sector

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Abstract

Children in the Sri Lankan plantation sector, a historically marginalized region because of its colonial origins and economic structure, continue to face significant disparities in access to and quality of education, despite the fact that it is a fundamental right. The historical injustice and systemic neglect that the estate communities have endured are the direct causes of this ongoing educational inequality. Here, literacy rates a crucial development indicator, remain low, indicating underlying problems that jeopardize the development of human resources. Although the national education system disseminates knowledge, persistent issues like low school attendance and high dropout rates compromise its efficacy in the plantations. Since official statistics frequently hide this attrition, the full scope of educational exclusion is a serious social issue. The goal of this study is to determine redressal mechanisms and examine how the lasting effects of historical injustice affect students' current educational participation rates in a few chosen schools in the Nuwara Eliya district. To investigate this connection, the study uses a quantitative methodology. The central inquiry is: To what degree are modern historical systemic discrimination and underinvestment to blame for the high rates of school dropouts in the plantation sector? The study makes the assumption that the educational crisis is mostly a generational consequence of structural and historical inequality that has been made worse by current economic pressures. The systemic devaluation of estate labor (forcing early wage work or early marriage), lack of infrastructure, intergenerational poverty, and restricted access to higher education pathways are all seen as contemporary expressions of the past inability to fully integrate these communities. It is determined that only focused interventions that address the systemic causes of historical injustice rather than merely providing short-term financial respite can essentially stop the trend of excluding people from school. Some ideas are to set up a Truth, Reconciliation, and Investment Commission for Education in the estate sector, use a reparative education funding model, and create culturally sensitive, high-quality vocational and skill training programs.

Keywords: Historical Injustice, Systemic Inequality, Education, School Dropout, Plantation Sector, Inter-Generational Poverty

Introduction

The word ‘Education’ is derived from the Latin word ‘Educo’. It means to instruct or teach. Education is an abstract concept. It is a continuous and lifelong process that develops knowledge, skills, morals, and attitudes in an individual from birth to death. It is not just about learning theoretical facts. It not only improves the logical thinking of the individual, but also fosters personality development, but also leads to social revolutions. According to the UNESCO definition, education as the lifelong process of acquiring knowledge, skills, values, and attitudes through formal, non formal, and informal learning. It is considered a fundamental human right, a tool for sustainable development, and essential for eradicating poverty and building peace.

Education is one of the most powerful and transformative forces in human society. It can be described as the informal and formal learning undertaken by people of all ages globally, which develops and sustains their health, communities and economies. It assumes that education is “a fundamental human right and a common good that contributes to the development of the capacities of individuals, promotes social and economic development and fosters the unity of cultural values”. At a higher, more philosophical level, we can say that the educational process in civilization is not limited to what happens between schools – when fees are paid and teachers teach wherever education takes place, it is a continuous process in which people learn to adapt to the demands of life and whatever else is presented in their path.

A public institution of the individual, education involves personal development and public spending. hundred percent guaranteed inequality reproduces and transmits the culture of a given society, its conventions and lores. Education also functions as a means of social action to overcome structural inequality and provide life chances As an activity carried out by the individual, therefore, education both develops the brain, and forms moral character that is based on rational judgement As John Dewey expressed it in 1916: "Education cannot be preparation for living. Learning is life itself." Thus an educative experience is ongoing and unfolded continuously throughout the entire life of an individual**.**

The Communities of Nuwara Eliya Tea Estates

Education can be identified as a fundamental component of a country's progress and national development. Education is a fundamental right of citizens of a country. However, there are still various disparities in the access to education among citizens in different regions of Sri Lanka. When focusing on Sri Lanka, the overall literacy rate of Sri Lanka as of 2022 is about 92%, but it varies according to the districts. Various reasons such as historical, national, religious, ethnic, geographical, etc. have contributed to this.

Accordingly, this study focuses on the Nuwara Eliya district, which is the center of the tea industry in Sri Lanka, and it focuses specifically on students residing in tea estate communities.

These communities began during the colonial era when South Indian workers were imported to work in the plantations. They were first brought to Sri Lanka in 1823 for coffee cultivation. At that time, they worked as migrant workers in coffee plantations. Later, when coffee plantations were completely destroyed by a fungal disease, the British introduced tea cultivation as a plantation to Sri Lanka. Since the tea plant is a plant that needs to be maintained throughout the year, South Indian Tamil workers were brought in and settled by their families. However, they were not brought in on a formal basis and have been living as slaves since ancient times and have been working as laborers in tea plantations. They receive very low wages and live a very insecure life. They can also be identified as a marginalized group suffering from many inequalities such as low education, limited health facilities, and limited infrastructure.

Their living conditions are deplorable due to the low income and high cost of living, the high stress they face, and the fact that they are marginalized. Tea plantation workers usually live in line-rooms or houses provided by the estates. Many estates are physically isolated due to their remote, mountainous location. The lack of a good transport system, the long distances from the estates to cities, and the difficulty of accessing basic services such as high-quality schools and healthcare further isolate them from the system. A combination of historical deprivation, economic vulnerability, and geographical barriers that make learning challenging, estate workers' children are at high risk of dropping out of school.

The introduction of the Free Education Policy to Sri Lanka in 1945 has become a milestone in Sri Lankan history. The Free Education Policy has become a progressive step in ensuring right to education in Sri Lanka enabling the state to maintain a higher literacy rate in the South Asian Region. This enables the country to enjoy and maintain a remarkable progress of literacy rate in the South Asian Region with the level of literacy being 92 percent while the global literacy rate for people aged 15 and above is 86.3 percent. Even thought Sri Lanka records the highest literacy rate in the South Asian region, the educational standards in the plantation sector id still regressing. The legacy of the estate sector in Sri Lanka draws back to nearly 200 years. From the total plantation population, approximately 88.4 percent is Tamils whose religion is Hinduism and estate plantations are comprised of rubber, tea and coconut. But the tea plantation in the estate sector of Sri Lanka is more popularized.

Methodology

The Ministry of Education, Higher Education, and Vocational Education (MOE) and associated governmental organizations (such as the Department of Census and Statistics) provide official statistics, which are the sole source of secondary analysis used in this study's quantitative research design. This method, which focuses on data divided for the tea Estate Sector, is required to conclude the official, verified scale and trends of school dropout among students in Government Schools within the Nuwara Eliya District. This methodology is essential because it uses official government data, lending high authority and authenticity to the findings regarding the reported dropout rate. There are five educational zones in Nuwara Eliya district. Namely, Nuwara Eliya, Walapane, Kothmale, Hanguranketha, and Ambagamuwa ect. The data extracted from the official reports of the Ministry of Education, Higher Education and Vocational Education will be analyzed using Comparative Descriptive Statistics. This methodology is critical for fulfilling the study's objective of highlighting the extent of the educational inequality faced by the tea estate communities. For each year in the study period, the following descriptive statistics will be calculated across all comparative units,

> Average Annual Dropout Rate - Average percentage of school dropouts during the entire academic period.
> Grader Specific Dropout Rates - The school dropout rate is calculated by gender.
> Gender Inequality - Difference between male and female dropout rates within the Nuwara Eliya Estate Sector.

The primary limitation of this methodology is the reliance on reported data. Official MOE figures may:

- It is a problem that the official definition of 'dropout' (e.g., two months of absence) does not include those who attend school very irregularly and those who do not formally leave school.
- Statistics do not explain the reasons for dropping out of education, which can only be revealed through primary qualitative research.

Discussion

Only publicly available statistics from Sri Lanka's Ministry of Education, Higher Education, and Vocational Education (MOE), particularly the yearly School Census Reports, serve as the basis for the data used in the Comparative Descriptive Analysis. To capture current trends and the effects of national events (like the COVID-19 pandemic

and the ensuing economic crisis) on educational continuity, the study uses a two period time series of dropout rates by grade for Government Schools.

The following official MOE publications will serve as the basis for the analysis:

2) Dropout Rate by Grade 2019/2020. Information taken from Table 4.15 of the Annual School Census Report 2020.
3) Dropout Rate by Grade 2022/2023 Information taken from the Annual School Census Report 2023.

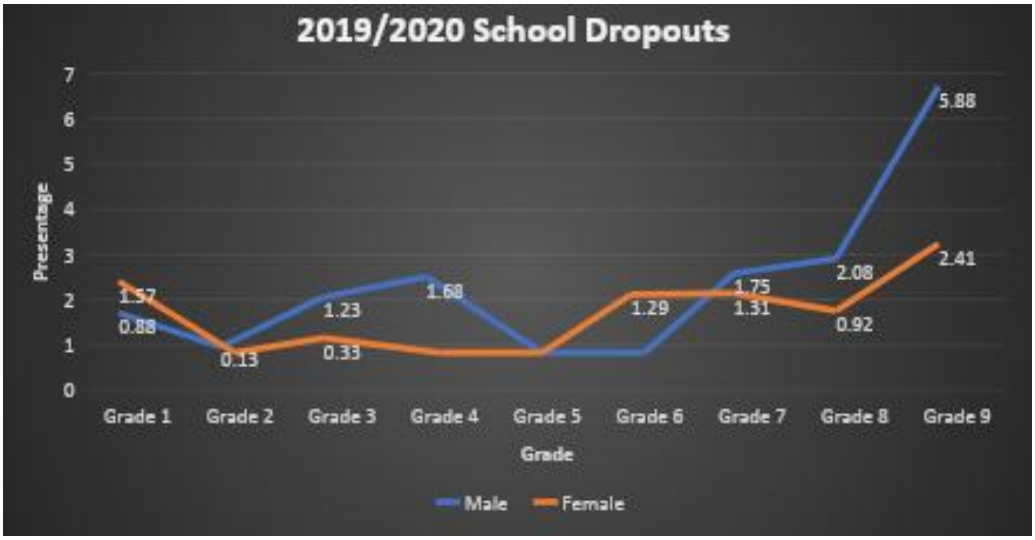
4.15 - Dropouts Rate by Grade - 2019/2020 (in Govt.Schools)

Province	District	Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 9	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Western	Colombo	0.65	0.00	0.00	0.32	0.00	0.63	0.54	0.00	0.00	0.00	0.89	0.00	0.08	0.00	0.97	0.00	1.63	0.90
	Gampaha	1.19	0.00	0.25	0.43	0.70	0.49	0.90	0.00	3.90	0.94	0.54	0.00	2.43	0.00	1.94	0.00	1.96	0.00
	Kalutara	0.00	0.00	0.49	0.00	0.00	0.00	0.21	1.21	2.40	0.01	0.53	0.00	0.29	0.60	0.93	0.67	2.37	0.00
	Total	**0.69**	**0.00**	**0.22**	**0.29**	**0.27**	**0.42**	**0.60**	**0.30**	**2.07**	**0.37**	**0.68**	**0.00**	**0.99**	**0.15**	**1.31**	**0.16**	**1.92**	**0.35**
Central	Kandy	0.18	0.00	0.00	0.46	0.88	1.01	1.06	0.00	1.57	0.00	0.56	0.36	0.93	0.58	1.08	0.51	0.28	1.58
	Matale	0.64	0.56	0.93	0.00	0.29	0.00	0.92	1.20	2.58	4.76	0.62	0.02	0.81	2.00	0.00	0.05	2.07	0.18
	Nuwara Eliya	0.88	1.57	0.13	0.00	1.23	0.33	1.68	0.00	0.00	0.00	0.00	1.29	1.75	1.31	2.08	0.92	5.88	2.41
	Total	**0.48**	**0.59**	**0.23**	**0.23**	**0.87**	**0.61**	**1.22**	**0.23**	**1.29**	**0.92**	**0.40**	**0.57**	**1.17**	**1.07**	**1.20**	**0.56**	**2.36**	**1.58**

4.15 - Dropouts Rate by Grade - 2022/2023 (in Government Schools)

Province	District	Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 9		Grade 10		Grade 1-10 Total Dropout Rate		
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Western	Colombo	0.76	0.75	0.00	0.03	0.22	0.42	0.98	0.66	0.00	0.00	1.34	0.53	1.67	1.50	2.22	0.65	3.39	0.31	4.69	2.62	1.67	0.79	1.24
	Gampaha	1.05	0.37	2.09	0.95	0.03	0.22	2.39	0.81	3.96	2.44	0.00	1.54	1.70	2.46	0.08	1.24	2.57	1.47	4.04	2.17	1.83	1.40	1.61
	Kalutara	1.30	0.72	0.00	0.00	1.02	0.00	0.66	1.90	5.77	1.49	1.85	0.80	1.28	0.41	1.62	2.15	4.08	1.09	3.66	1.70	2.16	1.05	1.61
	Total	**1.01**	**0.59**	**0.79**	**0.38**	**0.36**	**0.23**	**1.43**	**1.04**	**2.97**	**1.32**	**0.98**	**0.98**	**1.59**	**1.60**	**1.31**	**1.23**	**3.25**	**0.94**	**4.21**	**2.23**	**1.85**	**1.09**	**1.47**
Central	Kandy	0.20	0.00	0.00	0.00	0.27	0.00	0.00	0.15	1.20	1.17	1.98	0.27	0.76	0.92	1.70	1.02	1.10	1.05	3.57	1.93	1.09	0.67	0.88
	Matale	0.00	1.46	0.96	0.83	1.15	0.00	0.09	0.00	3.44	3.32	1.80	0.94	1.85	0.00	1.33	2.62	0.00	0.00	4.67	3.02	1.55	1.24	1.39
	Nuwara Eliya	1.37	1.41	0.00	0.00	0.61	1.91	0.00	0.00	0.10	1.57	1.92	0.60	3.08	3.31	4.78	1.38	7.64	2.05	7.94	3.25	2.76	1.56	2.17
	Total	**0.50**	**0.71**	**0.19**	**0.17**	**0.55**	**0.56**	**0.02**	**0.08**	**1.31**	**1.71**	**1.93**	**0.50**	**1.67**	**1.49**	**2.57**	**1.42**	**2.85**	**1.14**	**5.04**	**2.53**	**1.68**	**1.05**	**1.36**

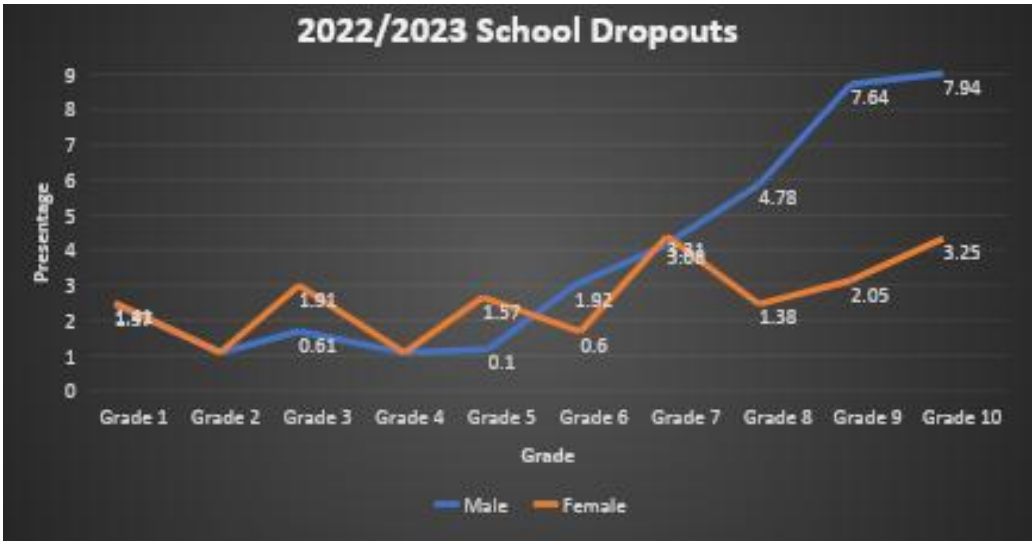
The images provided contain official school dropout data by grade and gender for Government Schools in the 2019/2020 and 2022/2023 academic years, including the Nuwara Eliya District.



According to this chart, Grades 1–5 in elementary school, Grade 1 Male dropout rates 1.57% are almost twice as high as female dropout rates 0.88%, indicating that males face greater initial barriers to continuing their education. Grade 2 Both rates fall precipitously, with the female rate at a nearly insignificant 0.13% and the male rate at 0.13%. Grade 3 The rates for males and females both slightly increase to 1.23% and 0.33%, respectively. In favor of male dropouts, the gender gap widens once more. Grade 4: The biggest gender disparity in favor of male dropouts occurs during this phase, with the male rate peaking marginally at 1.68 and the female rate falling to 0%. Grade 5 The dropout rate is very low 0% for both genders.

Grades 6 through 8 in middle school the female dropout rate surpasses the male dropout rate for three consecutive grades during this phase, which represents a significant shift. Grade 6 The female rate is the only dropout percentage for this grade, with the male rate staying at 0% and the female rate rising to 1.29%. Grade 7 Both rates rise once more, with the female rate marginally higher at 1.75% and the male rate increasing to 1.31%. Grade 8 The male rate increases again, albeit marginally, to 2.08%, while the female rate falls slightly to 0.92%.

Grade 9 Secondary School Grade 9 of all grades, dropout rates are highest for both sexes. The female dropout rate increases to 2.41%, while the male dropout rate soars to 5.88%. With the male dropout rate more than double that of the female, the increase for males is more pronounced, producing the chart's largest absolute gender difference.



The "2022/2023 School Dropouts" trend for Grades 1–10 is shown in the chart, demonstrating how attrition changes and varies by gender. By connecting the numerical spikes in the chart to the known socioeconomic and structural barriers that students in the

Nuwara Eliya tea estate sector must contend with, this intricate pattern can be thoroughly examined.

Grades 1–5: Primary Stability and "Silent Exclusion"
Data Point: In Grades 2 and 4, the dropout rate is 0%, which is incredibly low. For males in Grade 5, the highest rate is 1.57%.

Academic success is not demonstrated by this low rate of overt dropouts. According to research, the main issue in this field is "silent exclusion," which refers to enrolled children who are at risk because of their poor performance, irregular attendance, and exclusion from valuable education. The minimum primary dropout rate only hides a growing educational deficit (poor functional literacy and numeracy), Since communities like Park Estate in Nuwara Eliya have the highest absenteeism rates, it later harms the educational journey of students.

The Critical Transition and Peak Female Weakening
Both male and female dropout rates rise dramatically in Grade 7, with female attrition peaking at 3.31%. The male rate is not far behind, at 3.08%.
The study suggests that this earlier peak in female school dropouts may be related to gendered mobility constraints. Particularly in places like Nuwara Eliya, where Muslims and Tamils predominate, social customs and cultural norms prohibit young women from leaving their homes as they approach adolescence. Attending combined secondary schools often requires long commutes, which puts young women at risk for safety concerns and social stigma.

Secondary acceleration and dominant male attrition
Male dropout rates rise sharply and steadily, from 4.78% in Grade 8 to an overwhelming peak of 7.94% in Grade 10. The female rate rises to 3.25% in Grade 10, but the male rate is more than twice as high. Deep Consequences The severe and continuous increase in male dropout rates in the top grades is directly caused by the poverty and social backwardness that are inherent in the estate industry, which has some of Sri Lanka's highest rates of poverty. The economic opportunity cost of keeping male adolescents in school rises as they get older because of their increased earning potential. This pattern demonstrates how older male students are being dragged out of school to work as illegal children in order to support their families. A final, systematic failure to retain students just before the end of the required basic education cycle is represented by the Grade 10 spike.

Reasons for School Dropouts in Nuwara Eliya District

The issue of school dropouts in the Nuwara Eliya District is a deep-rooted, structural problem overwhelmingly concentrated in the estate (plantation) sector. It stems from a vicious cycle of inherited poverty, poor infrastructure, and weak educational pathways.

a. The Overwhelming Impact of Poverty and Economic Crisis

The deep impact of poverty and economic crisis the plantation community is among the most economically vulnerable and marginalized groups in Sri Lanka. Education is the first expense that needs to be cut for these families.

The need for child labor is the primary direct cause of dropout, particularly for boys in higher grades. Families with extremely low and unstable monthly incomes (median incomes often below a sustainable level) force children to work in order to survive. Research indicates that 58% of school dropouts from the real estate industry are either employed or actively seeking employment. Worsening economic crisis is the recent economic crisis in Sri Lanka has made this issue worse. Principals at Nuwara Eliya claim that necessities like uniforms, shoes, stationery, and transportation costs are unaffordable due to the high cost of living. Some students only eat roti or plain rice twice a day because their parents are unable to feed them every day. Students frequently miss class or drop out.

b. Structural Barriers to Secondary Education

The educational system itself, especially after primary school, is one of the main barriers. Absence of higher grade schools more than half of the schools in the Nuwara Eliya district are Type 3, meaning they only provide primary education. After finishing their education, The distance from tea estates to secondary schools is very long. Travel costs are very high, so going to secondary schools in the city costs more per day. This has a severe impact on low-income families. It often leads to dropping out of education after grade 5. Irregular attendance indicates early dropout. They are struggling economically and are engaged in tea estate-related jobs with their parents, so they are less likely to pursue secondary school education. Due to poor sanitation, poor infrastructure and lack of essential materials, estate schools often do not meet national standards, which negatively affects the quality of the learning environment. Poor nutrition of children is also a factor that strongly influences school dropout. Since more than 10 members live in a family, the daily income is not enough to meet their food needs.

c. Gender-Specific and Social Factors

Teenage pregnancy and early marriage are two of the main causes of dropout among adolescent girls working in the estate industry. Teenage pregnancy refers to a pregnancy in a female between ages of 10 and 19. one of the main reasons for this kind of teenage pregnancies may be the lack of sexual education during their teenage. The majority of the girls are unaware of what this sexual abuse means and its consequences. Even though they have faced sexual harassment; they have no clear idea about what they faced. Domestic Duties: In households where the mother is the main provider of income, girls frequently perform unpaid domestic work and look after younger siblings or ailing family members. A major cause of child abuse in plantations is the fact that girls are left alone at home during the day. This is because the parents have gone to the plantation or the mother has gone abroad or stayed in a distant place for work purposes. The main reason boys drop out of school is economic crisis. Since they face high living costs, they engage in some kind of work related to the tea estates with their parents from a young age.

Suggestions to reduce school dropouts

1. Addressing Economic Barriers

Expanding and giving priority to school meal programs is essential. Ensure that the school meal program is maintained and expanded, giving children in the most underprivileged plantation communities priority. The food insecurity that leads to malnutrition and absenteeism is directly addressed by this.
Create a scholarship or stipend program that is funded by the school and intended exclusively for secondary school students from low-income or heavily indebted families. The indirect expenses of education (transport, uniforms, shoes, stationery) ought to be covered by this fund.

2. Improving School Infrastructure and Quality

Ensure fair distribution of resources, including IT hardware, operational science labs, and sanitary restrooms. Specialized training in an inclusive educational system should be given to disadvantaged students, and a special push should be put in place to draw in and keep qualified subject teachers (math, science, English, etc.).

Provide special "catch-up programs" for students, particularly those in higher grades, who missed a lot of instruction during the pandemic and economic crisis. This prevents them from giving up due to poor academic performance or low self-esteem.

3. Targeted Interventions for Vulnerable Groups

It is crucial to provide strong career guidance and life skills counseling to students in grades 8 and 9. This can enhance students' professional mindsets by helping them see a

path beyond plantations and low-wage labor and providing opportunities for continued education.
Create safe, gender-sensitive areas inside or close to schools and raise awareness of sexual and reproductive health issues to address the causes of early marriage and pregnancy.

Importance of Education for Human Dignity

Education is the foundation of an empowered individual, a developed society, and a progressing economy. In the case of tea estate communities in Sri Lanka, education assumes even greater significance given the historical marginalization and poverty experienced by these minorities. Education provides children with knowledge, skills, and competencies to live life well; it encourages critical thinking and contributes to upward social mobility (UNESCO, 2020). The findings of this research highlight how the lack of consistent educational engagement, as reflected in high dropout rates, perpetuates cycles of poverty and limits opportunities for personal and community development.

The development of human capital depends on education. Regular school attendance helps children develop the literacy and numeracy skills, technical knowledge, and problem-solving abilities they need to participate in the modern workforce. Education offers a way out of generational poverty in the tea plantation industry, where families often rely on manual labor to survive. Children who drop out of school miss out on the opportunity to develop their creativity, cognitive skills, and potential for financial independence. As observed in this research, many children drop out of school at a young age to engage in plantation labor. While this practice provides immediate financial relief, it limits their long-term earning potential and reinforces structural inequalities in the plantation community.

Education contributes to social well-being as well as to improving individual identity. Schools act not only as centers of academic learning, but also as spaces where children learn values, ethics, and social responsibilities. For children in plantation communities, education can develop awareness of health, gender equality, and social rights, which can enhance their ability to participate meaningfully in society. The findings of this study suggest that early marriage and gender expectations disproportionately affect girls' educational achievement. A comprehensive education system can challenge these social norms by promoting gender equality and empowering children, especially girls, to make informed decisions about their future.

Education is very important for the growth of a country. Literacy and educational attainment are two of the most important indicators of a country's human development index, and they are closely linked to economic growth, social stability, and democratic participation (Department of Census and Statistics, 2020). For example, the Nuwara Eliya tea estates have low school retention rates, which makes it harder to build a skilled

workforce and slows down economic growth in both the local and national levels. Educating children in poor communities can help close the gap between rich and poor, boost productivity, and make society fairer.

Education affects people of all ages. Kids who finish school are more likely to go on to college or vocational training, which makes it easier for them to find work. Parents who have a good education are also more likely to value and support their children's education. This creates a positive feedback loop that lowers dropout rates over time. In the context of estates, tackling the economic obstacles that contribute to school absenteeism such as insufficient school supplies, transportation difficulties, and poor nutrition can markedly enhance educational outcomes and disrupt the cycle of poverty identified in this study.

Education builds strength in times of trouble. The study shows that the ongoing economic crisis in Sri Lanka has had a direct effect on children's ability to stay in school. Education gives people the tools they need to adapt to new situations, spot opportunities, and make smart choices about their lives. For kids who live on plantations, a good education can help them deal with the bad effects of unstable economies, working at a young age, and social pressures.

Conclusion

Education is the fundamental foundation for human dignity and is particularly vital for Nuwara Eliya's marginalized tea estate communities, offering the only reliable path out of generational poverty. It is the key driver of human capital, providing the critical literacy, technical skills, and problem-solving abilities necessary for meaningful participation in the modern workforce. High dropout rates, driven by economic survival, directly compromise this potential, trapping children in low-wage plantation labor and reinforcing structural inequalities. Education also serves as a crucial tool for social well-being, fostering awareness of health, gender equality, and social rights, which empowers individuals, especially girls to make informed decisions and break free from limiting societal expectations like early marriage. Ultimately, consistent educational engagement is essential for closing economic disparities, boosting regional productivity, and building resilience against the crises that destabilize these communities.

The persistent high school dropout rate in the Nuwara Eliya District is a critical issue stemming from the systemic poverty and structural inequality of the estate sector. A serious problem resulting from the structural inequality and systemic poverty of the estate industry is the Nuwara Eliya District's high school dropout rate. Since education is the best way for young people to escape poverty and achieve a skilled life outside of plantation labor, this crisis calls into question its vital importance. The issue is exemplified by the rise in Grade 9 dropouts, which occurs when children are forced into child labor to survive financially, and is made worse by the dearth of secondary schools and qualified teachers in the area. A multifaceted approach is required to address this: we must invest

in structural reform by promoting primary schools to secondary level, establish targeted economic safety nets like stipends and expanded school meal programs, and offer crucial academic and social support.

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Chapter 37: Negotiating Marginality through Cultural Sustainability: The Tea Community of Kaliabor

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Abstract

The Tea Community of Assam occupies a historically marginalized position within the socio-economic and cultural landscape of the region. Brought during the colonial period as indentured labourers from Bihar, Odisha, Madhya Pradesh, Bengal, and other regions to work in the tea plantations of Assam, these communities were settled across different parts of the province, with a significant section gradually settling down in Kaliabor in Nagaon district. During British rule, the extension of the North East Frontier Railway to Kaliabor made stations such as Silghat, Jakhalabandha, and Shalna significant on the map of Assam. This railway connectivity not only facilitated the growth of the tea industry but also deeply influenced the linguistic and cultural fabric of the region. Tea plantations such as Chikni, Sagmootea, Amlakhi, Dejoovalley, Bamuni, and Lungchung played a crucial role in shaping labour settlement and production structures in Kaliabor.This paper examines how the Tea Community of Kaliabor negotiates marginality through the preservation and adaptation of its cultural practices. Despite socio-economic exclusion rooted in the plantation system, the community has sustained its identity through festivals such as Karam Puja, oral traditions, plantation songs, and life-cycle rituals. Continuous interaction with Assamese society has further led to cultural exchange and gradual processes of adaptation. Rather than viewing these traditions as static remnants of the past, this paper argues that they function as dynamic mechanisms of cultural sustainability and resilience. It seeks to demonstrate that cultural sustainability operates as a critical strategy through which marginalized communities negotiate identity, continuity, and survival within structures of historical inequality.

Keywords: Tea Community, Kaliabor, Plantation Labour,Cultural Sustainability, Marginality,Colonial Assam.

Introduction

The tea community of Assam, often referred to as “Tea Tribes”, constitutes one of the most significant yet marginalized socio-cultural groups in the state. Their history is deeply tied to the colonial era’s tea plantations in Assam, which started with the Assam

Company's founding in 1839. Brought primarily from Chotanagpur, Odisha, Central Provinces, and parts of present-day Jharkhand and Bihar under indentured labour systems, these communities were subjected to tough working conditions, social isolation, and economic exploitation.

Kaliabor holds historical significance due to its medieval legacy and agrarian economy, and it also became a hub for tea gardens during colonial and post-colonial times. The tea community here presents an intriguing case of how displaced and marginalised populations negotiate identity and belonging within a dominant cultural context. This chapter examines how cultural sustainability, expressed through festivals, language, rituals, music, and collective memory, serves as a survival strategy and assertion mechanism for the tea community of Kaliabor.

Methodology:

This chapter mainly follows a qualitative approach. It uses secondary sources such as books, research articles, and historical writings related to the tea community of Assam.In addition, oral traditions ,folk songs such as Jhumur, and cultural practices observed within the tea community of Kaliabor are used as interpretative sources to understand the processes of cultural continuity and adaptation.

Historiographical Context:

The importance of the discovery of the tea plant in Assam was further increased when it was proved that the local plant was identical to that of the Chinese variety and that the indigenous seeds were of a superior quality and more suitable for growing in local conditions.British private capital immediately responded to the immense prospects of opening up the vast wastelands in Assam for the cultivation of tea. Introduced in 1839, tea was firmly established as the most important cash crop by the 1870s. In the context of Assam, the existing historiography on tea plantations tends to focus predominantly on the political economy of labour, often overlooking the intricate cultural narratives of survival and resilience that unfolded within the complexities of colonial power dynamics. Less attention has been paid to the cultural dimensions of survival and negotiation at the micro-regional level, particularly in places like Kaliabor. Recent scholarship has reexamined cultural sustainability and identity politics, revealing how marginalized communities preserve traditions within power structures. This study extends this focus, examining the agency of such communities in shaping their own futures, rather than merely recounting narratives of victimization.

Marginality and Cultural Sustainability:

In this context, marginality encompasses not only economic deprivation but also political underrepresentation, social exclusion, and symbolic invisibility within the dominant regional identity discourse. In the case of the tea community, marginality was

structurally produced through colonial labour recruitment, plantation enclosure, and postcolonial neglect.Cultural sustainability encompasses the preservation and revitalization of a society's cultural health, historical legacy, and indigenous knowledge, underscoring the significance of honoring local narratives and transmitting cultural values to subsequent generations. However, marginality does not imply absence of agency. Drawing from subaltern studies, one may understand marginalized communities as historically constrained yet capable of creating alternative spaces of meaning. Rather than viewing culture as static, this chapter understands culture as dynamic and negotiable.

Historical Background of the Tea Community in Kaliabor:

The introduction of tea plantations in Assam required large-scale labour recruitment. Indigenous Assamese peasants were reluctant to work under plantation discipline. As a result, colonial authorities initiated recruitment drives in central and eastern India**.** Labour therefore had to be imported at considerable cost from places such as Bihar, Orissa, Chota Nagpur, Dacca, Chittagong and even distant places like Madras and Central Provinces. The gradual expansion of the tea industry in regions marked by an acute shortage of local labour led to the emergence of a class of agents or middlemen who were responsible for supplying workers to the plantations. The planters themselves maintained little direct involvement in recruitment beyond financing the process by paying for the labourers brought in. This system produced severe and often disastrous consequences. Contractors began competing among themselves by offering labourers at progressively lower wage rates, thereby intensifying exploitation. Moreover, prior to the enactment of the Inland Emigration Acts—namely Act III (Bengal Code) of 1863 and Act IV of 1865, recruiters were neither licensed nor regulated, and emigrant labourers were not formally registered. There were no standardized rules governing wages, working conditions, or contractual obligations. The absence of regulatory oversight enabled widespread abuse within the recruitment system.

In a few well-established plantations, relatively trustworthy labour intermediaries known as sirdars were identified. These individuals were granted paid leave to return to their native villages to recruit workers. For each recruit they brought back, they received a fixed bonus. However, this system was limited in scope and applied only in select cases. The majority of recruitment continued to be conducted through contractors.The extent of abuses under the contractor-based recruitment system was so severe that even official reports could not overlook them.

Kaliabor, located in the Nagaon district of Assam, emerged as an important centre during the colonial period. With the extension of the North East Frontier Railway to this region under British rule, stations such as Silghat, Jakhalabandha, and Shalna became significant points on the map of Assam. This railway connectivity not only facilitated the expansion of the tea industry but also influenced the linguistic and cultural landscape of

the region. Tea plantations such as Chikni, Sagmootea, Amlakhi, Dejoovalley, Bamuni, and Lungchung played a crucial role in shaping patterns of labour settlement and the organisation of plantation production in Kaliabor.

Central Argument: The central argument of this chapter is that:

The tea community of Kaliabor navigates its historical and structural marginality through a multifaceted approach, where cultural sustainability emerges as a dynamic mechanism. Cultural sustainability, functions as a strategic and adaptive tool of identity assertion, community resilience, and claims to belonging within Assamese society. Cultural practices are not passive remnants of the past; they are consciously preserved, reinterpreted, and mobilized to resist erasure and demand recognition.

Cultural Sustainability as Negotiation:

1.Festivals and ritual continuity:

Festivals such as Karam Puja and Tusu Puja continue to be celebrated in Kaliabor tea gardens. These rituals: create collective solidarity,transmit oral traditions to younger generations, reinforce ancestral memory.

This selective incorporation of elements from Assamese festivals, such as Bihu, exemplifies a nuanced process of cultural negotiation, wherein the community navigates its positionality within the broader regional culture. By adopting and adapting these cultural practices, the community demonstrates a strategic assertion of belonging, while simultaneously maintaining distinct ritual practices that underscore its unique identity. This dialectical relationship between cultural assimilation and preservation enables the community to occupy a liminal space, thereby articulating both its distinctiveness and its membership within the larger Assamese cultural milieu.

2. Language and Oral Traditions :

The primary language of the tea tribes of Assam is Assam Sadri , which serves as a lingua franca among the diverse ethnic groups in the tea gardens.Because of contact and convergence with dominant regional languages such as Bengali and Assamese, the Sadri (or Sadani) spoken in Assam, often characterised as Assam Sadri, differed in some ways from the Sadri spoken in the Chotanagpur plateau. In 1931, the Tea Districts Labour Association issued a handbook titled Language Handbook Sadani, which provided a brief description in English of the Sadri language as it was spoken in the tea plantations of Assam. Although the handbook was published anonymously, the clergyman Peter Shanti Nowrangi later stated in his writings that it had been prepared by Henri Floor, a Belgian Jesuit associated with the Catholic mission. Nowrangi himself was an important activist and scholar of the Sadri language, and in 1956 he published one of the earliest works on the language, A Simple Sadani Grammar. Floor’s handbook was intended primarily to

assist British and Indian tea-estate officials in communicating with plantation labourers. The book was divided into three main sections. The first section offered a short overview of Sadani grammar in six chapters. The second section included a collection of conversational expressions related to everyday matters such as settlement in the estates, labour, leave, weekly markets, land issues, marriage, funerals, forests, hunting, religious practices and sanitation. The final section contained a bilingual vocabulary list of Sadani and English words.

The sample sentences in Sadri included in the section titled "Work and Tikka and Earning" provide a revealing glimpse into the harsh realities of life in the tea plantations of colonial Assam. These expressions reflect the difficult working conditions, meagre wages, excessive labour demands and the hierarchical power relations that characterised plantation life. Phrases such as "Ka le pachhuale?" (Why are you late?), "I ke siraek chahi, nai to dhibua kamti mili" (You must finish it, otherwise your wages will be reduced), and "Toen uriya ke taul men bhari karek khojathis" (You are trying to increase the weight dishonestly) indicate the strict supervision and suspicion faced by workers. Similarly, commands like "Ekhan usraba usraba" (Now hurry up) demonstrate the constant pressure placed on labourers to increase productivity. The sentence "Mor chhauwaman ke haluk kam Karwaek parbe?" (Can you give my children lighter work?) further highlights the economic hardships of plantation families, where even children had to participate in labour under strenuous conditions.

Multilingualism emerged as a prevalent trait among the tea community, facilitating communication across linguistic boundaries and fostering cultural exchange. Assamese is increasingly used in education and public interaction. However, oral songs, folktales, and work songs continue to preserve memories of migration, suffering, and resilience. These narratives transform trauma into collective identity.Language becomes a medium of both adaptation and preservation.

3. Music, Dance, and Performance:

The community's traditional dances and songs, once confined to private spaces, are now showcased in public forums, competitions, and even political events. This shift from private to public performance amplifies their cultural presence, transforming it into a visible assertion of identity. By taking their traditions to the public stage, the community stakes a claim to recognition and legitimacy within Assam's cultural landscape, subtly redefining their place in the broader narrative.

The tea community possesses a rich cultural life marked by numerous religious and social festivals. Among these, the Jhumur dance occupies a significant place and is closely associated with religious observances and communal celebrations. The dance is traditionally performed in three stages: Darshalia or Gayan–Bayan, Bhim Charia, and Baithak. Festivals such as Diwali and Bihu also hold considerable importance in the lives

of tea garden workers. In addition, celebrations like Dandi Yatra, Rath Yatra, and Mangala Devi Puja, particularly observed among the tea workers of Uriamul, form an integral part of their cultural and religious traditions. These festivals reflect the diverse cultural heritage carried by the migrant communities who settled in the tea estates of Assam.

Life-cycle rituals such as birth, marriage and death also play an important role in shaping the social life of the tea community. Childbirth rituals generally follow Hindu customs. On the fifth day after a child's birth, a ritual is performed in which the umbilical cord is ceremonially disposed of. Hair-cutting rituals are conducted by a barber, and a naming ceremony known as Nam-Dharani is organised, during which the child's horoscope may also be consulted. On the eleventh day, the mother undergoes a purification bath and resumes her daily responsibilities. In some cases, the child's head is shaved on the thirtieth day, marking another stage in the early life rituals.

Death rituals are equally significant in the folk life of the tea workers. The person who performs the cremation observes a period of ritual seclusion and does not leave the house for ten days. On the eleventh day, the shraddha ceremony is performed to honour the deceased. During this ritual, male family members often shave their heads and offer alms to Brahmin priests. Members of the community are then served simple food such as chira (flattened rice) and yogurt, and offerings are made as part of the commemorative ceremony.

Another important folk tradition among tea workers is Griharambh, the ceremony associated with the construction or inauguration of a new house. During this ritual, posts are erected and religious rites are conducted, often under the guidance of a Brahmin priest. The ceremony may include Ganesh Puja, wearing new clothes or saris, and other symbolic acts meant to bring prosperity and protection to the household.

Food habits of the tea community largely reflect broader Indian dietary traditions, though the consumption of traditional rice beer, commonly known as haria, forms an important part of their cultural practices. This beverage is particularly significant among groups such as the Oraon and Munda communities. Rituals like Gram Puja (village worship) are often incomplete without the offering of haria, and animal sacrifices such as chickens or goats may also be performed as part of these ceremonies.

Marriage ceremonies constitute one of the most elaborate social events among tea workers. Among those of Purulia origin, traditional wedding customs include the planting of banana plants at the marriage venue and ritual bathing of the bride and groom by relatives from the maternal side. Various ceremonial practices such as welcoming the bride and groom, exchange of rings, and other festive rituals form part of the marriage celebrations.

The tea community in Assam consists of diverse ethnic groups, each contributing distinct customs and traditions. For instance, certain agricultural or pastoral rituals involve symbolic acts such as offering new ropes to cattle or performing small ceremonial offerings. These practices illustrate the persistence of rural cultural traditions within plantation life.

In conclusion, the tea workers of Kaliabor have developed a distinctive cultural identity while simultaneously integrating with the broader Assamese social and cultural milieu. Their festivals, rituals and everyday practices demonstrate how migrant communities have negotiated their marginal position by sustaining their cultural traditions while gradually becoming part of the wider Assamese national life.

4. Modern Aspirations and Cultural Preservation among the Youth of Kaliabor:

In the Kaliabor region, the younger generation is increasingly pursuing education and actively participating in student organizations and various social initiatives that aim at community development and greater opportunities. With expanding access to education and exposure to broader social and political ideas, young people in Kaliabor are becoming more aware of their rights, responsibilities, and the challenges faced by their society. Their involvement in student bodies and local initiatives reflects a growing sense of social consciousness and collective responsibility towards the progress of their community.

At the same time, the process of modernization has not weakened their attachment to cultural traditions. Many youth groups in Kaliabor actively organize cultural festivals, community gatherings, and traditional performances that celebrate and preserve the region's rich cultural heritage. Through such activities, they play an important role in reviving traditional practices, promoting indigenous art forms, and strengthening a sense of cultural identity among the younger generation. This coexistence of modern aspirations and deep cultural rootedness demonstrates how the youth of Kaliabor are negotiating change while maintaining continuity with their heritage. Such a balance between modern development and cultural preservation represents a sustainable and adaptive path for the future of the region.

The cultural practices of the tea community cannot be understood merely as isolated traditions preserved from the past; rather, they represent dynamic processes through which the community negotiates its social position within the broader socio-cultural landscape of Assam. The continuation of folk music, dance, oral traditions, and ritual practices demonstrates the ways in which marginalised communities actively sustain their cultural identity despite the structural inequalities that have historically shaped plantation life. In this context, cultural sustainability becomes a significant medium through which the tea community asserts both continuity and resilience.

The preservation of festivals, language and oral traditions among the tea communities of Kaliabor demonstrates how cultural sustainability functions as a form of negotiation with marginality. Historically, the tea tribes of Assam were brought as indentured labourers from different regions of central and eastern India, which placed them in a socially and economically marginalized position within colonial plantation society. In such circumstances, cultural practices became important tools for maintaining collective identity and social cohesion.Through rituals, music, festivals and linguistic practices, the tea community constructs a shared sense of belonging that transcends their diverse ethnic origins. Cultural expressions such as Jhumur songs, Karam Puja and Tusu Puja not only sustain ancestral traditions but also create communal spaces where collective memories of migration and labour are preserved. These practices transform cultural heritage into a living resource that enables the community to assert its identity despite historical exclusion.The continuation of these cultural practices illustrates how the tea community of Kaliabor negotiates its historically marginalised position within Assamese society. Cultural traditions such as festivals, music, oral narratives, and social rituals function not merely as inherited customs but as active mechanisms through which the community sustains its identity and collective memory.

At the same time, the tea community engages in a process of cultural interaction with the wider Assamese society. Cultural sustainability within the tea gardens is not a process of rigid preservation. Rather, it involves continuous adaptation and interaction with the wider Assamese cultural environment. The adoption of elements of Assamese festivals, language and social customs indicates a gradual process of cultural integration. However, this integration does not erase the community's distinct cultural identity. Instead, it represents a dynamic process of negotiation in which traditional practices are preserved while new cultural influences are selectively incorporated.The incorporation of festivals such as Bihu, the increasing use of the Assamese language in education and public life, and the participation of tea communities in regional cultural events demonstrate a dynamic process of cultural exchange. This interaction allows the community to maintain its distinct cultural heritage while simultaneously integrating into the broader socio-cultural landscape of Kaliabor.

Thus, cultural sustainability among the tea community of Kaliabor reflects a complex interplay between preservation and adaptation. By maintaining their cultural traditions while simultaneously interacting with the broader regional culture, the tea community articulates its presence within the socio-cultural landscape of Assam. Cultural practices therefore serve not only as expressions of heritage but also as strategies through which marginalized communities negotiate recognition, belonging and dignity.Thus, cultural sustainability becomes a form of negotiation. By sustaining their traditions while selectively adopting elements of regional culture, the tea community articulates both difference and belonging. Cultural practices serve as a subtle yet powerful medium

through which historically marginalised groups express resilience, continuity, and a collective aspiration for dignity and inclusion.

Cultural Sustainability and Emerging Political Consciousness

While cultural practices such as festivals, music, and rituals play a crucial role in sustaining the identity of the tea community, they also intersect with broader processes of social awareness and political articulation. Over time, cultural spaces have become important arenas where collective experiences are shared and community consciousness is strengthened. In plantation societies, where workers historically faced economic exploitation and social exclusion, cultural practices often served as subtle forms of expression through which collective grievances and aspirations were communicated.

Songs, performances, and community gatherings frequently reflect themes related to labour, dignity, and everyday struggles. At the same time, the subject matter and style of Jhumur songs have gradually expanded in response to changing social realities. In order to attract wider and younger audiences within modern society, performers have begun to incorporate new themes and stylistic elements into traditional performances. Globalisation has worked with its own sets of paradoxes, creating both challenges and opportunities for the preservation of indigenous cultural forms. While the core structure and rhythm of Jhumur remain rooted in tradition, several attractive features have been added to the performance style. As a result, noticeable changes can be observed in both the tunes and the lyrics of contemporary Jhumur songs. Today, many performances include references to political developments, social issues, and everyday experiences within the broader society. These transformations illustrate how traditional cultural expressions continue to evolve while maintaining their role as a medium for collective memory, identity, and social commentary within the tea community. At the same time, the preservation of cultural traditions contributes to the emergence of a stronger sense of community identity. As the tea community interacts with the wider socio-cultural environment of Kaliabor and Assam, cultural practices become symbols of both continuity and recognition. Participation in regional festivals, cultural programmes, and public events has gradually created opportunities for greater visibility of the tea community within Assamese society.Education, migration, and increased political awareness in recent decades have further influenced this process. Younger generations of the tea community are increasingly engaging with questions of representation, cultural recognition, and social rights. Cultural traditions, therefore, function not only as markers of identity but also as sources of collective pride that inspire greater participation in social and political life.

In this context, cultural sustainability becomes closely connected with questions of empowerment. By preserving their traditions and expressing them in public spaces, members of the tea community assert their cultural presence and challenge the historical

invisibility associated with plantation labour. Cultural practices thus become important mediums through which the community negotiates recognition within the broader social structure. The case of the tea community in Kaliabor illustrates how cultural traditions can play a transformative role in shaping collective consciousness. While these practices originate in everyday life and ritual observance, they also contribute to the formation of a shared sense of belonging and social awareness. Cultural sustainability therefore operates not only as a mechanism of cultural preservation but also as a dynamic process that supports the community's evolving engagement with wider social and political realities.

Conclusion:

The history of the tea community in Kaliabor is a history of displacement, enclosure, and endurance. Colonial plantation capitalism institutionalized economic and spatial marginality. Postcolonial transitions alleviated some constraints but left structural inequalities intact.Yet across generations, the community has sustained rituals, songs, languages, and collective memories. These cultural practices are not inert traditions; they are active mechanisms of resilience and negotiation.

This chapter has argued that marginality is negotiated through cultural sustainability. In Kaliabor, identity is preserved not by isolation but by adaptive continuity. Through festivals, everyday practices, hybrid participation in regional culture, and emerging political consciousness, the tea community transforms historical displacement into evolving belonging. Cultural sustainability thus emerges as both emotional anchor and political strategy. It enables the tea community of Kaliabor to remain rooted while asserting presence within the broader socio-cultural fabric of Assam.

In this context, cultural sustainability functions not only as a means of preserving tradition but also as a subtle form of social negotiation. The everyday practices of music, ritual observances, oral traditions, and community gatherings enable the tea community to reaffirm collective identity while responding to changing socio-economic realities. Rather than remaining confined within the historical marginality imposed by the plantation system, these cultural expressions create spaces for visibility, dignity, and continuity. Therefore, the experience of the tea community in Kaliabor demonstrates that culture operates as a living process through which marginalized groups reinterpret their past and articulate their place within contemporary Assamese society. Through this ongoing negotiation, cultural practices become instruments of resilience, enabling the community to sustain both memory and belonging across generations.

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Chapter 38: Gender Equity in Education: Building Sustainable Classroom Cultures

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Abstract

Gender equity in education serves as the essential foundation for establishing social justice and sustainable development work. Although significant global advancements have improved access to schooling, gender-based inequalities continue to shape students' participation, leadership roles, subject selection, academic performance, and educational experiences. The study investigates sustainable classroom culture creation which establishes gender equity through educational methods that include all students and through fair organizational rules and through learning spaces which bring about change. It shows that hidden curricula combined with teacher expectations and language usage and institutional norms create pathways for students to develop gender stereotypes which lead to systemic discrimination. It uses current educational theories together with sustainable development principles which include SDG 4 (Quality Education) and SDG 5 (Gender Equality) to show how gender-sensitive teaching methods, curriculum changes, interactive teaching styles and teacher training that uses self-reflection all create fair educational environments. Sustainable classroom cultures exist when people demonstrate respect for each other and everyone takes part equally while students develop critical thinking skills and schools end their unfair treatment of certain groups. The study demonstrates that community involvement needs to happen together with governmental backing and the establishment of systems which will track progress to achieve sustainable results. The educational system develops gender equity through its teaching and learning initiatives which operate on a daily basis. It also finds that sustainable classroom cultures require more than equal representation because they need organizations to establish a new power structure which enables all students to learn about different cultures and their civic duties. Educational systems need these initiatives because they build systems that maintain social equity and environmental sustainability while achieving their sustainable development targets.

Keywords: Gender equity, Sustainability, Inclusive pedagogy, Hidden curriculum

1.0 Introduction

"Education is the great engine of personal development through which the daughter of a peasant can become a doctor; the son of a mine worker can become the head of the

mine; while the child of farm workers can become the president of a great nation"- Nelson Mandela

Education serves as a fundamental instrument that drives social change while fostering human development. Nelson Mandela emphasized that education creates pathways which enable people to overcome social, economic and cultural obstacles. It develops human capabilities and protects human dignity while it establishes democratic systems.

Gender equity in education refers to the fair and equal treatment of individuals regardless of their gender in all aspects of the educational system, including access, opportunities, and outcomes. It encompasses creating an environment where both girls and boys, women and men, have equal opportunities to participate in and benefit from educational resources, programs, and experiences (Zabaniotou, 2020; Mundial, and UNICEF, 2016). Within its broader vision, gender equity in education is considered as the main educational issue. A lot of schools around the world have managed to get more students enrolled, but gender gaps in education haven't just disappeared, they've just gotten trickier to spot. Gender equity isn't just about having the same number of boys and girls in class. It's about making sure everyone gets a fair shot at participating, leading, picking subjects, meeting expectations, and actually learning. What students go through at school isn't just shaped by what's in the textbooks. It comes from all sorts of places: the school's culture, what teachers actually believe, how kids treat each other, and the rules and systems that sometimes without anyone even realizing keep old gender roles alive. Classrooms function as active social environments which enable students to develop their personal identities while learning about societal values. Students develop understanding of gender standards through their daily interactions and language usage and teaching methods. The school environment teaches students essential lessons through its hidden curriculum which includes unspoken educational content.

The concept of sustainable classroom culture provides a meaningful framework for addressing these concerns. A sustainable classroom culture requires its members to practice inclusion and fairness while developing mutual respect and shared responsibility together with their critical engagement skills. The system creates a learning space which enables all students to reach their maximum potential through their complete participation in the program. The classrooms create a learning environment which enables students to develop their critical thinking abilities while they learn to recognize and challenge social injustice through their exploration of different viewpoints. When teachers bring equity and sustainability into their classrooms, they don't just change lessons they change lives. Creating a classroom where everyone, no matter their gender, feels seen and valued isn't just about lifting up individuals. It pushes society forward. If we want a world that's fair and sustainable, we need schools that teach equality, encourage everyone to speak up, and help students care about their communities. That's how real change sticks. Fair and

inclusive classroom environments establish the foundation which helps to decrease discrimination while developing social unity among students. The process of achieving gender equality in education functions as both an ethical obligation and a practical approach to establishing fair and inclusive educational environments which lead to the development of sustainable communities.

2.0 Conceptual Framework

2.1 Gender Equity in Education

Gender equity in education stands as a fundamental pillar of social progress and human development (Marston, et al., 2016; Mark, et al., 2018). The system extends beyond basic school access because it works to remove all social and cultural and structural barriers which prevent specific groups from obtaining educational opportunities.

Key Dimensions of Gender Equity in Education

A. Equal Participation in Classroom Activities: All students must participate in classroom activities because equal participation requires students to participate in discussions and group work and presentations and extracurricular activities without any gender restrictions. Teachers must create inclusive classrooms which enable all students to share their thoughts without facing any form of bias. The students who participate in this activity will develop their self-confidence and communication abilities while they develop a feeling of belonging to the group.

B. Balanced Representation in Leadership Roles: Gender equity enables students to access all leadership positions which include roles as class monitors and team leaders. The selection process for leadership positions should focus on evaluating applicants based on their abilities and interests instead of following traditional gender stereotypes. This approach enables students to attain leadership abilities and decision-making expertise while they develop respectful relationships with others.

C. Freedom in Subject Choice: Students should be free to choose subjects according to their interests and abilities rather than gender expectations. Equal participation across all fields which include STEM and the humanities will enable learners to discover their strengths while creating pathways to various professional paths.

D. Bias-Free Evaluation Practices: The assessment process needs to be conducted without biases to assess candidates based on their actual performance and their learning outcomes instead of using gender as a basis for judgment. Teachers should provide all

students with equal access to feedback and academic support through their assessment criteria which need to be explicit for all students.

E. Safe and Inclusive Learning Environments: The gender-equitable environment safeguards students against all forms of discriminatory treatment and bullying and harassment while it upholds the rights of all students to identify themselves as any gender. Classroom environments which prioritize safety and inclusivity lead to improved student well-being and increased student engagement and better academic results.

2.2 Sustainable Classroom Culture

A sustainable classroom culture creates an educational space which enables equal access to education and supports all students while teaching them to share academic responsibilities with their peers. It is more likely created by designing the perceptions that educational leaders bring when entering an institution and the way they go about their responsibilities (Garcia et al., 2022). The system promotes behaviours which build respect among people and encourage people to take part in activities which lead to beneficial changes in society. It promotes:

Respect for Diversity: A classroom exists as a sustainable space which embraces all forms of gender and cultural and linguistic and ability and economic differences. A positive school culture values diversity and promotes inclusivity (Khalifa et al., 2016). Teachers create an environment where students develop mutual respect which allows all students to feel they belong in class. The process of recognizing diversity creates an environment which decreases discrimination while developing empathy between students.

Collaborative Learning: Group discussions and peer learning and cooperative activities create a learning environment which supports students to develop their abilities to work in teams. Students practice sharing ideas with each other while working together to solve problems and helping their classmates understand better. The approach develops skills in communication while enabling people to work together and share responsibility for their group tasks.

Critical Thinking: Students in sustainable classrooms must learn to question all existing assumptions while they study information and analyse real-world social problems. The process of inquiry-based learning combined with open discussions enables learners to develop skills in independent thinking which will assist them in making responsible decisions.

Ethical Responsibility: Students receive guidance to understand the essential values which include honesty and fairness and respect and accountability. Teachers demonstrate ethical behaviour through their actions while they teach students to develop their moral values during everyday school activities which lead to their development as responsible people who will benefit society.

Long-Term Social Transformation: The sustainable classroom educates students to become responsible citizens who will advance social equality and environmental protection after they leave the classroom. Education serves as a mechanism which enables permanent social transformation to create a fairer society.

2.3 Hidden Curriculum and Gender Socialization

As stated by Trueman (2024), the 'hidden curriculum' is said to be a curriculum in schools that is covertly and or subconsciously in being. Gender stereotypes receive unintentional reinforcement through the combination of teacher conduct and classroom interactions and textbook content and school traditions. Teacher attention and learning materials which include gendered content and conventional role expectations create differences in student confidence and career goals and classroom engagement. The hidden curriculum establishes a major impact which shapes how students understand gender roles and their social identities.

2.4 Education and Sustainable Development Goals

The Sustainable Development Goals (SDGs) which seek to achieve worldwide equality and sustainable development progress are directly linked to gender equity in educational access. The SDG 4 standard requires educational institutions to deliver inclusive educational programs which guarantee all students equal access to learning and assessment opportunities regardless of their gender or background. The goal of SDG 5 is to establish gender equality while empowering women and girls through the elimination of discrimination and the establishment of equal rights and leadership and educational access.

Educational institutions serve as important agents in achieving these interconnected goals by creating inclusive learning environments, encouraging equal opportunities, and fostering values of respect, justice, and social responsibility. Schools and universities create pathways for sustainable social development through their implementation of gender-equitable education initiatives that drive enduring social progress.

3.0 Gender Inequality in Classrooms Practices

The educational system supports gender equality through strong policy commitments, yet subtle forms of inequality continue to exist in classroom practices. The unintentional actions of teachers during class create obstacles which hinder students from achieving their full development.

Differential Teacher Interaction: Teachers show a bias toward boys when they assign difficult tasks while they show a preference for girls who remain quiet and show compliance. The ongoing pattern of unequal interactions between students creates a situation which leads to decreasing confidence and decreasing academic engagement.

Gendered Leadership Roles: Classroom roles such as group leader, class representative, or technical coordinator are sometimes influenced by traditional gender norms. Boys receive encouragement to assume leadership positions while girls get assigned to perform organizational duties. This situation prevents girls from developing leadership abilities while it maintains traditional gender role expectations.

Stereotypes in STEM Subjects: The social environment links Science Technology Engineering and Mathematics STEM subjects with boys. The bias exists through teacher and peer interactions and textbook content. The effect causes girls to doubt their abilities which leads to decreased STEM career interest and participation.

Reinforcing Classroom Language: The classroom language used by teachers creates an unintentional pattern which establishes traditional gender roles. Teachers show boys appreciation for their intelligence and assertive behaviours but they give girls praise for their tidy appearance and proper conduct. Those distinctions create different ways for students to perceive themselves which affects their academic performance.

The classroom practices create gender identities which lead to self-evaluation through their impact on students.

4.0 Building Gender-Equitable Sustainable Classroom Cultures

Educational institutions must create gender-equitable classroom environments which promote sustainable learning to achieve their goal of providing inclusive educational programs. The gender-equitable classroom requires more than equal enrolment between students because it must provide all students with equal opportunities to engage in learning activities and respect their individual needs and learning outcomes.

4.1 Gender-Sensitive Pedagogy

Teachers who apply gender-sensitive pedagogy will establish teaching practices which advance fairness and bring about inclusive learning conditions that provide equal learning opportunities to all students irrespective of their gender identity. A gender-sensitive teacher understands how gender influences learning, communication, participation, and achievement. According to the National Education Policy (NEP, 2020), inclusive and equitable education is central to India's vision of social transformation. Therefore, training teachers for gender-sensitive classrooms is both a pedagogical necessity and a moral responsibility.

Encouraging Equal Participation: Teachers should establish platforms which allow both boys and girls to express themselves through speaking activities and to take charge of various classroom tasks and participate in group discussions. This activity requires teachers to actively select students for participation in class while they implement a system which assigns different students to lead different learning activities and establishes rules that prevent any single group from controlling classroom conversations. Equal participation helps build confidence and reduces gender-based academic gaps.

Using Inclusive Language: Language creates mental frameworks which determine how people perceive things. Teachers should avoid gender-biased expressions (e.g., assuming certain roles are suitable only for boys or girls) and instead use neutral, respectful terms. Inclusive language establishes a space where all learners belong while it protects their personal identification.

Challenging Stereotypes: Educators play a key role in questioning traditional gender norms. They can present diverse role models, use examples that break gender stereotypes (e.g., female scientists, male nurses), and openly discuss how stereotypes limit potential. This practice encourages students to follow their interests because of their capabilities.

Adopting Learner-Centered Approaches: Learner-centered teaching values individual differences, interests, and learning styles. Teachers use collaborative learning together with group discussions and participatory methods to engage all students in active participation of the learning process. The method establishes an environment which enables students to show respect and empathy while they take on shared responsibilities which lead to a more equitable outcome.

4.2 Curriculum Transformation

Educational content and learning materials undergo revision through curriculum transformation to achieve equitable representation and social justice. A gender-equitable curriculum not only provides knowledge but also promotes inclusive values and critical thinking. The following elements are essential:

Include Diverse Gender Representations: Textbooks and examples and learning resources need to show both women and men in different roles that go beyond conventional portrayals. Students achieve positive self-identification through the display of balanced representation within the curriculum materials.

Highlight Contributions of Marginalized Groups: The curriculum needs to recognize and honour the achievements of women and other marginalized groups whose accomplishments have not received sufficient recognition throughout history. The inclusion of diverse voices from history, literature ,science and social studies enables better societal understanding and greater respect for different cultures. This activity helps students develop an understanding of equality and diverse cultures.

Promote Critical Social Awareness: Students receive encouragement from the transformed curriculum to examine social systems that create inequality and discrimination and develop stereotypical beliefs. Students acquire skills to investigate social problems which involve gender and justice through their participation in discussions and projects and their practice of reflective learning.

4.3 Participatory Teaching Strategies

Participatory teaching strategies requires students to take an active role in their learning experience instead of listening passively. The interactive methods that include group discussions and collaborative learning and problem-based learning together enable all participants to take part in the activities because these methods create open spaces for interaction.

Group Discussions: This method encourages students to express their thoughts and listen to different viewpoints while developing their ability to think critically. It provides equal speaking opportunities for both boys and girls which leads to their confidence development and mutual respect establishment.

Collaborative Learning: Students use small groups to work together on their project and task completion. Teamwork gets developed through shared duties and students helping each other. The process of collaboration creates a classroom atmosphere which eliminates gender-based competition while building a friendship among students.

Problem-Based Learning (PBL): Students investigate authentic world issues while they create solutions through collaborative efforts. The method promotes analytical development together with creativity enhancement and practical skill acquisition while all students take part in their educational process.

The implementation of participatory strategies establishes a classroom environment which enables students to feel both valued and respected, which encourages them to participate in learning activities alongside their peers.

4.4 Reflective Teacher Training

The method of reflective teacher training instructs educators to continuously assess their progress while developing their professional skills. Teachers need to analyse their personal beliefs and attitudes and their classroom practices to discover hidden biases that stem from their gender and cultural background and social status. Through reflection teachers develop an understanding of how their language and expectations and assessment methods create unintentional advantages for specific student groups. This knowledge enables them to implement teaching methods which promote equal treatment of all students. The process of reflective training enables teachers to develop the skills needed to establish classrooms that provide equal treatment and support to all students while addressing their unique needs.

5.0 Role of Institution and Community Support

Educational Institutions need to work together with community members to achieve sustainable gender equity progress. Schools need to create gender-inclusive policies which will guarantee equal access and protection of students who need to learn in a secure environment. Educational leaders must engage with parents, community organizations, and stakeholders to build strong partnerships. Open and transparent communication is vital for fostering a positive school culture (Gruenert & Whitaker, 2015). Utilizing digital communication platforms and culturally responsive strategies enhances stakeholder engagement (Birch & Lefebvre, 2018). The government needs to deliver teacher training together with sufficient budget resources and functional assessment systems which will enable effective execution and evaluation of programs focusing on gender issues. The community shapes students' perspectives because it should teach them to value fairness while they battle against common cultural stereotypes. Parents should support their children to explore careers and educational pathways which match their skills and interests instead of following traditional gender roles. Educational institutions must implement ongoing assessment systems to achieve their goals of educational equality because these systems provide transparency while helping them reach their long-term objectives.

6.0 Implications for Educational Practices

The findings highlight several important implications for improving educational practices:

Gender equity must be embedded in everyday teaching practices: Schools need to treat gender equity as an integrated teaching element which should be applied across all classroom activities and assessment methods and curriculum implementation. Teachers need to create equal classroom opportunities while using non-biased language and sharing leadership responsibilities and countering stereotypes. Students understand fairness through equity practices which teachers implement as standard learning methods.

Teachers act as agents of social transformation: Teachers fulfil an essential function because they determine how students develop their educational values and core beliefs. Teachers who promote respect together with inclusion and critical thinking skills will help students challenge existing gender norms while they learn to recognize different forms of inequality. Through this process educators become more than teachers because they help students develop into responsible citizens who create a fairer world.

Classroom culture significantly influences sustainable development outcomes:

A classroom environment which establishes mutual respect and equal opportunities together with shared learning experiences will create conditions that enable people to sustain social development throughout their lives. Inclusive learning environments provide students with the ability to build empathy and social confidence and leadership capabilities. These values help to advance social development objectives which include the equitable and inclusive educational system described in the United Nations Sustainable Development Goals (SDGs).

Educational reforms should integrate equity with sustainability principles: The policies and reforms need to establish a connection between gender equity and sustainable development goals instead of treating these two areas as separate entities. All educational programs including curriculum frameworks and teacher training initiatives and institutional policies must demonstrate alignment with global objectives which include the United Nations Sustainable Development Goals 4 and 5. The educational systems need to implement these principles because they create a framework which enables students to achieve academic success while the educational system maintains social justice and supports enduring community development.

7.0 Conclusion

Gender equity in education requires more than providing equal access to education; it needs complete changes to classroom dynamics and institutional systems and teaching methods. Sustainable classroom environments develop when teachers and students treat each other with respect and all students can take part in classroom activities. Educational systems can combat discrimination through hidden curriculum identification and

implementation of gender-sensitive educational practices which will create socially responsible citizens. Classrooms need to develop equitable learning environments which foster critical thinking skills and democratic engagement to achieve sustainable development goals. Gender-equitable education functions as an educational necessity which leads to the development of inclusive societies that achieve sustainable growth.

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Chapter 39: Negotiating Tradition and Modernity: Youth, Cultural Transmission, and the Reconfiguration of Meaning of Jonbeel Mela among the Tiwa Tribe of Morigaon District.

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Abstract

Junbeel Mela constitutes a historically embedded indigenous institution through which the Tiwa community of Assam has articulated economic reciprocity, ritual authority, and inter-ethnic sociability. While existing scholarship has predominantly examined the mela through the lenses of heritage preservation, barter economy, and ritual continuity, insufficient analytical attention has been directed toward the generational dynamics that increasingly mediate its contemporary relevance. This paper interrogates the role of Tiwa youth in reconfiguring the meanings, practices, and symbolic significance of Jonbeel Mela under conditions of late modernity .Drawing on qualitative ethnographic fieldwork conducted in Tiwa villages of Morigaon district during the Junbeel Mela seasons of 2025–2026, the study is based on participant observation, 22 semi-structured interviews with Tiwa youth (aged 18–35), and discussions with community elders and cultural custodians. The findings demonstrate that youth engagement with the mela is neither indicative of cultural rupture nor simple continuity; rather, it reflects a process of selective appropriation, symbolic reframing, and strategic distancing from certain ritual-economic practices. Jonbeel Mela emerges as a mutable cultural field wherein tradition is actively reconstituted through generational negotiation.

Keywords: Indigenous youth, cultural reproduction, negotiated modernity, Tiwa community, Junbeel Mela.

1. Introduction

The Tiwa are a native tribal community located in parts of central Assam and the nearby state of Meghalaya. Research shows a distinction between the hill and plain Tiwas, revealing differences in their family structures, settlement patterns, and rituals. Despite these differences, shared cultural practices, especially festivals and rituals, play a key role in shaping their collective identity.

The Junbeel Mela takes place near a crescent-shaped wetland in the Morigaon district. It attracts participants from various communities in both hill and plain areas. Historically, this mela has served as a regular gathering for trading agricultural products, forest resources, and handmade goods through bartering. Alongside its economic functions, the mela includes ritual performances, group fishing activities, and ceremonies that promote social unity and order in their worldview.

The mela is closely connected to traditional political power, marked by the ceremonial presence of the Tiwa king and council. This blend of economy, ritual, and governance makes Junbeel Mela a complex institution that goes beyond being just a marketplace or cultural event. In this detailed social and cultural context, the role of youth becomes significant.

1.1 - Ethnographic and Socio-Cultural Context

The Tiwa are an indigenous tribal group living in the hills and plains of Assam and Meghalaya. They are known for their internal diversity in family relationships, political systems, and ritual practices. The Junbeel Mela, held near a crescent-shaped wetland in Morigaon district, has historically provided a space for trade between hill and plain communities. This occurred through methods like barter, ceremonial taxes, and governance led by the ***Gobha Deoraja*** (King**).** Anthropological studies have documented the Tiwa community's social organization and ritual life *(Bordoloi, 2019; Mishra, 2004).*

2. **Statement of the Problem**

The inquiry into Indigenous festivals like Junbeel Mela has mainly looked at their historical roots, barter systems, ritual importance, and ongoing presence in Tiwa society. Recent research has examined how modernization, tourism, and commercialization affect the mela *(Roy, 2017; Doloi, 2024*). It highlights both continuity and change in economic and ritual practices. However, a significant gap remains in the current literature. The role of Tiwa youth as cultural mediators has not been thoroughly analysed or studied.

Most studies of Junbeel Mela usually take an institutional or community perspective. They suggest that cultural transmission is mainly led by elders, while overlooking how younger members understand, negotiate, and engage with their

traditions in light of today's socio-economic factors. Given the influence of education, migration, digital technology, and market integration, youth experiences offer important insights into the future of Indigenous cultural institutions. This research aims to address this gap by exploring how youth redefine tradition. It presents Junbeel Mela not as a fixed form of heritage but as a cultural space where tradition and modernity are constantly negotiated.

3. Study Area

The mela site lies within Morigaon district (26°15′–26°35′ N; 92°10′–92°35′ E), located near Jagiroad in Morigaon District, Assam. Morigaon district, found in central Assam, is known for its fertile plains, wetland areas, and farming landscape. These features play an important role in the social and ecological aspects of Tiwa cultural activities. The region is mainly home to the Plain Tiwa community, along with other ethnic groups, which makes it a key area for interactions between different communities. The Junbeel Mela, happening every year by the crescent-shaped Junbeel wetland, serves as an important cultural centre where rituals, barter exchanges, and the formation of shared identities occur. This makes it a great place to study youth involvement and cultural change.

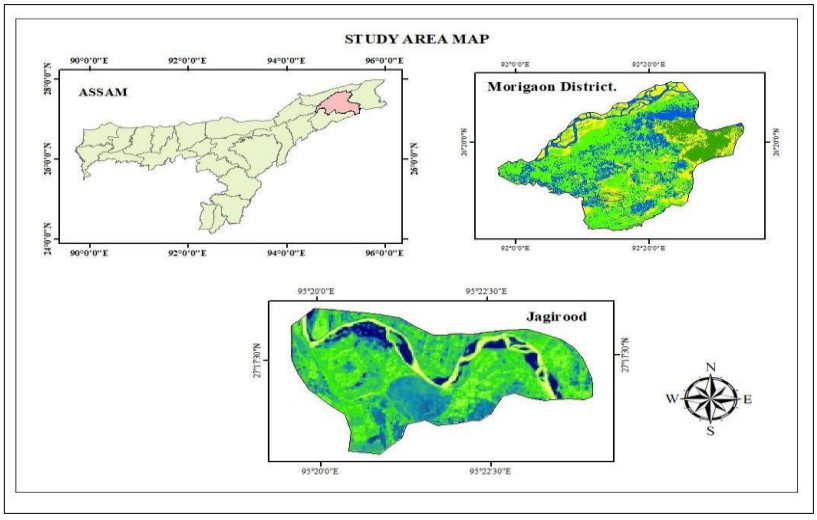


Figure 1 – Study Area Map

4.Methodology

The research uses a qualitative ethnographic approach. This method helps understand the experiences, interpretations, and practices related to indigenous cultural institutions. Primary data was collected from Tiwa villages in Morigaon District. The researchers used participant observation, semi-structured interviews, and focus group

discussions. Participant observation occurred during several Junbeel Mela celebrations to record how youth engaged in rituals, cultural performances, barter interactions, and public displays.

Fieldwork was conducted during the Junbeel Mela seasons of January 2025 and January 2026 in Tiwa villages around Jagiroad and Junbeel wetland in Morigaon district. The study involved 24 semi-structured interviews with Tiwa youth aged between 18 and 35, 6 interviews with community elders and cultural leaders, and two focus group discussions with local participants. Participant observation was carried out during the three-day mela festival. Secondary sources included peer-reviewed journal articles, ethnographic works, and past research on Tiwa culture, festivals, and modernization.

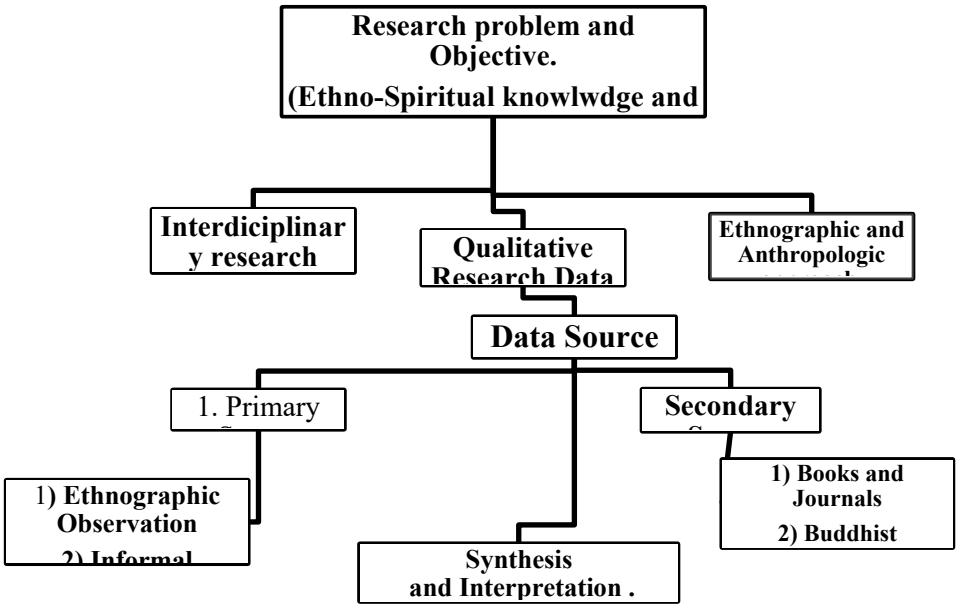


Figure 2 – Flowchart of Research Methodology

5. Review of Literature

Junbeel Mela stands out as a long-standing indigenous institution rooted in the Tiwa Tribe. It combines ritual practice, political authority, and economic exchange. Early historical studies place the mela within pre-colonial governance and inter-community relationships. They show its role as a space for barter, taxation, and traditional kingship. *Medok and Hazarika's* important research portrays Junbeel Mela as a reflection of the

Tiwa socio-political structure. They emphasize the ceremonial presence of the Gobha king and the mela's function in maintaining harmony between hill and plain communities.

Later ethnographic research has expanded this view by placing Junbeel Mela within the broader cultural environment of Tiwa society. *Bordoloi's* examination of Tiwa marts and melas highlights their role as symbolic institutions where ritual authority, memory, and identity are expressed visibly rather than mainly serving economic purposes. Complementary studies on Tiwa material culture and traditional political systems further show how festivals and fairs help reproduce culture. They embed social hierarchies, clan ties, and indigenous worldviews into daily practice.

Recent literature, especially in heritage and development studies, has looked at the effects of modernization, tourism, and market integration. *Roy (2017)* describes Junbeel Mela as a community-based cultural event increasingly influenced by tourism promotion and event management practices. This raises concerns about commercialization and outside intervention. Building on this, *Doloi (2024)* provides a detailed analysis of continuity and change. He claims that while modernization has changed economic practices—especially through partial monetization of barter—the mela's ritual essence and symbolic meanings remain strong. Such findings align with broader heritage research that views tradition not as a fixed entity but as a flexible practice.

Religious and ritual studies add complexity to this narrative by emphasizing cultural diversity. *Borkataky-Varma (2017)* shows how Tiwa ritual life incorporates elements from broader Hindu and '***Śākta traditions'*** while still retaining indigenous knowledge. Similarly, research on Tiwa festivals like Wanchua illustrates the role of ritual gatherings in passing down indigenous knowledge systems and strengthening ethnic identity across generations.

Despite this rich and diverse scholarship, a significant gap exists regarding youth and generational agency. Current studies mostly focus on institutional, historical, or ritual views, often portraying youth as passive heirs or as victims of cultural loss due to modernization. There is limited empirical investigation into how Tiwa youth actively reinterpret festivals like Junbeel Mela in response to education, migration, media, and shifting aspirations. This study aims to address this gap by bringing youth to the forefront as cultural agents who navigate tradition and modernity.

6. **Theoretical Framework -**

This research relies on three connected theoretical frameworks that allow for a thorough examination of Junbeel Mela as a dynamic site for cultural negotiation.

1. First, theories about cultural continuity and transformation view culture as a process and practice rather than a static legacy. Using interpretive and practice-based anthropology, culture is seen as something that is continuously created, recreated, and reinterpreted through daily social interactions *(Geertz, 1973; Bourdieu, 1977)*. In this view, tradition is not an unchanging inheritance passed down through generations. Instead, it is a set of meanings that are selectively activated and modified in response to shifting social and historical contexts.

2. Next, the concept of indigenous modernity challenges simple models of modernization that tie modernity to the decline of tradition. Researchers argue that indigenous communities actively adopt modern institutions, technologies, and ideas in ways that reflect their unique cultures. This leads to mixed social forms instead of cultural breaks *(Appadurai, 1996; Sahlins, 1999).*

3. Finally, studies on youth and identity formation emphasize young people as a vital social group that reflects broader changes. Youth are not just passive receivers of tradition; they actively engage with different norms and create new forms of belonging *(Arnett, 2000; Jeffrey & McDowell, 2004*). Together, these perspectives highlight Junbeel Mela as a vibrant cultural space where tradition and modernity intersect through activities led by youth.

7. Current Scenario of Junbeel Mela: An Ethno-Cultural Perspective

The examination of field-based data, considered alongside existing research, shows that the Junbeel Mela currently serves as a vibrant cultural space where meanings change across different generations. Instead of showing a simple decline due to modernization, the mela reveals a process of selective continuity influenced by Tiwa youth. This finding both supports and expands upon earlier studies that mainly viewed the mela through economic, ritual, or institutional lenses.

Historical and anthropological accounts have often highlighted Junbeel Mela as an indigenous institution combining barter exchange, ritual performance, and traditional governance. Although these elements remain significant, the current analysis shows that their social importance has shifted among younger Tiwas. Youth participants often express pride in the mela as a symbol of ethnic identity. Still, their involvement tends to be more symbolic rather than based in traditional rituals. This aligns with observations made by *Dewri* and *Saikia,* who argue that Tiwa material and ritual culture continues mainly as a cultural reference point rather than a complete way of life.



Figure 3 – The Age Old Barter System in Junbeel Mela, Morigaon.



One noticeable change concerns the barter system, long seen as the central feature of Junbeel Mela. Previous research viewed barter as both an economic activity and a way to promote harmony among communities. However, recent observations show that ***Tiwa youth largely see barter as a performance or heritage activity rather than a practical economic one.*** This supports *Doloi's* view that modernization has led to monetization and commercialization, causing a partial decline in the practical aspects of barter while keeping its symbolic meaning intact. Youth involvement thus reflects what could be termed "***heritage consciousness***" an awareness of cultural identity without full participation in traditional economic practices.

The influence of media and tourism adds complexity to this transformation. Studies focused on development have noted Junbeel Mela's growing recognition as a community-based tourism event. Current research shows that Tiwa youth actively engage by sharing images and stories of the mela on social media. This positions Junbeel Mela within a larger cultural visibility economy, where representation is as important as participation. Such behaviour aligns with broader anthropological discussions suggesting that modernity does not simply erase tradition but reshapes it through new forms of communication and representation.





Figure 4 – Community Fishing Catching and Cultural performances in Junbeel Mela.





Figure 5- The Entry gate[1] and Commercial Mela in Junbeel[2].

Sharp generational differences also arise in views of ritual authority and cultural transmission. Elders typically emphasize the importance of ritual obligation, continuity, and adherence to traditional norms, which aligns with Tiwa socio-religious structures that stress the authority of established institutions. In contrast, youth narratives show mixed attitudes toward strict ritual practices. While younger participants respect elders as keepers of knowledge, they express a desire for flexibility and relevance. This mirrors findings from studies on Tiwa festivals like ***Wanchua Misawa***, where youth participation is significant but often focuses on celebration and identity rather than *rigid ritual adherence*.

Importantly, this negotiated involvement should not be seen as cultural disengagement. Instead, it represents what scholars of indigenous modernity call ***'adaptive continuity'***, where traditions endure by adapting to changing goals and social contexts. Rituals and festivals still serve as platforms for sharing knowledge, though the ways of sharing are evolving. Research grounded in the Indian Knowledge Systems framework highlights that festivals increasingly serve as educational spaces where cultural meanings are conveyed symbolically rather than through formal instruction.Overall, the analysis shows that the resilience of Junbeel Mela comes not from untouched preservation but from its ability to be reinterpreted. Youth act as cultural

intermediaries who reinterpret inherited traditions in ways that connect to education, mobility, and digital modernity. This challenges narratives that depict indigenous youth as responsible for cultural decline. Instead, the findings support a view that sees tradition and modernity as processes that shape each other.

8. **Research Findings**

The study shows that Junbeel Mela continues to play an important cultural role for the Tiwa Tribe, even as its meanings, practices, and ways of participation change with social and economic trends. Instead of indicating a cultural decline, the mela demonstrates selective continuity, particularly influenced by young people's involvement.

A 24-years young Tiwa participant from Jagiroad stated:
" We participate in barter mainly to show our tradition to visitors. In everyday life we use money, but the mela reminds us of our cultural roots."

One of the important finding is the changing perception of the **barter system, which was once seen as the main feature of Junbeel Mela**. Earlier research described barter as a practical economic activity based on mutual exchange and community harmony. Now, fieldwork indicates that Tiwa youth view barter more as a symbolic or performative act than a practical way to trade goods. *Doloi's (2024)* observation that modernization and the use of money have made barter less central to the economy while preserving its cultural significance. Young people participate in barter to connect with their heritage rather than for practical needs. The study also finds a shift in how cultural knowledge is passed down. Traditional knowledge linked to rituals, authority, and exchange is no longer mostly conveyed through routine practice but through occasional festival participation, stories, and visual representation. Youth actively document and share images of the mela through digital media, changing Junbeel Mela into a platform for cultural visibility and representation.

An elder respondent noted:

"Earlier barter was necessary for survival, but now it is more symbolic. Still, it keeps our community united."

Another important finding relates to how different generations negotiate ritual authority. Elders continue to stress the importance of ritual obligation and custom, which matches anthropological accounts of Tiwa socio-political structure. In contrast, youth narratives express uncertainty about strict ritual frameworks, favouring flexibility and relevance. This does not show a rejection of tradition but reflects an adaptive approach, similar to patterns found in studies of Tiwa rituals and festivals within the Indian Knowledge Systems framework.

9. **Conclusion**

This study looks at Junbeel Mela as a lively cultural institution among the Tiwa Tribe of Morigaon District. It goes beyond simply viewing it as a static heritage event. The research shows that Junbeel Mela is not just kept alive through ritual continuity; it is actively reshaped through the involvement of younger generations, especially Tiwa youth. The findings indicate that youth participation involves selective borrowing, new interpretations, and flexible engagement with rituals, bartering, and authority. Instead of showing cultural decline, these processes illustrate what can be called adaptive continuity. Here, traditional practices adjust to fit modern realities influenced by education, mobility, media, and market connections. Youth play a very important role as cultural bridges, keeping Junbeel Mela relevant by translating tradition into ways that connect with current dreams while preserving its essential symbolic meanings.

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Chapter 40: Community-Based Tourism for Cultural Heritage Preservation: A Study of Nagaon District, Assam

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Abstract

Community-Based Tourism (CBT) empowers local peoples to plan, manage and share their tourist benefits. Community-Based Tourism (CBT) has significantly arisen as a participative plan that places local people as cultural heritage protectors by providing long-term livelihoods. In Nagaon District of Assam has also different cultural landscapes like from the indigenous bat cave complex of Baduli Khurung to the Vaishnavite history of Batadrava Than and the unique aqua-tourism approach at Jasingfaa which represents the living heritage practices that are nevertheless close to mainstream tourism development. In assam, culturally rich districts like Nagaon have great potential for Community-Based Tourism (CBT) led heritage preservation, but systematic research is lacking. This study analyses of different locations of Nagaon district to investigates the potential of Community-Based Tourism for maintaining these cultural landscapes such as Batadrava Than which was recently redeveloped as a major spiritual tourism destination. Jasingfaa which promotes Community-led aqua tourism; Baduli Khurung, where indigenous belief system shows human-bat coexistence and the proposed Samaguri ethnic village which aims to present 16 tribal communities. The study finds that although Assam has a supportive policy framework, community involvement, institutional coordination but sustainable planning is necessary for successful cultural preservation through CBT.

Keyword: Community-Based Tourism, Cultural, Heritage,indigenous,heritage.

1.Introduction

In many regions of the Global South, cultural heritage site is a valuable resource for the development of sustainable tourism. Tourism can provide financial supports for heritage

preservation while enhancing community well-being in areas where traditional and cultural landscapes are linked to local people (Timothy & Nyaupane, 2009; UNESCO, 2013). However, traditional tourism development models frequently give preference to outside investors but they ignore marginalize local communities (Tosun, 2005). That is why focusing more and more on community-based tourism (CBT) as a participatory strategy is essential because that gives local people control over the resources and advantages of tourism (Scheyvens, 1999; Goodwin & Santilli, 2009).

Northeast India, especially Assam, is known for its diverse cultural heritage practices, sacred landscapes and cultural traditions. Many districts of Assam are still lacking in adequate tourism infrastructure and economic opportunities despite their rich cultural heritage (Dutta, 2021). The Nagaon district is an example of how historical landmarks, places of worship and scenic vistas can coexist in a vibrant cultural environment. However, there hasn't been much research focus on how community-based tourism contributes to the preservation of this history.

By looking at important historical sites that represent the district's cultural diversity, this study explores how community-based tourism can support the preservation of cultural heritage in Nagaon district. The study focuses on a number of culturally significant sites that shows various aspects of the growth of heritage-based tourism in the district.

1.1 Objectives of the Study

This research has its simple objectives to explore and examine the Cultural Heritage Preservation in Nagaon district of Assam with the help of Community-based tourism. The specific objectives of the study are:

1. To identify and study the important cultural heritage places of Nagaon district.
2. To understand how local communities are connected with these heritage sites.
3. To examine the main challenges in developing tourism in Nagaon district.
4. To suggest ways to develop sustainable community-based tourism.

1.2 Database and methodology

The information of this study has been mainly collected from secondary sources of data. The different sources of the data have been used in this research and are collected from the published sources like books, journals, reports, publications and concerned web sites etc.

2. Community-Based Tourism and Heritage Preservation

The term "community-based tourism" refers to the travel in which local communities actively engage in the management, decision-making and the sharing of benefits sharing.

According to Scheyvens (1999), CBT can empower communities in a number of ways, including social, political, psychological, and economic. When CBT is applied well in these places, it can create jobs, boost cultural pride and promote local stewardship of cultural assets.

From a point of view of heritage, tourism can be very important for maintaining intangible cultural practices and safeguarding historic sites. According to Timothy and Nyaupane (2009), when communities continue to be actively involved in the interpretation and management, heritage tourism can promote cultural continuity. On the other hand, poorly organized tourism can result in environmental deterioration and the commercialization of culture. Thus, sustainable tourism development requires the integration of heritage preservation with participatory governance (UNWTO, 2013).

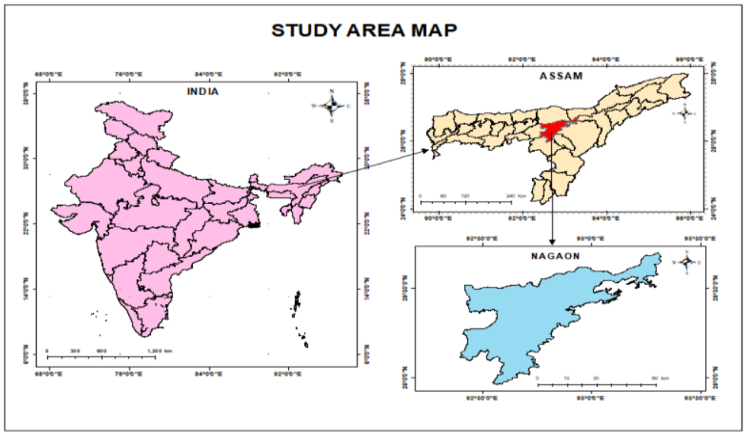


Fig1 .Study Area: Cultural Heritage Sites of Nagaon District

Kaliabor Manor Bungalow*:* It is located in the Kaliabor area of the Nagaon district. It is an important colonial-era heritage structure. The bungalow, which has historically been linked to the British administrative presence in Assam, exhibits the cultural and architectural effects of colonial rule in the area (Allen, 1905). The building now stands in a picturesque location close to the Brahmaputra valley, making it a possible heritage tourism destination that blends nature-based travel with historical interpretation (Guha, 2016).

From the perspective of community-based tourism, the Kaliabor Manor Bungalow provides chances for local involvement through guiding services, heritage interpretation and hospitality businesses. Tourism-related events like homestays, cultural events and artisan shows which display local customs that may benefit local communities. Beside this, the site's closeness to other cultural landmarks in the Kaliabor area opens up the potentiality of the integrated tourism circuits which link indigenous cultural landscapes with colonial heritage.

Besides that, the preservation of colonial heritage places like Kaliabor Manor Bungalow promotes educational tourism and increased historical awareness. These locations can serve as platforms for promoting a sustainable tourism while guaranteeing that local residents will be benefitted economically when they are managed through community partnerships and heritage protection efforts (Ashworth & Tunbridge, 2000; Graham, Ashworth, & Tunbridge, 2016).

Bordowa Than: It is the birthplace of the saint-scholar Srimanta Sankardev. Bordowa (Batadrava) Than is one of the most important Neo-Vaishnavite heritage sites in Assam. It serves as a major religious and cultural hub where devotional practices, performing arts and theatrical traditions continue to thrive among the Assamese people. Every year, thousands of devotees travel to Bordowa especially during festivals honouring Sankardev's legacy (Neog, 2017).

The recent redevelopment projects under the Srimanta Sankardev Avirbhav Kshetra project are to improve the site's tourist amenities and build infrastructure. The number of tourists has increased as a result of these changes and the nearby communities now have more chances for community-based tourism which will lead to develop the region. Through homestay accommodations, the sale of traditional handicrafts and cultural events associated with Neo-Vaishnavite customs where locals can also engage in tourism activities (Sarmah & Borah, 2025).

Beyond religious tourism, Bordowa Than is a significant place because it is a living cultural environment where customs from the ancient past continue to influence to give them a local identity. Increasing of community involvement in tourism planning can maintain and develop the heritage site's cultural and spiritual qualities while benefits the locals.

Bharali Namghar: A traditional Assamese religious place that is essential to community life is Bharali Namghar. Being houses of worship, Namghars are cultural venues for social gatherings, traditional dance and music. Sankardev and his followers built a wider Neo-Vaishnavite cultural legacy which is seen in the Bharali Namghar in the Nagaon district.

Cultural heritage sites like Bharali Namghar provide visitors with the chance to engage in genuine local customs and rituals. Participation in cultural events, guided religious interpretation and educational programs that acquaint tourists with the intellectual underpinnings of Neo-Vaishnavism and these are all examples of community-based tourism activities. Moreover, careful management is necessary to preserve the sanctity of Namghars through tourism while upholding religious holiness ((Poria et al., 2003). In order to decide on proper visitor access and cultural representation, community leadership is necessary. Namghars can develop into significant heritage site for cultural education and heritage preservation when tourism activities are in line with local values

Baduli Khurung: The place Baduli Khurung is known for its history and the different species of bats inside the cave which plays an important role in terms of tourist attractions. The Baduli Mela that is the main attraction of this place and is celebrated every year after two days of Maha Shivaratri for three days where local people and tourists visit to worship and see various species of bats. After this mela there are almost no tourists at the other times of the year and the place has not been popular or well known (Weaver, 2001). The various species of bats inside the cave and fair are the main attraction for tourists, that's why tourists are almost not seen at the other times of the year except during the Baduli Mela (fair).

Baduli Khurung is surrounded by hills, offering attractive scenery. A road has been cut through the hills to reach the Cave of Baduli Khurung. The area represents an example of how ecological landscapes and cultural practices can be integrated into community-based tourism initiatives (Kunz et al., 2011). Visitors to the area can experience rural livelihoods, traditional agriculture, and local culinary practices. Eco-tourism initiatives in places such as Baduli Khurung have the potential to generate income for local communities while promoting environmental conservation. Community involvement in tourism planning helps ensure that natural resources are managed sustainably and that tourism activities do not disrupt local ecosystems (Lane & Kastenholz, 2015). By combining cultural experiences with nature-based tourism, Baduli Khurung shows how rural landscapes can become important assets for sustainable tourism development in Nagaon district.

Silghat: Silghat is a historic river port located along the Brahmaputra River and has long served as an important commercial and transportation hub in central Assam. The place's strategic location has contributed to its development as a gateway connecting riverine trade routes with inland settlements.

In recent years, Silghat has gained attention as a potential heritage tourism destination due to its historical significance and scenic riverfront landscape (Garrod & Fyall, 2000). Community-based tourism initiatives in Silghat could include river tourism, cultural festivals as well as heritage walks that highlight the region's historical connections to trade and cultural exchange. Integrating tourism development with community participation is essential to ensure that local residents benefit from increased visitor activity. Heritage conservation efforts should focus on protecting historic structures and cultural traditions associated with the riverfront.

Purani Godam Kathar Devi Shrine: The Puranigudam Wood-Carved Durga Puja is one of India's most extraordinary cultural heritage sites. Located roughly 12 km from Nagaon town, it defies the standard Hindu tradition of *Pratima Visarjan* (immersion of the idol) by worshipping a permanent, century-old wooden masterpiece. The story began in the late 19th century with a master craftsman named Leshadhar Sarma, affectionately known

as Lerela Khanikar. Khanikar was a devout sculptor who found the annual immersion of his clay creations in the Kolong River deeply painful. Driven by the desire to create a deity that would remain with the community forever, he spent months carving the entire Durga family - Durga, Lakshmi, Saraswati, Kartik, Ganesh, and the demon Mahishasura - from a single Bael (Wood Apple) tree. The idol was completed and consecrated in 1901. The idol is a marvel of Assamese woodcraft. It was made within a single frame (*ek-chala*), the figures are life-sized and intricately detailed. Unlike modern commercial idols, this set reflects the traditional aesthetic of the Ahom and colonial eras.

The Unique Traditions which make this Puja truly distinct are its specific rituals:

a. Symbolic Immersion: Since the wooden idol cannot be submerged, so a symbolic ritual is performed. A mirror is placed in a bowl of water to reflect the deity and the reflection is 'immersed' to satisfy the scriptural requirement of Ghat-Bisarjan.

b. The "Waitlist" for Clothes: It is a matter of great pride for locals to donate the Goddess's new saree and ornaments. Due to the high number of devotees, there is a waiting list for donors that reportedly spans over 15 to 20 years.

c. Preservation: Every year before the festival, the idol undergoes a meticulous cleaning and a fresh coat of organic paint to maintain its luster.

The Puranigudam Puja acts as a bridge between the past and present. While thousands of clay idols are built and destroyed across Assam every year, this wooden deity stands as a silent witness to over 120 years of history. It has survived floods, social changes, and the passage of time, becoming a symbol of the artistic resilience of the Nagaon district. Today, the site is not just a place of worship but a heritage destination that draws researchers, historians, and devotees from across the Northeast.

Ranthali: Traditional Gold Ornament Craft Heritage: Ranthali, a village located in the Nagaon district of Assam. It is widely known for its traditional craftsmanship in gold ornament making (Bora, 2019). The artisans of Ranthali have preserved a distinctive and unique form of Assamese jewellery-making that reflects the cultural identity of the region in the national level. Traditional ornaments such as junbiri, dugdugi, keru, thuriya and lokaparo are crafted using techniques that have been transmitted through one after one generation within artisan families. These ornaments are closely associated with Assamese cultural traditions and are commonly worn during festivals, weddings and other ceremonial occasions (Baruah, 2005; Gogoi, 2019). The craft heritage of Ranthali represents an important component of Assam's intangible cultural heritage. Unlike industrial jewellery production, the ornament-making process in Ranthali relies heavily on manual techniques and traditional tools. Skilled artisans design intricate patterns inspired by natural motifs such as flowers, leaves and celestial forms. The production

process involves melting gold, shaping delicate designs, engraving patterns and polishing the ornaments. This craftsmanship requires extensive experience and artistic knowledge that is often passed down through family apprenticeship systems (Goswami & Sarma, 2018).

From the perspective of community-based tourism, Ranthali offers a unique opportunity to promote craft-based heritage tourism. Visitors interested in cultural experiences can observe jewellery-making workshops, interact with artisans and learn about the historical and cultural significance of Assamese ornaments (Bhuyan & Saikia, 2025). Craft villages around the world have successfully developed tourism activities such as live demonstrations, craft museums and artisan markets that support local livelihoods while preserving traditional knowledge systems (Timothy & Nyaupane, 2009; UNESCO, 2013).

Moreover, integrating Ranthali into a broader cultural tourism circuit within Nagaon district could enhance the visibility of traditional craftsmanship. For instance, visitors travelling to Bordowa Than or the Kaliabor region could also explore Ranthali as a craft heritage destination which will boost the economy of the region and will improve the lifestyle of the native people. Community based participation would be essential in designing the tourism experiences that respect the cultural significance of the craft while ensuring fair economic returns for artisans.

Choran Ahem: The Choran Ahem initiative in Natundanga village in the Bagori range of Kaliabor, is a recognized example of community-based tourism. It is successfully transformed a previous poaching hotspot into a famous destination for Karbi cultural preservation. The Ingham Self-Help Group and the Natundanga Eco-Development Committee took the initiative, which was established in 2008 as a strategic cooperation between WWF-India, the Kaziranga National Park authorities as well as the local administrative bodies. Its name, which translates to ‘Kitchen and Dining Place’ in the Karbi language, emphasizes its primary focus on gastronomic history as a tool for economic development. By providing a sustainable livelihood for approximately fifty local families, the center has effectively incentivized the community to move away from illegal forest activities and toward the protection of the surrounding ecosystem.

Choran Ahem brings eco-sensitive heritage tourism ideas both architecturally and operationally, reducing its environmental impact through the use of solar electricity and traditional bamboo construction. The center serves as a living repository for the Karbi people's intangible heritage, providing guests with an immersive experience featuring real tribal cuisine, traditional weaving, and folk hospitality. The initiative received significant national attention in early 2025 when it was awarded the Asom Gaurav Award, recognizing its effectiveness in combining conservation and cultural pride.

Challenges in Developing Community-Based Tourism for Cultural Heritage Preservation in Nagaon District:

Although Nagaon district has rich cultural and ecological heritage, the development of community-based tourism (CBT) in the region faces several challenges. These challenges affect both the preservation of cultural heritage and the participation of local communities in tourism activities.

1. Limited Infrastructure and Accessibility: One of the major challenges is the lack of adequate tourism infrastructure in many heritage sites of Nagaon district. Several culturally important locations such as Baduli Khurung, Ranthali, and Purani Godam Kathar Devi shrine have limited transportation facilities, poor road connectivity, and insufficient visitor amenities. Basic services such as accommodation, sanitation facilities, information centers, and signboards are often lacking. Without proper infrastructure, it becomes difficult to attract tourists and provide quality tourism experiences.

*2. Lack of Awareness and Promotion***:** Many heritage sites in Nagaon district remain relatively unknown outside the local region. While places like Bordowa Than attract pilgrims, other culturally significant locations such as Bharali Namghar, Chatial Satra of Kuoritol, and Samaguri Beel (Pokhi Tirtha) receive limited tourism promotion. The absence of effective marketing strategies, digital promotion, and tourism information reduces the visibility of these destinations. As a result, the tourism potential of the district remains largely underutilized.

3.Limited Community Participation: Community-based tourism requires active involvement of local communities in planning and managing tourism activities. However, in many cases local people are not fully aware of the economic opportunities that tourism can create. Lack of training in hospitality services, tourism management, and entrepreneurship limits the participation of residents in tourism initiatives. Without proper capacity building, communities may not be able to benefit fully from tourism development.

4. Risk of Cultural Commodification: Another challenge is the possibility that tourism may lead to commercialization or distortion of cultural traditions. Religious institutions such as Bordowa Than, Bharali Namghar, and Chatial Satra hold deep spiritual significance for local communities. If tourism activities are not carefully managed, cultural practices may be altered primarily for tourist entertainment, which can weaken their original meaning and authenticity.

*5. Environmental Concerns***:** Natural heritage sites such as Samaguri Beel require careful environmental management. Increased tourist activities may create problems such as waste generation, disturbance to bird habitats, and pressure on local ecosystems.

Sustainable tourism planning is therefore necessary to ensure that tourism development does not damage the ecological balance of the wetland and surrounding areas.

6. Institutional and Policy Limitations: Tourism development in many rural areas of Assam is still largely government-driven. Coordination between local communities, tourism authorities, and cultural institutions is often weak. Limited funding, lack of long-term planning, and insufficient policy implementation can slow down the development of community-based tourism initiatives in Nagaon district

Results and Discussion

The analysis shows that the Nagaon district has a diversified cultural landscape that can promote community-based tourist development. The heritage sites researched in this study represent several aspects of cultural heritage, such as religious institutions, colonial architecture, holy landscapes, and rural cultural landscapes.

However, a number of difficulties hinder the district's tourism development. First, many heritage sites still lack adequate infrastructure and visitor facilities. Second, tourism activities are frequently undertaken without the active participation of local populations. Third, historic interpretation and documentation are still inadequate, lowering the educational value of tourism encounters.

Community-based tourism can help address these issues by encouraging participatory planning and local entrepreneurship. Homestay programs, guided heritage tours, and community cultural festivals, for example, could improve visitor experiences while also providing revenue to local residents.

Suggestions for Developing Community-Based Tourism in Nagaon District

To promote community-based tourism (CBT) and ensure the preservation of cultural heritage in Nagaon district, several practical steps can be taken by local communities, government authorities and tourism stakeholders.

1. Improvement of Tourism Infrastructure: One of the most important steps is to improve the basic tourism infrastructure around the heritage sites. Roads, transportation facilities, sanitation systems as well as visitor information centres should be developed in places such as Bordowa Than, Silghat and Samaguri Beel. Proper signboards, parking areas and resting facilities can make these destinations more accessible and comfortable for visitors and tourists. Developing this small-scale accommodation will facilities such as homestays can also encourage tourists to stay longer in the region.

2. Encouraging Community Participation: Local communities could play a central role in tourism planning and management. Training programs need to be organized to teach residents about tourism services such as guiding, hospitality, handicraft marketing and small business management systems. When communities become active participants in

tourism activities, they are more likely to protect cultural heritage and benefit economically from tourism.

3. Promotion of Cultural Heritage: Many heritage sites in Nagaon district are not widely known outside the local area. Effective promotion through digital media, tourism websites and cultural festivals can increase awareness of these destinations. Events showcasing traditional dance, music, crafts and food can attract tourists while also strengthening local cultural identity.

4. Development of Heritage Tourism Circuits: Creating a heritage tourism circuit which can connects major cultural sites and significantly improve the tourism development in the district. For example, a tourism route linking Bordowa Than, Kaliabor, Ranthali craft village, Samaguri Beel, Silghat riverfront and Chatial Satra could provide visitors with a comprehensive cultural experience. This will encourage tourists to explore multiple locations and distribute economic benefits across different communities.

5. Support for Traditional Crafts and Local Products: Ranthali, known for traditional gold ornament making, should be supported through tourism initiatives. Visitors can be encouraged to observe craft demonstrations, interact with artisans and purchase locally made products. It will Promote traditional crafts which will help in preserve cultural knowledge while creating livelihood opportunities for local artisans.

6. Environmental Conservation and Sustainable Tourism: Natural heritage areas such as Samaguri Beel must be protected through environmentally responsible tourism practices. Community awareness programs, waste management systems and eco-tourism guidelines should be implemented to ensure that tourism activities do not harm the local ecosystem or wildlife.

7. Stronger Institutional Support and Policy Implementation: Government agencies, tourism departments and local organizations should work together to develop long-term tourism strategies for Nagaon district. Providing financial support, training programs and marketing assistance can help communities establish successful tourism initiatives.

Conclusion

This study addressed the potential of community-based tourism (CBT) as an approach for preserving cultural heritage in Assam's Nagaon district. The analysis shows that the district has a diverse and interrelated cultural landscape that comprises religious institutions, historical landmarks, craft practices, sacred ecological areas and rural heritage surroundings. Bordowa Than, Kaliabor Manor Bungalow, Bharali Namghar, Baduli Khurung, Silghat, Mrityunjay Mandir, Purani Godam Kathar Devi shrine, Kuoritol's Chatial Satra, Ranthali craft village and Samaguri Beel (Pokhi Tirtha) are

examples of the region's cultural and ecological diversity. These locations highlight how cultural history in Nagaon is strongly ingrained in everyday community life, making them ideal for community-driven tourism efforts.

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Chapter 41: Vulnerability to Agency: Intersectional Gender Perspectives on Climate Justice and Sustainable Development

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Abstract

Climate change is not a gender-neutral phenomenon; its impacts are shaped by existing social hierarchies, economic inequalities, and power relations. It explores how climate vulnerability is produced and experienced through intersecting structures of gender, class, ethnicity, age, and geographic location. Moving beyond narratives that portray women solely as passive victims of environmental crises and adopts an intersectional gender lens to examine how marginalized groups exercise agency in responding to climate risks and development challenges. Drawing on feminist political ecology and climate justice frameworks, it argues that vulnerability is socially constructed and deeply embedded within patriarchal and neoliberal development systems. The analysis highlights how unequal access to land, resources, decision-making spaces, and climate finance intensifies gendered risks, particularly in rural and disaster-prone regions. At the same time, it documents grassroots adaptation practices, community leadership, and collective action led by women and marginalized communities. By foregrounding lived experiences and local knowledge to achieving climate justice requires recognizing marginalized populations not merely as beneficiaries of aid but as active agents shaping resilient and sustainable futures. Integrating intersectionality into climate policy and development planning is therefore essential for building inclusive and socially just sustainability pathways. The chapter demonstrates that sustainable development must move from a protection-oriented approach toward transformative, rights-based models that prioritize participation, equity, and structural change.

Keywords: Intersectionality; Gender and Climate Change; Climate Justice; Sustainable Development; Feminist Political Ecology; Social Inequality

Introduction

Climate Change, Inequality, and the Question of Justice

Climate change is commonly defined as the planetary crisis, scientific issue of carbon levels in the atmosphere and increasing global warming. Although this framing emphasizes that the urgency of mitigation is a thing, it can mislead about one basic truth, which is that climate change is a crisis of inequality as well. Physical mechanisms that cause climate disruption can occur anywhere in the world but their effects are highly imbalanced. Disaster, ecological destruction, and economic devastation often fall on the shoulders of communities that have made minimal contributions to the level of greenhouse gases in the atmosphere (IPCC, 2022; Roberts and Parks, 2007). Feminist theorists warn that the easy stories of women as victims are dangerous because they tend to affirm paternalistic structures of development and dismiss the agency of women (Arora-Jonsson, 2011; MacGregor, 2010). Gender, rather, needs to be perceived as overlapping with other power axes such as caste, ethnicity, indigeneity, age, disability, and socio-economic status. Intersectionality, which was initially proposed by Crenshaw (1989), provides a critical tool of analysis in making sense of these overlapped dynamics. It shows the operation of systems of systems of oppression simultaneously, in the ways that create differences in experience of risk and resilience. A rich city woman, for instance, might be affected by the problem of climate change differently than a rural indigenous woman with few land rights and political representation. The vulnerability of the latter is not merely a result of exposure to the environment, but rather of the structural deprivation of resources, decision-making, and institutional protection. Feminist political ecology goes even further and analyses gendered and politicized aspects of environmental governance and knowledge production, as well as access to resources (Rocheleau et al., 1996; Elmhirst, 2011). The environmental policies are not neutral as they indicate power relations whereby the knowledge of some individuals is considered and their interests are given priority. Carbon markets, reforestation, or infrastructure development are climate mitigation strategies that may inadvertently tend to marginalize communities in which people rely on land and forests to earn their living (Escobar, 2018). This chapter states that vulnerability to climate change is a social construct, which is politically produced. It argues that in order to move toward a sustainable future, the perspective on vulnerability should be replaced with the acknowledgment of the agency, empowerment, and systemic change. The marginalized communities are not only the victims of the environmental change, but they are the agents of the adaptation strategies, social movements, and alternative models of development. This chapter redefines climate governance as a structural justice project and not a technical management one by incorporating intersectionality, feminist political ecology, and climate justice.

The Social Construction of Climate Vulnerability

Vulnerability is one of the central concepts of climate discourse. According to Intergovernmental panel on climate change (IPCC, 2022) vulnerability is a product of exposure, sensitivity and adaptive capacity. Although such a framework is analytically helpful, it exposes inequality to depoliticization in the sense that vulnerability becomes a natural property as opposed to a social construction of a property. A critical approach perceives vulnerability as a result of unequal opportunities to power, resources, and institutional support (Ribot, 2014).Notably, governance practices are also modes of reproduction of vulnerability. Inclusive solutions are usually fronted as decentralization and participatory initiatives, but the power imbalance in societies may defeat active participation (Agarwal, 2001). Capturing the resources of adaptations to the elite might leave out women, low caste, or minorities. The idea of misrepresentation by Fraser (2008) emphasizes the fact that the nature of climate policy is often made by people who are most impacted by the policies themselves. Discursive creation of vulnerability is also important. The stereotyping of some groups as vulnerable may facilitate stereotyping and legitimize the top-down intervention (Arora-Jonsson, 2011). According to feminist scholars, these narratives hide agency and resilience. The women and marginalized communities have their knowledge of adaptation and a shared approach, which is often ignored by technocratic planning (Nightingale, 2006; Sultana, 2014). The concept of vulnerability as socially constructed changes emphasis of the individual lacks to the inequalities within a system. It stresses that it is not only the geographic location where people are exposed to the risk of climate, but also the result of a political and economic organization. The answer to vulnerability is therefore a structural transformation: land reform, resource redistribution, inclusion of the governance system, acknowledgement of indigenous rights, and investment in the social protection system. In this context, vulnerability is not simply a state, which has to be controlled but an indicator of inappropriateness. It shows where the social systems have failed to guarantee equal access to security, opportunity and voice. Intersectional climate analysis reveals the structural sources of vulnerability therefore creating avenues to more equitable and sustainable futures where adaptation is not a stop-gap coping measure, but is a component of a wider-ranging initiative of social change.

Intersectionality and the Matrix of Domination

Black feminist legal scholarship gave rise to intersectionality as a critical form of intervention into structures that considered oppression systems as discrete and cumulative. Kimmerer Crenshaw (1989) came up with the idea as a way of showing how the experiences of the Black women in the face of discrimination were made invisible to the legal system that considered race and gender separately. The idea of anticipating co-occurrence of oppression led to the critique of single-axis analysis and revealed the shortcomings of the generalization of terms like women or racial minorities. Instead of posing the question of whether race or gender is more important, intersectionality looks at the way these two factors are mutually formed in a greater formation of power (Cho et

al., 2013). Environmental exposure in stratified societies like South Asia is also influenced by the caste hierarchies and gender. Women in lower caste can either be living in flood-prone regions or no access to irrigation facilities because historically they were not allowed to own land (Guru, 2009; Agarwal, 1994). The women of the upper caste, despite being bound by the patriarchal norms, might have an advantage in terms of higher social capital and access to institutions. In intersectionality thus, inequalities among gender categories are seen. Privilege is also brought out in the framework. The urban elite women can access climate resistant housing, diversification of their livelihoods, insurance plans and political networks. In the meantime, landless women in the rural areas could rely on climate-dependent subsistence agriculture with little security measures. Climate policies that are gender responsive and do not consider the differences in classes or caste can either favor already advantaged groups disproportionately, which will create intra-group inequality (Arora-Jonsson, 2011). Intersectional analysis is therefore a remedy to the good yet not quite sensitive policy measures. Intersectionality alters the situation with climate vulnerability by turning it into a relational and political situation. It moves the focus not only on isolated categories but systems of domination which determine the different exposure and adaptive capacity. By doing this, it offers a strong analytical grounding of climate justice by pointing out the fact that sustainable futures need to deal with the combination of structures of inequality and cannot approach environmental risk separately.

Feminist Political Ecology: Gendered Knowledge and Resource Governance

Feminist political ecology (FPE) was an important reaction to the gender blind environmental studies and policy in the 1990s (Rocheleau et al., 1996). FPE combines the feminist theory and political ecology as it studies how gender influences access to resources, environmental knowledge, and power to make decisions. It denies the belief that environmental governance is neutral or technocratic but instead it argues that ecological management is inherent within a larger political and economic framework. One of the fundamental contributions of FPE is that it pays attention to situated ecological knowledge. The daily work and embodied practice of feminine farming, forest-gathering, fisheries and water management commonly lead to elaborate awareness of ecosystems (Shiva, 1989). These type of knowledge are seed preservation methods, adaptation methods that are seasonal, biodiversity conservation activities and soil management. Nonetheless, formal environmental governance often excludes such knowledge and gives special precedence to scientific expertise and the market-based models (Nightingale, 2006). The women may not have the right to ownership or even inheritance, thus, this may lock them out of credit schemes, compensation funds, and land-use decision making. Property regimes can thus not be excluded in terms of climate resilience being gendered. The marginalized communities lack control over the decision-making processes at higher levels. Such scoring imbalance promotes structural inequities where the power is concentrated in remote institutions as the locals face the impact of the environment.

Significantly, the current FPE disregards essentialist beliefs that women have a natural attachment to nature. There were instances of romanticism of the women environmental roles by early ecofeminist arguments. Feminist political ecologists rather focus on the fact that gendered environmental responsibilities are historically specific and socially constructed (Nightingale, 2006). The ecological knowledge of women is based on division of labor and material conditions as opposed to biological determinism. Feminist political ecology also shows that climate adaptation is not a technical problem but a political struggle through the conceptualization of environmental governance as a sphere of power relations. Sustainable development demands beyond renewable energy systems or carbon accounting systems. It requires redistribution of resources, acknowledgment of other knowledge systems and democratization of environmental decision making.

Climate Justice and Environmental Justice Traditions

Climate justice is based on the environmental justice literature that has recorded the racialized exposure to environmental injustice (Bullard, 2000). Schlosberg (2007) has extended the theory of justice to incorporate justice of recognition and justice of participation as well as justice of distribution. Climate justice features historical responsibility and global inequality. Less developed countries are being severely affected and the cumulative emissions have mostly been made by the industrialized nations (Roberts and Parks, 2007). However, justice is also intra-national. Land policies, urban planning and disaster relief systems tend to favor the elites. According to Walker (2012), justice should not only take the procedural aspect but also the distributive aspect. Procedural justice involves a participatory decision making. Distributive justice relates to distribution of risks and benefits. The capabilities are also incorporated into climate justice by Schlosberg and Collins (2014) who state that the degradation of the environment worsens the basic human freedom.

Capitalism, Extraction, and Ecological Inequality

Climate vulnerability cannot be conceived out of the context of the world politics economy that has generated ecological crisis. The modern-day climate crisis is not merely the consequence of overproduction of emissions but it lies in a historically specific mode of development founded on capitalism, extraction and accumulation. Since the Industrial Revolution, the growth of capitalists has been relying on the burning of fossil fuels, industrialized agriculture, mining of minerals, and massive commodification of land, labor, and nature (Moore, 2015). These processes have facilitated a level of economic growth like never before, but at the cost of pushing the ecological costs to the periphery and concentrating wealth and political power in the hands of elite institutions and the industrialized nations. Jason W. Moore (2015) approaches capitalism as a world-ecology, highlighting the fact that capitalism does not exist outside of nature but structures nature as an arrangement of cheap sources-of-input, including cheap labor, cheap energy, cheap food, cheap raw materials, etc. In this particle, the appropriation of nature is a systematic

way of maintaining accumulation. Poor communities, racialized groups, small island states and agrarian communities tend to live in areas of great ecological vulnerability. Extraction cannot exist without capital accumulation. Mining, logging, monoculture plantations, and major infrastructural projects redefine the landscapes as well as breaking up the local livelihoods. The results of these processes are what David Harvey (2003) refers to as accumulation by dispossession where communities become deprived of access to land and resources by privatization and enclosure. Dispossession increases the vulnerability to climate by undermining traditional adaptive capacities. Subsistence communities lose essential safety nets when the common lands become privatised or when forests are commodified with the use of carbon offset schemes.Carbon markets can enable the high-emitting industries to buy offsets instead of restructuring the production systems. Climate vulnerability is therefore a reflection of economic power dominance globally. Making sense of climate change according to capitalism and extraction, it is important to note that vulnerability is not only an environmental but also a political-economic problem. Emission reduction is not the only way to address climate justice; it is also necessary to challenge the accumulation systems founded on the highest priority given to profits rather than on the ecological sustainability and social justice. Devoid of structural change, the mitigation and adaptation process can turn into technocratic changes in an extractive mode of development.

Colonial Legacies and Decolonial Environmental Critique

Climate injustice cannot be described outside the context of colonial histories which restructured land, labor and ecological relations in much of the Global South. Colonialism in Europe was an extractive economy that transformed landscapes by plantation farming, mining, and monoculture production (Escobar, 2018). These activities interfered with various agroecological systems and substituted them with production systems that aimed to serve urban markets. international climate negotiations are usually characterized by the inequities of geopolitics that are based on colonialism. The former colonial states have a higher institutional capacity and power in the international forums and most of the states that were formerly colonized have debt burdens and economic dependency, which lock out policy options. Such climate finance discussions as Loss and Damage indicate the call of historical responsibility based on acknowledgment of colonial exploitation. Decolonized environmental criticism thus demands the creation of structural change on more than one level. First, it requires an acknowledgment of the past ecological degradation. Second, it needs institutional change to see the marginalized communities meaningfully involved in the process of climate decision-making. Third, it demands legitimization of a wide range of knowledge regimes, such as indigenous ecological knowledge that have maintained landscapes over generations. The sustainability agendas will become another manifestation of top-down intervention without addressing the problem of colonial hierarchies in the institutions of development.

Caste, Ethnicity, and Stratified Ecological Exposure

According to intersectional analysis, the structure of caste and ethnicity produces environmental vulnerability, especially in South Asia and other societies based on stratification. Caste hierarchy impacts distribution of land, occupational and settlement patterns. The communities belonging to lower caste groups tend to be located in the environmentally unstable regions such as floodplains, degraded land or even in informal urban slums because in the past they were not given the right to own resources (Guru, 2009). These populations are out of proportionately impacted by climate-induced flooding or cyclones. There is also marginalization of ethnic minorities in the regard of resources. Ribot (2014) believes that, occasionally, decentralization reforms strengthen the local level capture of the elite, leaving social and ethnic groups in the periphery out of the decision-making process. According to Kaijser and Kronsell (2014), climate change should be perceived in terms of overlapping axes of power such as race and ethnicity. By way of example, ethnic majority groups can be privileged when it comes to accessing relief funds in case of a disaster recovery process. Research on environmental justice demonstrates that communities of color, the racialized and the marginalized communities are more exposed to pollution disproportionately (Bullard, 2000). These environmental burdens are multiplied with the cumulative risk of climate change. In this way, the vulnerability is defined at the point of the ecological exposure and social stratification.

Migration, Displacement, and Climate Mobility

Structural inequality is another aspect that mobility brings about due to climate. Black et al. (2011) posit that, under the influence of the factors related to the environment, the political, and economical ones, the process of migration decisions is conducted. Better-off households can migrate in advance as the poorer populations are trapped in the dangerously-prone regions. Migration is based on gender. The men can be migrating to work in the wage sectors and these leaving women with more agricultural and domestic duties (Arora-Jonsson, 2011). In other settings, women develop into precarious labor markets in cities, where women are exploited and legal protection is less than adequate. The native and minority populations face displacement that is not compensated or properly acknowledged (Whyte, 2017). Cultural affiliations to the land can be disregarded under planned relocation programs, enhancing the adaptation to technical relocation. Climate mobility is therefore an unequal adaptation ability based on socio-economic and political marginalization.

Gendered Impacts on Food Security and Agricultural Livelihoods

Women represent a significant population of agricultural workforce in the Global South, especially in South Asia and Sub-Saharan Africa (FAO, 2011; Black et al., 2011. Although they make very important contributions, they often do not have land tenure security, formal credit, agricultural extension, and climate information systems (Agarwal, 1994; Arora-Jonsson, 2011). This lack of structure is not a coincidence but based on

systems of patriarchal inheritance, discriminatory property rights, and socio-cultural practices that restrict the ability of women to make decisions. Climate variability, which is in a form of unpredictable rainfall, floods, intrusion of salinity, and long drought, have a direct negative impact on agricultural productivity. But the effects of it are moderated in the form of inequalities in access to resources. When they do not have reliable land tenure rights, women farmers tend not to or cannot make long-term adaptation investments like soil conservation, irrigation facilities or crop diversification investments (Elmhirst, 2011). They can also not benefit government compensation schemes and agricultural subsidies without being the owners or being recognized as the farmers. Intersectional inequalities also define adaptive capacity. Caste, ethnicity, and class, in interaction with gender, define how one can gain access to irrigation systems, markets, and state support in stratified societies. As an illustration, the rural India women of the lower caste can develop marginal lands that are prone to floods and do not have the political contacts that can enable them to access relief programs (Guru, 2009). By contrast, elite women, subjected to gender agendas, might have access to education, monetary assets and institutional connections through which they can adapt. Seed saving networks, organic farming methods, mixed agriculture, and collective cooperatives practice increase biodiversity and soil wellness and decrease reliance on external inputs (Shiva, 1989; Sultana, 2014). These projects are disruptive to mainstream industrial forms of agriculture and look into the future to view local ecological knowledge as the key to sustainable development. Through collective organization, women farmers also increase their bargaining capacity and visibility which also converts the vulnerability to shared agency.

Water Scarcity and the Care Economy

Women and girls in most of the rural areas are tasked with the role of domestic water collection. Due to the drying up or pollution of water sources by intrusion of saline waters and droughts, the distances of collection grow increasing unpaid work time (UN Women, 2020). This displacement of time eliminates the possibilities of education, paid work, and political involvement. Poor water systems in informal settlements in the city put women in health hazards and unsanitary environments (Eriksen et al., 2015). According to feminist economists, the invisible work of social reproduction is the care economy, which consists of unpaid work in the household and the provision of care (Elson, 1999; Federici, 2012). This labor is aggravated by climate shocks. In case of crop failures and the spread of disease, women usually fill this void by stretching family finances, dealing with food shortages, treating the ill and finding other sources of fuel. However, this increased work is not reflected in policy frameworks that put infrastructure and technological adjustment in the first place. Overcoming water insecurity thus cannot be done by an engineering solution alone, but it needs redistributive policies that cut on unpaid care costs. Community water systems, social protection schemes, gender-sensitive budgets, and childcare systems in the form of investments can address structural inequalities that exist

within the care economy. In the absence of these, climate adaptation is prone to strengthen gendered labor exploitation.

Health Vulnerabilities and Gendered Risks

Climate change is also a major health threat in the form of heat waves, diseases transmitted by vectors, malnutrition, and trauma due to disasters (IPCC, 2022). Females and children usually get disproportionate effects especially when there is poor access to health care. There is an increased risk to pregnant women in case of extreme heat events and food insecurity augment maternal and child malnutrition. Gender based violence and psychosocial stress is also worsened by disasters. Shelter crammed housing, displacement, and economic instability may be a source of heightened vulnerability to exploitation and abuse (MacGregor, 2010). The marginalized groups, such as the indigenous population, lower-castes, and those with disabilities, have a higher risk of being affected because of discrimination and lack of service delivery (Sultana, 2014; Whyte, 2017). Good climate adaptation should then be a combination of the public health system, gender sensitive disaster planning and social protection.

Climate-Induced Migration and Urban Precarity

Displacement and migration are increasingly caused by the degradation of the environment. Women and the marginalized can migrate on seasonal basis to work in the farms or permanently move to the urban informal settlements (Black et al., 2011). Migration may be a viable coping mechanism but, in most cases, it subjects women to precarious jobs, unprotected labor markets and other legal system safeguards (Arora-Jonsson, 2011). Migrant women have often established savings groups, mutual aids networks, and informal cooperatives which offer social and economic help (Nightingale, 2006). These dimensions combined, that is food systems, water access, health, and mobility, demonstrate that climate change is a process that interacts on a gendered and intersectional inequality basis. Meanwhile, they also show that sustainable futures must be based on identifying and empowering the agency inherent in marginalized communities.

Grassroots Movements and Community-Led Adaptation

Women and the marginalized can also migrate in season to work in agricultural farms or permanently move to the urban informal settlements (Black et al., 2011). Migration as an adaptive strategy can also place women in a vulnerable position of precarious employment, the informal labour market and inadequate legal protection (Arora-Jonsson, 2011). Migration also, however, brings out agency. Migrant women often establish savings groups, mutual assistance networks and informal cooperatives which extend social and economic assistance (Nightingale, 2006). Examples of collective action include native forest conservation movements in the Amazon, where communities resist deforestation and defend their territorial rights (Escobar, 2018), as well as global climate

litigation led by young people who use legal mechanisms to demand government accountability (Whyte, 2017). Those movements make the connection between local knowledge and larger political activism and show that the issues of adaptation and justice cannot be separated.

Climate Litigation and Policy Advocacy

Law has begun to be used as a way of promoting climate justice. Cases such as Urgenda v. The cases of Netherlands and litigation led by indigenous people in Latin America show that the law can be used to impose emission limits and adaptation practices (Schlosberg and Collins, 2014). The intersectional perspectives also make sure that the litigation would deal not only with environmental harm but also with social-economic inequality. It is also important that the policy advocacy in both national and international levels. Participatory budgeting, inclusive climate finance mechanisms, and gender-responsive climate planning contribute to the adaptive capacity and political representation (UN Women, 2020; Kaijser and Kronsell, 2014).

Integrating Intersectionality into Climate Governance

Intersectional climate governance requires:

10) **Disaggregated data collection**: Gender, caste, ethnicity, age, and disability must be considered in vulnerability assessments.
11) **Participatory decision-making**: Marginalized groups must be meaningfully involved in planning and implementation.
12) **Equitable resource distribution**: Adaptation funding and climate finance should prioritize communities with high vulnerability.
13) **Recognition of local knowledge**: Indigenous and women's ecological knowledge must inform policy design (Shiva, 1989; Elmhirst, 2011).

By integrating these principles, climate governance can move beyond top-down interventions toward transformative sustainability.

Climate Finance and the Politics of Adaptation

Climate finance is a vital pillar to climate justice in the world. Developed nations agreed to provide developing nations with 100 billion dollars a year to help them mitigate and adapt to the situation. However, funding commitments have often been inadequate, and access is also disproportionate (IPCC, 2022). The disadvantages of smaller states and grassroots organization are usually associated with bureaucratic complexity, technical application requirements, and co-financing expectations. On a national level, adaptation funds can be seized by the political elites or they can be concentrated to macro infrastructure building projects instead of community resiliency projects. Women-based cooperatives, local NGOs, and indigenous councils are often confronted with challenges of going through accreditation processes of international funds (Elmhirst, 2011; UN Women, 2020). To take an example, agricultural damages need compensation that takes

care of the landless laborers, informal workers and women whose contribution may not be documented. Furthermore, the process of adapting itself is political. Power relations are reflected in decisions that are made regarding the areas that get protection infrastructure, the priority of crops in agricultural programmes and which households get relocation assistance. Adaptation can become cemented with inequalities instead of reducing them without the transparent and participatory processes.

Critiquing Technocratic Sustainability

Even though technological innovation remains impossible to do without, technocratic solutions are associated with depoliticization of climate change through the lens of a managerial dilemma; as opposed to a structural crisis (MacGregor, 2010; Kaijser and Kronsell, 2014).Technocratic sustainability also has the tendency of neglecting the social reproduction and care economies. Adaptation projects that concentrate on infrastructure developments might not be able to counter unpaid labour pressures that have been compounded by climate stresses. Devoid of the incorporation of gender analysis and participatory governance protection, sustainability is a technical activity that is out of touch with life experiences.

Capabilities, Rights-Based Approaches, and Transformative Adaptation

Other frameworks focus on justice, rights, and capabilities of humans. The capabilities approach as developed by Sen (1999) conceptualizes development in the form of an expansion of substantive freedoms- the capacity to live a healthy life, get food, engage in politics and even gain worthy livelihoods. Nussbaum (2011) also extends the discussion to provide a list of core abilities that states are supposed to defend.

Rights-based strategies supplement capabilities theory since they view adaptation as an issue of right and not good (Walker, 2009; Fraser, 2008). The right to clean water, safe housing and working conditions are turned into the right of the state. This view empowers the marginalized communities to secure protection through the law.

The central concept of promoting climate justice is based on grassroots movements. In Nepal, women water user groups have risen in order to gain equal access to irrigation systems (Sultana, 2014). The Amazon forest defenders are indigenous people who integrate legal advocacy with their traditional ecological knowledge to oppose extractive industries (Escobar, 2018). Youth climate litigation campaigns put governments on toes to prohibit failure to honor constitutional and human rights commitments.

Cases in the law including Urgenda Foundation v. Netherlands are an example of how rights-based litigation can push the state into acting. In the same way, indigenous lawsuits on climate issues in Latin America demand protection against environmental degradation and claim territorial rights. Intersectional analysis builds up on these attempts by making

litigation respond to the stratification of vulnerabilities, such as gender, caste, ethnicity, and socio-economic marginalization, as opposed to abstract environmental harm (Schlosberg and Collins, 2014; Whyte, 2017).

Toward Inclusive, Just, and Sustainable Futures

To achieve sustainable futures, transformation is needed in synchronous scales. On the national level, governments need to institutionalize gender-responsive budgeting, implement land and labor rights and increase social protection mechanisms. The local level of participatory governance should acknowledge native sovereignty and feminine ecological understanding. Social resilience and ecological sustainability can be better achieved through investment in the care economy, decentralization of decision-making power, and empowering grassroots leadership (Elson, 1999; Federici, 2012; Sultana, 2014). The shift of vulnerability to agency redefines marginalized populations not as passive beneficiaries of help, but as participators in climate change solutions. Climate justice, then, requires environmental reform more. It involves democratizing, redistribution and transformation of the social relations that result in ecological inequality.

Conclusion

Climate change is not necessarily only an environmental phenomenon but a tremendously social, political as well as economic crisis. It also is disproportionately distributed and mirrors and exaggerates historical injustices, structural inequalities, and systemic marginalization. Vulnerability is not a natural or inherent one, but a social construction. Examining climate change of an intersectional gender lens, this chapter has shown that various overlapping axes of oppression such as patriarchy, coloniality, class hierarchies, and racial or caste-based discrimination are all factors that produce vulnerability (Crenshaw, 1989; Collins, 2000; Fraser, 2008; Whyte, 2017). Intersectionality plays a central role in comprehending the meaning of climate justice since it represents how various types of social divisions converge to determine risk and adaptive capacity. This chapter highlights the fact that sustainability is not only a technical issue, but is political in nature and that there is the need to be critical in regard to power relations and putting into consideration different standpoints in decision making. Climate justice provides a practical and normative way of addressing these inequities. Justice is about re-distributing resources, as well as acknowledging marginalized identity, cultural knowledge and political representation (Schlosberg and Collins, 2014; Fraser, 2008). Rights-based development and capabilities approach also offer complementary approaches, and it is stressed that adaptation and sustainable development are not issues of charity or benevolence, but entitlements and liberty (Sen, 1999; Nussbaum, 2011). Notably, marginalized communities do not represent passive recipients of aid, but active agents of resilience, adaptation and innovations. Examples of how the capacity of the grassroots actors to effect a transformative change are women led cooperatives, indigenous governmental institutions, youth climate movements, and community based

disaster management programs. They are movements taking on the dominant paradigms of development and provide ecologically, socially, and culturally grounded models of development. These are further enhanced by climate litigation, policy activism and advocacy which ensure that not only efficiency but equity and fairness are addressed by setting goals in adaptation and mitigation. To sum up, creating sustainable futures involves moving towards a more general approach to vulnerability and a more agency-focused and empowerment-focused and systemic approach. The intersectionality, feminist political ecology, climate justice, and rights-based development frameworks have to be included in policies. The process of making vulnerable groups agentic is not only an ethical necessity but also a political one, and it requires not only the involvement of the international institutions, the governments of the countries, but also the activities of civil societies. It is only with such concerted efforts that the Global South, as well as the world at large, will be able to achieve sustainable futures that are sustainable not only in environmental terms, but in social terms too.

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Chapter 42: Marginalized Lives and Uncertain Futures: Intersections of Caste and Class in Sujatha Gidla's *Ants Among Elephants*

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Abstract

This chapter looks at Sujatha Gidla's memoir, *Ants Among Elephants: An Untouchable Family and the Making of Modern India* (2017), as three major theories: Marxist political economy, B. R. Ambedkar's anti-caste philosophy, and Kimberlé Crenshaw's intersectionality. In Gidla's account of four generations of a Dalit family in Andhra Pradesh, you find a vivid, often unsettling portrait of Dalit and marginalized situation in India and one shaped by the constant push and pull of caste and class. These aren't just separate forces running side by side. They're tangled up together, each making the other stronger, harder to uproot. The chapter digs deep into the memoir, focusing on moments that hurt and linger: the shame woven into daily life through clothing, the contradictions and blind spots within the communist movement, the way Dalit women bear the weight of multiple oppressions at once. In each case, economic exploitation and caste ideology work together, shutting out Dalit communities from a life of dignity and possibility. The entire analysis argues that understanding marginality and Dalit life in postcolonial India requires dismantling not only material poverty but the ideological structures that naturalise social hierarchy across each generation. In this reading, Gidla's memoir is more than just a family story. It's an act of resistance, a way of forcing the stories of the dispossessed into the public eye. The chapter ends by reflecting what true social change looks like for people whose exclusion has been built and rebuilt over time.

Keywords: Dalit Literature, Intersectionality, Marxism, Ambedkar, Caste and Class, Marginalization.

1. Introduction

Sujatha Gidla starts her memoir with a simple line, “My stories, my family’s stories, were not stories in India. They were just life” (Gidla 1). Caste in India is not just a system or social level of the life but it is suffering of Dalit communities, it seems so ordinary and normal in the India. On the other hand, Social structure of India represent the most complex structure of caste and society. The intersection of caste and class, defines Dalit experience is not only about a local peculiarity but a historically shaped system whose roots run with colonialism, early land relations and religious ideology simultaneously. To understand this complex and rigid system, it requires theoretical tools, perspectives, ideology and multiple complementary. Beyond the economic definitions of development or progress and entering the social, cultural and ideological ground that Gidla precisely reflects and maps in her memoir. After analysing the Marx, Ambedkar, and Crenshaw, the following analysis reflects that futures for marginalized communities in India not only depend on material resources and things but also on deconstruction of ideological structures with inequality across generations.

This chapter describes in five parts. First, the theoretical framework, putting Marx, Ambedkar, and Crenshaw in conversation. Next, the historical context around caste and class in India. Then comes the longest section: a close reading of Gidla’s memoir. After that, what this analysis means for communities whose futures have been shut off by systemic barriers. Finally, wrap up with a conclusion.

2. Theoretical Framework: Marx, Ambedkar, and Intersectionality

2.1 Marx: Base, Superstructure, and Alienation

The foundational right of Marxist social theory is that human consciousness not only produce material conditions but material conditions produce human consciousness. As Marx put it in A Contribution to the Critique of Political Economy, “It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness” (263 Marx). From this tenet flows the distinction between economic base and ideological superstructure, the legal systems, religious philosophies, cultural customs, and political institutions that constitute the superstructure do not arise independently of economic life but also serve to legitimise and reproduce the class relations embedded in the base.

In the Indian context, the caste system performs this superstructural function with extraordinary efficiency. It presents as natural, divine, and inevitable an arrangement of human beings whose primary purpose is to concentrate land, labour, and social power in the hands of the upper castes. The ideological work of the caste system is therefore not incidental to its economic function; it is its economic function, accomplished through cultural means.

The Marxist concept of alienation defines this analysis further. In the Economic and Philosophical Manuscripts of 1844, Marx describes alienation as a fourfold estrangement: the worker is alienated from the product of labour, from the act of labouring itself, from other human beings, and from their own species-being or human potential (70–83). For Dalit workers in India, this alienation is not simple consequence of capitalist production but is expanded and deepened by caste, which gives them to the most degraded occupations, denies them contact and access to social life and strips them of dignity in ways that go beyond what the wage connection alone can elaborate and explain. Marx's figure of the Lumpenproletariat reflects that underclass permanently excluded from formal economic participation and maps directly onto the condition of landless Dalits who are systematically shut out of organised labour and its protections.

2.2 Ambedkar: Caste as a Division of Labourers

Dr. B. R. Ambedkar was a reader of Marx and his most important Indian interlocutor and the relationship between the two thinkers is one of the most productive tension. In this entire scenario, Marx find out the two primary relationship between capital and labour. On the other hand, Ambedkar argued that in India, caste established a separate and in some respect more essential axis of oppression. *In Annihilation of Caste* (1936), he argued that caste is not simply "a division of labour" but "a division of labourers," meaning that it organises not merely what people do but who they are, encoding social worth and human dignity directly into birth (Ambedkar 47).

Ambedkar didn't hold back when he criticized upper-caste Marxists. He saw right through the reluctance of Hindu socialists and communists to tackle caste head-on. To take caste seriously, they would have to admit and give up the social advantages they enjoyed because of it. This is real contradiction inside the Indian communist movement: they claimed to represent all workers, but their leadership kept the same old hierarchies alive within their own ranks. Gidla's memoir doesn't let you forget this isn't just theory; Dalit party members lived that contradiction every single day.

Ambedkar argued that caste ideology isn't just forced on people from above it leaks in and gets accepted by those on the receiving end, too. Dalits might even start to believe their own lower status is natural, or somehow deserved. This idea actually lines up with Antonio Gramsci's concept of hegemony, and you see it in Gidla's own memories, how she, as a child, simply accepted caste hierarchy as a fact of life. For Ambedkar, breaking the grip of caste means more than just economic change it is identity. It calls for a cultural and ideological revolution. That's a crucial point if we're ever going to talk seriously about what real progress for Dalit communities looks like.

2.3 Crenshaw and Collins: Intersectionality and the Matrix of Domination

Kimberlé Crenshaw's idea of intersectionality, developed in her 1989 essay developed "Demarginalizing the Intersection of Race and Sex,", came from a sharp observation: The experiences of Black women were not simply the sum of racism and sexism; they were produced by the unique configuration of those forces acting simultaneously (Crenshaw 139–167).This insight and analysis different oppressions intersect and create new forms of marginalization and also fits right into the story of Dalit women in India, who face caste, class, and gender all at once.

Patricia Hill Collins took this further with her "matrix of domination" framework. She argued that systems of oppression are not merely additive but structurally interlocking, operating across what she calls the structural, disciplinary, hegemonic, and interpersonal domains of power (Collins 18). You can't pick apart caste, class, or gender and expect to understand what's really happening. If you look at Gidla's memoir through this lens, you see how Dalit women like her mother, Manjula, experience the world never just as Dalits, or as women, or as poor people, but all three, tangled together.

3. Caste and Class in India: Historical and Political Context

The caste system in India goes way back to old Brahminical texts like the Manusmriti. These texts split Hindu society into four varnas, Brahmins (priests and scholars), Kshatriyas (warriors and rulers), Vaishyas (merchants), and Shudras (labourers) and pushed Dalits, once called untouchables, completely outside the system. This wasn't just for show; it shaped every part of the life. Your job and occupation was set by your birth. Where you lived was determined by your caste, and Dalit communities were often forced to settle outside village only. Even the basics needs like water, temples, education, the right to take part in society were all limited if you were Dalit.

British colonial rule didn't break this system; but it made things more tangled. British policies often sustained up upper-caste landlords or so called capitalists, making sure the economic roots of caste-based exploitation ran more deep, even after the freedom of India. The Indian Constitution tried to fix things in 1950 and officially banning untouchability and setting up reservations in schools and jobs as well. But real change is more tough than it looks. Laws changed, but caste-based exclusion stuck around. As G. S. Ghurye observed, caste and class in India are neither coterminous nor fully independent; they are historically entangled, with caste functioning as the social technology through which class domination has been imposed and naturalised (Ghurye 112).

Andhra Pradesh, where Gidla's family history takes place, saw all this play out in dramatic ways. The Telangana Peasant Rebellion (1946–1951) brought landless Dalit and lower-caste labourers together to fight the Nizam's feudal rule, this time under communist

leadership. represented one of the most significant attempts to forge caste-class solidarity in modern Indian history. But when the state shut it down, and Dalit voices were side-lined inside the communist movement, that set the stage for the Naxalite insurgency and the revolutionary tradition to which Gidla's uncle K. G. Satyamurthy devoted his life.

4. Textual Analysis: Reading Oppression in *Ants Among Elephants*

4.1 The Opening: Making the Invisible Visible

Right from the start, the structure of Gidla's memoir shows its hand. Those opening pages lay out a blunt truth: for Dalits, what counts as a "story" in India hardly gets told at all and noted that "were not stories in India,". Gidla doesn't just describe untouchability she brings you inside it. She spells out, in plain terms, that untouchables "are not allowed to live in the village at all" because their job, inherited and inescapable, is "to labor in the fields of others or to do other work that Hindu society considers filthy" (Gidla 4). It's all connected. Dalits get pushed outside the village because they're needed for the work nobody else wants to do, and they get stuck with that work because they're kept outside. It's a closed loop. That's the point, caste and class don't just overlap, they actually build each other.

Gidla goes further. She says you can't hide from caste the way you might try to hide your class. Money is slippery; caste isn't. Everyone in the village already knows your place, and if you move somewhere new, people will ask—and "by tradition, everyone has the right to know" (Gidla 5). You can get an education, land a better job, but the mark of caste sticks. The stigma follows you. So, right away, the memoir sets out the real problem: individual effort or a change in economic status can't erase this. The roots go deeper.

4.2 The Body as Ideological Site: Clothing, Space, and Caste Enforcement

Some of the memoir's clearest insights come out through stories about clothing and how it's policed. The first story is about Gidla's grandmother, Maryamma. One Christmas Day, she walks into the village in a new sari and a blouse she made herself from an old dress. The sari came from Christian missionaries; the blouse is her own way of claiming a bit of dignity. The upper-caste men hanging around the village store don't hide their rage. as Gidla describes it, "infuriated to see an untouchable daring to wear decent clothes" and insult her crudely (Gidla 35). When the Dalit Christian community pushes back—cancelling their celebrations and demanding an apology for a Gandhian Brahmin steps in and tells them not to do anything that could "provoke the caste Hindus" ever again (Gidla 36).

There's a lot packed into this. From a Marxist angle, the attack on Maryamma's clothing isn't just about social rules; it's about protecting the beliefs that keep the upper castes on top. When an untouchable dress well, she's saying she doesn't accept her assigned place in the labour order. The Gandhian Brahmin's advice is telling, it's not about changing the

behaviour of the oppressors, but about making sure the oppressed stay in line themselves. Reform, when filtered through upper-caste hands, ends up telling Dalits to keep themselves small.

The second story centers on Satyam, Gidla's uncle as a kid. He gets attacked by a golla boy (a cattle-herding caste, low but not untouchable) for wearing knickers instead of a loincloth. The boy's insult is sharp and to the point: "You untouchable son of a bitch! Who told you that you could wear knickers?" (Gidla 43). He means it. There's a rule here, and everyone knows it. The loincloth marks you as untouchable, as someone ready for the dirtiest work, as someone not allowed bodily dignity. When a shaken Satyam tells his uncle Nathaniel, Nathaniel doesn't get angry. He just shrugs: "You want to go to the meadow? Then wear a loincloth. You want to wear your knickers? Then stay home!" (Gidla 43). That's what internalized oppression looks like—the rules get enforced by the people they hurt most.

Raymond Williams's reading of Marx helps make sense of all this. Williams argues that the superstructure should not be understood merely as a set of ideas floating above the economic base but as an active set of practices—what he calls "processes of incorporation" that work to shape and limit the consciousness and behaviour of subordinate groups (Williams 6). Those stories about clothing aren't just reflections of the economic order. They're how the order writes itself, literally, onto the bodies and movements of Dalit people, making sure things stay just as they are.

4.3 Class Struggle and Its Internal Contradictions

K. G. Satyamurthy, Gidla's uncle, the revolutionary poet and founding member of the People's War Group also stands out as the memoir's most layered and complicated figure. Satyam lives with both the scars of caste oppression and the drive of revolutionary politics. He spends his life fighting for Dalit labourers, but he's still tangled up in the very hierarchies he's trying to break. Gidla doesn't paint him as a hero or a villain. She refuses to flatten him into something simple, and that honesty gives the memoir its edge.

Satyam's story shows both the real wins and the hard limits of class-based politics in India. In Andhra Pradesh, the communist movement rallied Dalit agricultural workers against feudal landlords and made life better for a lot of people. That's real. But Gidla doesn't let us forget that even these movements carried caste bias inside them. Upper-caste leaders stayed on top, while Dalit members got pushed into supporting roles. The movement talked a big game about class, but it swallowed up the specific issues Dalits faced not just as workers, but as Dalits. So, caste disappeared in the conversation, but that didn't mean it was gone. This is exactly the contradiction Ambedkar saw coming: in India, class solidarity always seems to mean the less-marginalized joining up, but only if Dalits leave their caste identity at the door. That's why Satyam's revolution never quite gets

there and it can't square this circle. Gidla's memoir pushes the idea that real change in India demands we tackle both caste and class together, as two sides of the same coin.

4.4 Alienation in Layers: Education, Labour, and the Limits of Mobility

One thread running through the memoir is the story of educated Dalits who can't turn their education into real social mobility and a story Gidla's family lives through, generation after generation. Satyam's parents, both trained teachers, get work in Christian mission schools in Visakhapatnam and, for a while, enjoy the dignity of stable, respected jobs. But this dignity is always on shaky ground. They cannot rent a house honestly because the landlord would not rent to Dalits; they maintain a fiction that they are caste Hindus who have converted to Christianity, and the landlord, who suspects the truth, tolerates them because he needs tenants with steady incomes (Gidla 40).

When Maryamma dies of tuberculosis what Gidla calls "a disease of the poor" (Gidla 41) the family's fragile stability shatters. Satyam's father, crushed by grief and debt, leaves the children behind. Satyam finds himself living in "a one-room hut with holes in the roof, sleeping on the floor" (Gidla 47). Marx's idea of alienation really hits home here: the family's hard work earns them degrees and respect, but none of it sticks across generations the way property or money would. One disaster, and they're back at square one. Dalit families, kept away from land, savings, and inheritance, have nothing to save them from disasters of life like illness, death, job loss and the sorts of things other communities can weather.

Gidla's mother, Manjula, lives out the next round of this cycle. She's educated, capable, and has the right credentials, but caste, class, and gender keep fighting her in. Her qualifications don't count as much because of caste. Gender roles hem her in at home. And class means she doesn't have the resources to work around these barriers. Marxist theory lays it out: education alone can't smash the cycle. In a world where who you are matters more than what you achieve, cultural capital without caste capital just doesn't go far.

4.5 The Intersectionality of Gender: Dalit Women's Compounded Subordination

At the heart of the memoir is the raw, everyday reality of Dalit women living at the crossroads of caste, class, and gender. Crenshaw's idea of intersectionality isn't just some outside theory pasted on here; it's a real description of how this story actually works. Gidla doesn't just tack on a gender lens to a story about caste and class. She reveals how these systems come together, shaping lives in ways you can't understand by looking at just one of them.

Maryamma, she's respected as a teacher and a community leader, but even this is boxed in by her gender. She relies on her husband's freedom and money, and after he leaves the

family, everything falls back on her. Her work at home is caring, holding things together and goes unseen, never counted as real labour. Her daughter, then her granddaughter (Gidla herself), live versions of this same story, each with their own twist. These women go further with their education than society expects, but that's still not enough to break out of the grip of caste, class, and gender. When Gidla talks about dealing with caste in the United States, it takes the story deeper. Crossing borders doesn't erase caste; it just turns up in new, quieter ways inside your own head, in the gaps you feel in confidence or social skills, in the scars left from growing up always told you're less than others. The kind of oppression Gidla describes isn't stuck to one place. It's a mix of forces that stick with you, wherever you go.

4.6 Ideology and the Politics of Invisibility

One of the most powerful things about Gidla's memoir is how it shows caste isn't just kept alive by those at the top and it lives on in the minds of the oppressed, too. There's one scene from her childhood that really drives this home. She remembers watching her family jump up and bow their heads when a certain Hindu man walked by. She didn't question it. She accepted the idea: "Christians are lowly. Hindus are superior. Christians are weak. Hindus are powerful. I understood. I accepted. That was the natural way of things" (Gidla 8).

This is exactly what Ambedkar talked about in *Annihilation of Caste*, the idea that people can end up enforcing their own subordination, without anyone forcing them. It's also close to what Marx meant by "false consciousness," though that word doesn't quite fit here. The Dalit people in this memoir aren't fooling themselves about their situation. What's missing is a way to even name it as wrong, instead of just natural. Gidla's story shows how people gain that new perspective through education, politics, moving abroad, or just writing it all down. That's what political awakening looks like.

The memoir itself breaks this old way of thinking wide open. By narrating and reflecting the stories of people whose pain was never considered a "story" at all, Gidla gives it form and meaning, she pulls it into the open, where it can be seen and challenged. This is the political function of Dalit literature more broadly: not merely to represent marginalised experience but to challenge the ideological conditions that make that marginalisation seem inevitable.

5. Foreclosed Futures: What Marginalisation Costs and What Transformation Requires

Every chapter in Gidla's memoir tells a story where hope for a better future gets shut down. Maryamma just wants to wear a decent sari, but she's attacked for it and a world

where Dalit women walk with dignity is simply blocked off. Satyam tries to wear knickers, and gets beaten, a future where Dalit boys can feel normal in public slips away. Manjula dreams of a career, but caste discrimination shuts her out, so the idea that educated Dalit women might build lives like their upper-caste peers? Gone. The memoir keeps coming back to this same pattern: possibility, then foreclosure. By the end, you really see what caste does, it keeps Dalit families from building up resources, dignity, or opportunity, the basics anyone needs for a real future.

The pattern has a specific economic logic that the Marxist framework helps illuminate. Dalit families don't get land, don't have social capital, don't have the kind of networks and inheritance that let other groups pass down advantage. When Maryamma dies, the family has nothing to fall back on no property, no savings, no connections to help the kids through the crisis. That's not some random misfortune; the caste system sets it up this way on purpose, to keep Dalit labour cheap, always available, and with nowhere else to go.

Three things follow from this analysis for thinking about what genuine transformation requires. First, changing economics alone isn't enough if you don't also shift ideology. Ambedkar saw this, and Gidla's memoir backs him up that the caste system doesn't just limit jobs or money; it shapes how people see themselves and each other, keeping the hierarchy alive even when the rules are supposed to be fair. If development programs only focus on income or education, but ignore the social attitudes that keep Dalits from being recognized, you just end up with the same frustration in new forms.

Second, you can't talk about Dalit futures without putting Dalit women at the center. The memoir makes it painfully clear. Dalit women deal with caste, class, and gender all at once, and the future of their communities depends on whether women get real access to education, economic freedom, and a break from the patriarchal norms that hold them back.

Third, and maybe most fundamentally, real futures need what might call ideological transformation: building cultural and political spaces where Dalit dignity isn't just tolerated but respected, even celebrated. That's the real work Gidla's memoir does and it makes visible what the dominant order tries to hide. Literature, on this genre, is not supplementary to social transformation but one of its necessary conditions. If a community and society can't picture itself as worthy of dignity, no other politics or reform will make that dignity real.

These analysis and insights extend beyond India. All over the postcolonial world, societies where race, caste, religion, gender, and class all tangle together. The integrated research and framework this chapter has developed, drawing on Marx, Ambedkar, and Crenshaw, offers a methodology for taking these intersections seriously: for understanding oppression not as a set of separate problems requiring separate solutions but as a matrix

of linking systems that must be addressed simultaneously and in their connections to one another. At the end, we need to talk about it if we need to fix it.

6. Conclusion

Ants Among Elephants digs into what it means to be made invisible and what it takes to finally be visible. Sujatha Gidla's memoir stretches across four generations and two continents but at its core, it keeps circling back to one question: how does a society keep treating a whole community as less than human, again and again, without seeing it as a crisis or even a problem? The answer of the memoir delivers, and the argument running through this chapter, is that caste, class, and gender all work together, reinforcing each other at every turn. No single theory can really pin this down. Marxist theory shines a light on how exploitation works and how ideas keep the system running, but it misses the stubborn, specific nature of caste. Ambedkar's anti-caste thinking catches what Marxism overlooks. Crenshaw's intersectionality helps hold all these threads together without flattening them.

The entire research has argued that through close reading of key incidents in Gidla's memoir, that caste functions as a superstructural ideology that naturalises economic exploitation and class-based politics in India has historically reproduced caste hierarchy rather than dismantling it; that Dalit alienation is surrounded by caste in ways that deepen and extend the Marxist concept also Dalit women bear the fullest weight of these intersecting systems on the other hand, the memoir itself makes a form of counter-ideological work that is inseparable from its political claims. Literature is one platform where this transformation begins. In telling the stories that were not stories, Gidla starts the work of making a different world imaginable.

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Chapter 43: Traditional Environmental Practices of Northeast India: An Analysis

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Abstract

Northeast India is distinguished by its rich cultural heritage and vibrant ecological landscape. It comprises Assam, Meghalaya, Manipur, Nagaland, Tripura, Arunachal Pradesh and Mizoram. However, Sikkim was later added to the list. Traditional environmental practices refer to those practices and policies followed by a community for the protection, preservation and sustainable development of the environment. Environmental sustainability has been an integral component of indigenous lifestyles in Northeast India. Their practices are based on indigenous knowledge and methods, Cultural values, religious beliefs etc. It can be seen that compared to the other industrialized and urbanized regions of India, the Northeast region of the country is more environmentally friendly region. It follows different practices like preservation of sacred groves like Mawphalang by the Khasi and Jayantiya communities of Meghalaya, jhum cultivation, organic farming, traditional water management system, bamboo-based environment friendly living etc. These practices reflect deep ecological knowledge and contribute significantly to biodiversity conservation and sustainable livelihoods. Moreover, North-eastern people have nature centric religious beliefs for which they have a great reverence for environment. This article examines key traditional environmental practices followed across Northeast India, analyses their ecological relevance, and discusses contemporary challenges threatening their continuity. The study highlights the importance of integrating indigenous knowledge with modern environmental policies to achieve long-term sustainability and ecological balance.

Keywords: Indigenous knowledge, Northeast India, sustainability, traditional practices, biodiversity conservation.

1. Introduction

Northeast India represents one of the most culturally diverse and ecologically rich regions of the country. Comprising Assam, Meghalaya, Manipur, Nagaland, Tripura, Arunachal Pradesh, Mizoram, and later Sikkim, the region is distinguished by its unique blend of indigenous traditions and natural abundance. The communities inhabiting this region have historically maintained a close and respectful relationship with nature. Their environmental practices are deeply rooted in indigenous knowledge systems, cultural ethics, and spiritual beliefs that emphasize harmony between humans and the natural world. Traditional environmental practices in Northeast India include sacred grove preservation, shifting cultivation, organic farming, bamboo-based housing, and community-based water management systems. These practices evolved not merely as survival strategies but as sustainable approaches to resource use and ecological balance. For instance, the protection of forest patches considered sacred reflects a collective commitment to biodiversity conservation. Similarly, agricultural techniques such as jhum cultivation, when practiced traditionally with adequate fallow periods, demonstrate an understanding of soil regeneration and ecosystem cycles. Compared to highly industrialized regions, much of Northeast India continues to follow environmentally sensitive lifestyles. Nature-centric religious beliefs foster reverence for forests, rivers, and wildlife, strengthening conservation ethics within communities. However, modernization, population pressure, and changing socio-economic conditions now challenge these traditional systems. This study explores key indigenous environmental practices across the region, evaluates their ecological significance, and highlights the need to integrate traditional wisdom with contemporary environmental policies to ensure sustainable development and long-term ecological resilience. Research on traditional environmental practices in Northeast India highlights a rich body of indigenous ecological knowledge that plays a crucial role in sustaining biodiversity and local livelihoods. Several studies emphasize that traditional farming systems and community resource management strategies are more than cultural customs; they represent adaptive responses shaped by long-term observation of local ecosystems.

2. Traditional Environmental Practices of Northeastern Region: Bordoloi (2025) investigates indigenous agricultural practices such as jhum cultivation and terrace farming among tribal communities in Northeast India, revealing how these systems maintain soil fertility, support biodiversity, and contribute to ecological resilience when managed with traditional knowledge and rotational fallow periods. Sacred groves have also received focused academic attention as critical components of traditional environmental stewardship. Baidya and Devi (2024) provide an extensive documentation of sacred groves in Assam, finding that over 280 sacred sites conserved by local communities protect diverse ecosystems. Strengthening community forest

management In Assam, traditional environmental practices have evolved in response to the dynamic floodplain ecology of the Brahmaputra valley. Community-managed wetlands known as beels serve as sources of fisheries, irrigation, and biodiversity conservation. Raised bamboo houses (chang-ghars) represent architectural adaptation to seasonal flooding. Baidya and Devi (2024), in their study on sacred groves of Assam, document over 280 community-protected forest patches that function as biodiversity reservoirs and carbon sinks. Their research demonstrates that ritual taboos and customary sanctions effectively regulate extraction without formal enforcement mechanisms. Additional ethnographic research on floodplain agriculture highlights how mixed cropping and organic inputs enhance soil fertility and reduce ecological vulnerability. Political ecology analyses, however, point to embankment construction and commercial agriculture as disruptive forces that weaken traditional flood-adaptive systems. Meghalaya provides one of the most cited examples of sacred grove conservation in India. The Khasi and Jaintia communities preserve forest patches known as Law Kyntang, including the well-documented Mawphlang Sacred Grove. Ecological surveys conducted by environmental historians and botanists reveal high species endemism within these groves. Scholars argue that such sacred landscapes operate as informal in situ conservation zones. Research on bamboo drip irrigation systems further highlights indigenous engineering knowledge that ensures efficient water distribution across steep slopes with minimal evaporation. Studies in sustainability science interpret these practices as decentralized governance systems rooted in clan-based authority. Political ecology scholarship also examines tensions between state forest departments and community ownership structures, emphasizing the need for legal recognition of customary rights. In Arunachal Pradesh, the Apatani agricultural system in the Apatani Valley has attracted significant academic attention. Anthropological research describes the integrated rice–fish cultivation model as a rare example of sustainable intensification in mountain ecosystems. The system combines terracing, irrigation channel networks, and nutrient recycling without chemical fertilizers. Studies published in environmental management journals highlight its high productivity relative to land area, challenging assumptions that shifting or indigenous agriculture is inherently inefficient. Clan-based forest ownership and ritualized hunting restrictions have also been examined as mechanisms of ecological regulation. Scholars argue that these institutions embody principles consistent with the Brundtland definition of sustainability by balancing present productivity with future resource security. Nagaland and Mizoram are frequently discussed in literature on shifting cultivation, or jhum agriculture. Early colonial and postcolonial narratives often portrayed jhum as destructive; however, more recent ecological studies reassess this claim. Bordoloi (2025) emphasizes that traditional jhum cycles lasting 15–20 years allowed forest regeneration, maintained soil fertility, and supported high crop diversity. Agroecological research demonstrates that mixed cropping patterns enhance pest resistance and nutritional diversity. Village councils

regulate land distribution, illustrating strong community governance structures. In Mizoram, scholarship on bamboo flowering cycles (mautam) documents how communities developed coping mechanisms and food storage systems in anticipation of rodent outbreaks. Political ecology studies, however, show that shortened fallow periods due to demographic pressure and land privatization have reduced ecological sustainability, suggesting that the issue lies not in the system itself but in altered socio-economic conditions. In Manipur, environmental scholarship centers on Loktak Lake and its unique phumdi ecosystem. Research in wetland ecology identifies phumdis—floating biomass formations as critical habitats for aquatic biodiversity and as foundations for traditional fishing and agriculture. Studies highlight how indigenous fishing practices maintain breeding cycles and avoid overexploitation. Sacred groves known as Umang Lai are also documented in cultural ecology literature as community-conserved forest patches. However, hydropower development and water regulation projects have significantly altered the lake's hydrological regime. Political ecology analyses interpret these changes as examples of state-led modernization conflicting with local ecological knowledge. Tripura's traditional practices have been explored through ethnographic and agroforestry studies. Rotational cultivation systems integrate forest regeneration with subsistence agriculture. Scholars note that bamboo-based housing and craft traditions reflect sustainable material culture, as bamboo regenerates rapidly and requires minimal processing energy. Research on community water harvesting structures in tribal areas emphasizes localized water governance that reduces dependency on centralized infrastructure. Yet, plantation monoculture and urban expansion have introduced new environmental pressures that challenge traditional diversity-based systems. Sikkim's environmental trajectory is often examined within sustainability policy discourse. The sacralization of landscapes such as Khangchendzonga is rooted in Buddhist cosmology, which reinforces non-exploitative attitudes toward nature. Studies on terrace farming demonstrate its effectiveness in preventing soil erosion and enhancing water retention in mountainous terrain. Recent scholarship on Sikkim's transition to organic agriculture argues that the policy succeeded because it built upon pre-existing indigenous practices rather than imposing entirely new systems. This case is frequently cited as an example of effective integration between traditional knowledge and modern environmental governance.

Across the region, the literature consistently identifies common themes: sacralization of forests, community-based resource management, agro-biodiversity, renewable material culture, and adaptive climate knowledge. Scholars within sustainability theory argue that these systems represent living examples of circular economy principles and ecosystem-based management. Political ecology further reveals tensions arising from centralized conservation laws, infrastructure expansion, and shifting land tenure arrangements. Contemporary research increasingly calls for epistemological pluralism

recognizing indigenous knowledge not as folklore but as legitimate environmental science.

Empirical evidence strongly supports the ecological effectiveness of traditional environmental practices in Northeast India. According to the Forest Survey of India (2023), the Northeastern region maintains nearly 65% of its geographical area under forest cover, significantly higher than the national average of about 21%, with states such as Mizoram (over 84%), Arunachal Pradesh (around 79%), and Meghalaya (about 76%) showing particularly high forest retention largely due to community-managed forests and sacred grove traditions. Ecological surveys of sacred groves in Meghalaya reveal 15–30% higher species richness compared to adjacent degraded forests, with Shannon–Wiener diversity index values recorded at approximately H' = 3.2 in sacred groves versus H' = 2.1 in disturbed patches, demonstrating statistically significant biodiversity conservation outcomes. Similarly, studies on shifting cultivation (jhum) systems in Nagaland and Manipur indicate that traditional fallow cycles of 10–15 years allowed soil organic carbon to recover to nearly 85–90% of pre-cultivation levels; however, the reduction of fallow periods to 3–5 years has led to an estimated 30–35% decline in soil organic carbon and increased erosion rates by about 20–25%. Carbon stock assessments further show that community-managed forests in the region store approximately 120–180 tons of carbon per hectare compared to 80–100 tons in degraded state-managed forests. Correlation analyses in community forestry research reveal a moderately strong positive relationship ($r \approx 0.68$) between levels of community participation and forest biomass density, suggesting that stronger indigenous governance institutions significantly enhance ecological sustainability. These quantitative indicators substantiate the theoretical arguments advanced by Berkes (2012) and Ramakrishnan (1992) that indigenous environmental knowledge systems are not merely cultural traditions but empirically verifiable mechanisms of sustainable resource management.

3. Challenges Towards Traditional Environmental Practices of North Eastern Region:

i) Population Increase: Population increase is one of the major challenges. According to the census 2011, the total population of the region is about 45 million. Out of which Assam contributes the highest (68%) of the total population. Rapid population growth is one of the most important demographic features of the northeastern region. As per the census report the growth of population in the north eastern states has been higher than the national average. This population growth has a negative effect on the traditional practice of jhum cultivation. It has reduced the cycle of jhum cultivation from 20-30 years to 3-5years. Due to the shorter cycles the soil could not recover its nutrients,

resulting in low fertility and as such it yields poor crops. Again, Rapid industrialization is another threat.

ii) Industrialization: Northeastern region has witnessed rapid industrialization in the last few years. There are Agro Based Industries which includes tea industry, textile industry, grain mill products industry (rice, oil and flour industry), mineral based Industries, petroleum oil industry and natural gas-based industry, forest Based Industries like plywood industry, paper industry etc. Though such industrialization brought progress and growth to the region, it has also caused significant environmental challenges in the region. It effects river-based livelihoods, disturbs forest ecosystems, undermine sacred groves and community forests. The natural flow of Brahmaputra and its tributaries have been changed by hydroelectric initiatives. It affects the traditional water-based livelihood practices. Again, it leads to displacement of Tribal populations and this will automatically lead to the loss of traditional knowledges devaluing traditional practices.

iii) Deforestation: Deforestation too effects the Northeastern region in different ways. The human-animal conflict has been rising tremendously in Assam and its neighbouring states due to shrinking forest covers. Due to deforestation, forest cover is shrinking day by day and as a result the elephants, leopards and tiger are entering human habitation in search of food. Assam's Udalguri district is one of the top human-elephant conflict zones in Assam. Records show more than 100 elephants and 200 people have been killed in the last 12 years in this conflict. Man-elephant conflict has been rising in the region due to shrinking of forest covers. The elephant corridors were encroached by humans by building houses on their movement areas.

iv) Modernization: Gradual modernization has significantly transformed the traditional practices of the region. Modern methods like using chemical fertilizer, high-yielding varieties of corps, mechanized farming has affected the shifting cultivation. Though these practices yield high productivity, it led to environmental degradation due to overexploitation of land and the depletion of soil fertility (Chaitanya,2025). Moreover, in search of better education and livelihood people of this region migrates to other parts of the nation. This risk the traditional knowledge being swayed away by migration of local indigenous people.

v) Lack of proper management: There are legal and constitutional provisions for the protection of indigenous self-rule, like Forest Rights Act (2006) which enable the indigenous people to conserve forests. Again, there are Autonomous District Councils, empowered by 6th schedule of the constitution, which makes provisions for land and forest management. But, according to Mota Reports 2022, the execution of such provisions is not fruitful. It states that most of the Autonomous District Councils do not

possess financial stability and technical capabilities to execute such provisions. As a result, most of the environmental policies are imposed by central and state government, instead of community involvement (Prasad 2025).

Conclusion: The northeastern region – the eight states of India, represents a rich cultural and traditional wisdom which contributes toward maintaining sustainable environment and as such towards the well-being of the region. Though there are several threats like population increase, industrialization, deforestation, modernization etc., such traditional wisdom must be preserved. Proper documentation and research in this field can greatly support the process of preserving traditional environmental wisdom. Government must support local rituals which show deep reverence for nature. Infrastructural development must follow the principle of sustainable development backed by traditional practices. Agro-forestry must be introduced, which can be a very good alternative for jhum cultivation. Workshop and training programs must be organized to educate local people about agro-forestry and its value. People must realize that proper development can be achieved not only by science and technology but by a balanced integration of indigenous wisdom with scientific tactics. Northeastern region represents in-depth knowledge of biodiversity and balanced ecosystem. But unfortunately, they are underestimated in mainstream policy making. There must be proper consultation with the local indigenous people prior to any governmental decision. Government must ensure effective participation of them to achieve sustainable development.

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Chapter 44: Community-Based Heritage Tourism in Namsai, Arunachal Pradesh

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Abstract

Community-based heritage tourism has gained increasing attention as a sustainable development approach in culturally rich and environmentally sensitive regions of the Global South. Namsai District of Arunachal Pradesh, predominantly inhabited by the Tai Khamti community, represents a distinctive tourism landscape where cultural traditions, religious institutions, and community life remain actively practiced. This study examines how heritage-led tourism in Namsai is shaped through community participation in festivals, monastery-centered tourism, traditional craftsmanship, and locally managed hospitality initiatives. These practices contribute to livelihood generation, cultural continuity, and social cohesion within the community. At the same time, the study critically engages with emerging challenges associated with tourism growth in the region. Local perceptions of increasing environmental pollution, improper waste disposal linked to limited civic awareness among visitors, and a gradual rise in temperature are examined as indicators of mounting ecological stress. Such concerns highlight the risks of cultural commodification, environmental degradation, and uneven development if tourism expansion remains insufficiently regulated. The chapter emphasizes that sustainable tourism outcomes depend on responsible visitor behaviour, effective waste management, and strong community-led governance frameworks. By presenting both opportunities and constraints of heritage tourism in Namsai, this study argues that long-term sustainability requires an integrated approach that balances cultural preservation, environmental responsibility, and inclusive economic development. The chapter contributes to broader discussions on tourism, heritage, and community-based sustainable development by offering insights from a marginalized cultural landscape in the Global South, where local knowledge and community leadership play a central role in shaping sustainable futures.

Keywords: Community-based tourism; Cultural heritage; Sustainable development; Tai Khamti community; Environmental sustainability; Namsai, Arunachal Pradesh.

1. Introduction

Tourism has emerged as one of the fastest-growing sectors of the global economy and plays a significant role in regional development, employment generation, and cultural exchange. In many developing regions, tourism has become an important strategy for economic diversification while simultaneously promoting cultural heritage and natural landscapes. Over the past few decades, scholars and policymakers have increasingly emphasized the importance of community participation in tourism development.

Community-based tourism represents an approach in which local communities play an active role in tourism planning, management, and benefit sharing. Unlike conventional mass tourism models that are often dominated by external investors, community-based tourism prioritizes local control, cultural preservation, and equitable economic benefits. This approach is particularly relevant in culturally diverse regions where indigenous traditions and social systems remain integral to everyday life.

Heritage tourism, which focuses on the exploration and appreciation of historical sites, cultural practices, and traditional lifestyles, forms a key component of community-based tourism. In regions such as Northeast India, heritage tourism provides an opportunity for indigenous communities to present their cultural identity while generating new livelihood opportunities.

Namsai district in Arunachal Pradesh represents an emerging destination where cultural heritage and tourism development intersect. The district is inhabited primarily by the Tai Khamti community along with the Singpho and other indigenous groups. Their religious traditions, festivals, and cultural practices contribute significantly to the cultural landscape of the region.

In recent years, tourism in Namsai has expanded due to improved road connectivity, increasing interest in cultural tourism, and the development of religious monuments such as Golden Pagoda. These developments have transformed the district into an emerging center of religious and cultural tourism.

However, the expansion of tourism also raises concerns related to environmental sustainability, cultural commodification, and infrastructure development. Therefore, this study aims to examine the development of community-based heritage tourism in Namsai and to explore how local cultural traditions, religious institutions, and community participation contribute to tourism growth while also facing environmental challenges.

2. Literature Review

The concept of community-based tourism has received considerable attention within tourism studies, particularly in relation to sustainable development in culturally rich and environmentally sensitive regions. Scholars argue that tourism development should not only generate economic benefits but should also contribute to cultural preservation and environmental protection.

Research on community-based tourism highlights the importance of local participation in tourism planning and decision-making. When local communities actively engage in tourism activities, they are more likely to benefit economically while maintaining control over their cultural resources. This approach also encourages the preservation of traditional knowledge and social practices.

Heritage tourism has emerged as another significant field of study within tourism research. Studies suggest that heritage tourism allows visitors to experience cultural traditions, historical monuments, and indigenous lifestyles while creating opportunities for cultural exchange between visitors and host communities.

In the context of Northeast India, scholars have highlighted the region's tourism potential due to its rich cultural diversity, indigenous communities, and unique landscapes. Research related to tourism development in Arunachal Pradesh indicates that cultural heritage, religious tourism, and traditional festivals play an important role in attracting visitors.

However, several studies also emphasize the potential environmental challenges associated with tourism development. Unregulated tourism growth may result in environmental degradation, waste management problems, and pressure on local ecosystems. These issues are particularly significant in ecologically sensitive regions such as the Eastern Himalayan foothills.

Therefore, existing literature emphasizes the need for sustainable tourism approaches that integrate community participation, cultural preservation, and environmental management.

3. Study Area

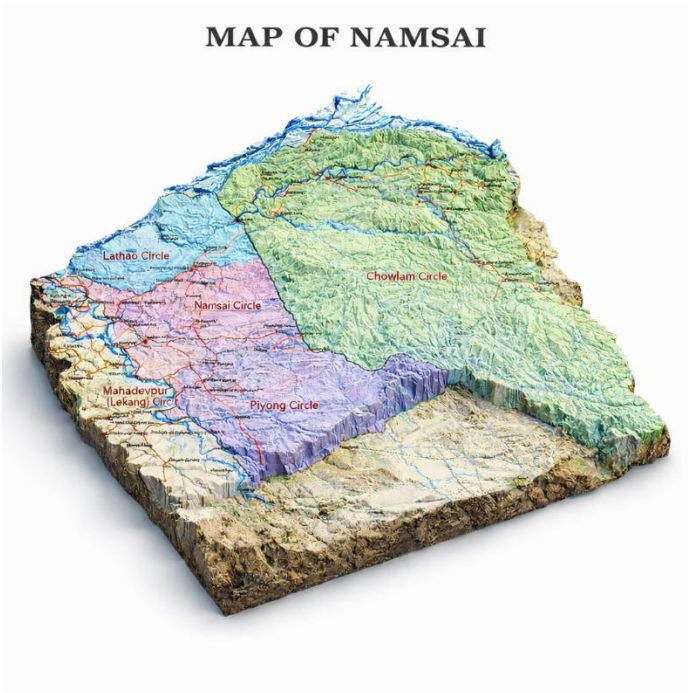


Figure 1. Location map of Namsai district in Arunachal Pradesh

Namsai district is located in the eastern part of Arunachal Pradesh and forms part of the foothill region of the Eastern Himalayas. The district lies approximately between 27.5° North latitude and 96° East longitude and shares geographical and economic connections with neighbouring regions of Assam.

The landscape of the district consists of fertile river valleys, forested hills, and agricultural plains. Several rivers and streams flow through the region, supporting agricultural activities and rural settlements. These natural features contribute to the scenic environment of the district and enhance its tourism potential.

The climate of the region is generally humid subtropical, characterized by warm summers, moderate winters, and significant monsoonal rainfall. Agriculture remains the primary economic activity of the local population, with rice cultivation being the dominant crop.

In addition to agriculture, traditional crafts, weaving, and small-scale trade contribute to the livelihoods of local communities. In recent years, tourism has emerged as an additional economic sector due to the development of religious monuments and cultural attractions.

4. Historical Background and Migration of Tai-Khamti

The Tai-Khamti community represents one of the most significant indigenous groups inhabiting Namsai District. Historical accounts and oral traditions suggest that the Tai-Khamti people originally migrated from regions of mainland Southeast Asia, particularly areas that today fall within northern Myanmar and parts of Thailand. Over several centuries, different Tai-speaking groups gradually moved westward following river valleys and fertile lowland corridors toward the eastern Himalayan foothills and the Brahmaputra basin.

After arriving in the northeastern region of India, the Tai-Khamti established settlements in fertile alluvial valleys that were suitable for agriculture and permanent habitation. These settlements gradually developed into organized village communities characterized by agricultural production, cultural institutions, and religious establishments. The availability of fertile land and water resources contributed to the establishment of stable agrarian livelihoods.

Religion plays a central role in the identity and social organization of the Tai-Khamti community. The majority of the population follows Theravada Buddhism, and religious institutions such as monasteries serve not only as places of worship but also as centres of education, cultural preservation, and community gatherings. Religious rituals and daily prayers remain an integral part of household life, reflecting the continued influence of Buddhist traditions on social values and cultural practices.

One distinctive feature of the Tai-Khamti community is the presence of their own traditional script known as Lik-Tai. This script has historically been used for religious manuscripts, historical records, and literary texts associated with Buddhist teachings. The existence of this writing system represents an important aspect of the intellectual and cultural heritage of the community.

Traditional settlement patterns also reflect adaptation to local environmental conditions. Earlier houses were typically constructed on raised platforms using bamboo, timber, and thatched roofing materials. Such elevated structures provided protection from seasonal flooding and humidity. In recent decades, however, modernization and urban development have led to the gradual replacement of these traditional houses with brick and concrete buildings.

Historically, the social structure of the Tai-Khamti community included different hierarchical roles within society. Community chiefs and elders often played an important role in governance and dispute resolution, while Buddhist monks and priests maintained strong influence in spiritual and cultural matters. These institutions contributed to the preservation of social order and cultural continuity within the community.

5. Cultural Heritage of Tai-Khamti and Singpho Communities

The cultural landscape of Namsai District is deeply influenced by the traditions and social practices of the Tai-Khamti and Singpho communities. These groups maintain rich cultural traditions that include craftsmanship, textile weaving, performing arts, and ritual practices that continue to shape everyday life.

Among the Tai-Khamti community, craftsmanship represents an important cultural skill passed from one generation to another. Artisans produce a variety of handmade objects using locally available materials such as bamboo, wood, bone, and other natural resources. One of the most well-known traditional objects is the ceremonial sword known as Pha-nap, which symbolizes both artistic craftsmanship and the historical martial traditions of the community. In earlier times, weapons such as spears, bows, and shields were also produced as part of traditional defence and hunting practices.

Traditional clothing forms another significant component of cultural identity. Men in the Tai-Khamti community commonly wear a full-sleeved cotton shirt known as Siu Pachai along with a traditional lower garment referred to as Pha-Noi. Women traditionally wear a half-sleeved blouse known as Sui Pashao paired with a woven skirt called Sui, which may be produced from cotton or silk. Decorative scarves and ornaments such as amber earrings and coral necklaces are also worn during cultural events and ceremonies.

Weaving is particularly important among women of both Tai-Khamti and Singpho communities. Using traditional looms, women produce garments that display intricate patterns and vibrant colors. These weaving traditions not only preserve cultural identity but also contribute to household income through the sale of handicrafts and textiles.

Agriculture remains the primary economic activity for many households within these communities. Historically, both shifting cultivation (jhum) and settled agriculture were practiced. Rice cultivation forms the backbone of agricultural production, while other crops such as maize, millet, vegetables, ginger, and chilli are also cultivated. Agricultural practices are closely connected with seasonal cycles and cultural traditions.

The combination of traditional craftsmanship, weaving practices, agricultural livelihoods, and religious traditions contributes significantly to the cultural heritage of the region. These cultural expressions also provide important attractions for visitors

interested in exploring indigenous traditions and rural lifestyles in the eastern Himalayan foothills.



Figure 2: Tai-Khamti traditional house

6. Festivals and Cultural Tourism

Festivals play a vital role in expressing cultural identity and social cohesion in Namsai District. These celebrations provide opportunities for communities to preserve their traditions while also attracting visitors interested in experiencing indigenous cultural practices. As a result, festivals have become an important component of cultural tourism in the region.

One of the most significant festivals celebrated by the Tai-Khamti community is the Sangken Festival. This festival is observed annually in April to mark the traditional New Year according to the Tai calendar. During the celebration, sacred images of the Buddha are ceremonially bathed in a ritual symbolizing purification and spiritual renewal. Temporary structures known as Kyangphra are constructed to house the Buddha images during the festivities. The event is accompanied by prayers, religious processions, and the symbolic sprinkling of water among participants, representing peace, prosperity, and harmony.



Figure 3: Sangken Festival celebration

Another important cultural event is the Poi Pee Mau, which celebrates the beginning of the traditional Tai New Year and agricultural cycle. The festival involves religious rituals, community feasts, traditional games, and cultural performances. Such celebrations strengthen social unity within the community while also providing visitors with an opportunity to observe traditional customs and ceremonies.

Several other religious festivals are celebrated throughout the year, including Khao-Wa, Mai-Ka-Sung-Phai, Poy Kathing, and Buddha Purnima. Each of these festivals reflects different aspects of Buddhist traditions and local cultural heritage. These events attract visitors interested in observing religious ceremonies, traditional costumes, and cultural performances.

Performing arts form an important part of festival celebrations. One notable performance is the Ka-Pung dance-drama, which narrates stories derived from Buddhist mythology and moral teachings. Another popular performance is the Ka-Fi-Fai or cockfight dance, which represents symbolic cultural expressions of the community. These performances are accompanied by traditional musical instruments such as drums, cymbals, and bamboo flutes.

Traditional cuisine also contributes to the cultural tourism experience of the region. Rice forms the staple food of the Tai-Khamti community and is commonly prepared as steamed rice known as Khao Hai. Popular dishes include Tongtep, Khawlam, Paasa, and Nam-Som, which are prepared using local herbs, rice products, and river fish. These culinary traditions provide visitors with an opportunity to experience the distinctive food culture of the region.

Overall, festivals, performing arts, and traditional cuisine collectively enhance the cultural tourism potential of the district by offering visitors a deeper understanding of the region's indigenous heritage and social traditions.

7. Tourism Resources

Namsai district possesses a variety of tourism resources associated with religious heritage, cultural landscapes, and natural surroundings. These attractions contribute significantly to the development of tourism in the region.

The most prominent landmark in the district is the Golden Pagoda. Constructed in a traditional Southeast Asian architectural style, the pagoda has become one of the most recognized Buddhist monuments in Northeast India. The temple complex attracts pilgrims, tourists, and researchers interested in Buddhist culture and architecture.

Another important religious site in the district is the Empong Monastery, which serves as an important spiritual and cultural institution for the Tai Khamti community.

Monasteries such as Empong play an essential role in preserving Buddhist traditions, religious teachings, and community gatherings.

In addition to these religious sites, the district is located within a broader cultural and pilgrimage landscape. One of the important pilgrimage destinations located near the district is the Parshuram Kund, which attracts thousands of pilgrims every year during religious festivals.

The scenic landscapes of river valleys, agricultural fields, and forested hills surrounding Namsai also contribute to the tourism potential of the district. These landscapes provide opportunities for nature-based tourism, photography, and cultural exploration.

The presence of monasteries, cultural villages, and traditional settlements further enhances the tourism appeal of the region. Visitors often travel to Namsai not only for religious pilgrimage but also to experience the cultural traditions and hospitality of local communities.

8. Tourism Infrastructure Development

Tourism infrastructure in Namsai has gradually expanded over the past decade as the region has gained recognition as an emerging tourism destination. Improvements in transportation networks, accommodation facilities, and tourism services have contributed to increased accessibility for visitors.

The development of hospitality establishments has played an important role in supporting tourism growth in the district. Accommodation facilities such as 7 KM Resort and Tung Tao Resort provide lodging, food services, and recreational spaces for visitors traveling to the region. These resorts are often located in scenic environments near rivers and forested landscapes, offering visitors opportunities to experience the natural beauty of the area. In addition to resorts, small guest houses, homestays, and locally managed hospitality services have also emerged as part of the tourism infrastructure. These facilities are often operated by local residents and contribute to community-based tourism development.

Restaurants, transportation services, and local markets have also expanded to support the growing number of visitors. Such developments have created employment opportunities for local residents in sectors such as hospitality, guiding services, transportation, and small-scale trade.At the same time, the expansion of tourism infrastructure has generated discussions among local communities regarding its environmental and social impacts. While tourism development has contributed to economic opportunities, some residents have raised concerns about deforestation, land-

use changes, and increasing environmental pressure associated with resort construction and infrastructure expansion.

Therefore, sustainable planning and community participation remain essential for ensuring that tourism infrastructure development in Namsai supports long-term cultural preservation and environmental sustainability.

12. Methodology

This study adopts a qualitative and descriptive research approach in order to understand the relationship between cultural heritage, tourism development, and environmental concerns in Namsai district. The research is based on both primary and secondary sources of data.

Primary data were collected through field visits conducted in different locations of Namsai district, particularly around the Golden Pagoda and nearby tourism sites. Field observation was used to understand the patterns of tourism activities, visitor behavior, and the interaction between local communities and tourists.

A questionnaire-based survey was conducted among 28 respondents. The respondents included local residents, tourism workers, small business owners, resort staff, and individuals engaged in tourism-related services. The questionnaire focused on several aspects such as the growth of tourism, its impact on local livelihood, cultural preservation, and environmental challenges associated with increasing tourist activities.

Informal communication and discussions were also carried out with members of the Tai Khamti and Singpho communities. These interactions helped to understand the perceptions of local people regarding cultural tourism, community participation, and environmental change in the region.During the field visit, interactions were also made with domestic and international tourists visiting the pagoda complex and nearby resorts. Some visitors from Italy, North America, and Europe were informally engaged in discussions regarding their travel experiences and perceptions of the cultural environment of Namsai. These conversations provided useful insights into the attractiveness of the region as an emerging cultural tourism destination.

Secondary data were collected from academic books, research articles, tourism department reports, and government publications related to tourism development, cultural heritage, and environmental issues in Northeast India. These sources helped to provide a broader contextual understanding of tourism development in the region.The combination of primary and secondary data sources allowed the study to examine both local perspectives and broader academic interpretations of tourism and cultural change in Namsai.

13. Findings and Discussion

The findings of the study reveal that tourism in Namsai district has experienced gradual growth over the past decade, largely due to the increasing popularity of the Golden Pagoda and the promotion of cultural festivals associated with the Tai Khamti community.

Results from the questionnaire survey conducted among 28 respondents indicate that a majority of participants perceive tourism as a positive development for the local economy. Many respondents stated that tourism has created new livelihood opportunities through hospitality services, transportation, small shops, handicraft sales, and food businesses.

Local entrepreneurs have also benefited from the increasing number of visitors. The development of resorts, guesthouses, and restaurants has generated employment opportunities for youth in the district. Tourism-related activities have therefore contributed to improving income sources for several households. Another important finding from the survey is the role of cultural heritage in attracting visitors. Respondents emphasized that traditional festivals such as Sangken Festival play a significant role in promoting tourism. Cultural performances, religious rituals, and traditional costumes displayed during these festivals provide visitors with a unique cultural experience. Interactions with international visitors also revealed that many tourists are particularly interested in the cultural traditions, Buddhist heritage, and peaceful natural environment of the region. The architectural beauty of the Golden Pagoda and the surrounding landscape were frequently mentioned as major attractions.

However, the findings also highlight several challenges associated with the growth of tourism. Some respondents expressed concerns regarding the lack of proper waste management facilities in tourist areas. Increased tourist activities have also led to greater pressure on local resources and infrastructure.

In addition, some participants noted that rapid tourism development could potentially influence traditional lifestyles if not managed carefully. Therefore, community participation and sustainable tourism planning were identified as important factors for the future development of tourism in the district.

14. Environmental Concerns

Environmental concerns have become increasingly noticeable with the growth of tourism activities in Namsai district. During field observations and interactions with local residents, several environmental issues were identified.



Figure 4. Environmental impacts associated with tourism development in Namsai.

One of the most frequently mentioned problems is improper waste disposal in tourist areas. Plastic waste and food packaging materials left by visitors have become a growing concern around popular locations such as the Golden Pagoda.

Local residents also expressed concerns regarding deforestation and land-use changes associated with the expansion of tourism infrastructure. The construction of resorts and commercial establishments has gradually altered parts of the natural landscape.

Some respondents also reported noticing gradual environmental changes over the past few years. A few participants perceived an increase in temperature and changes in seasonal patterns, which they associate with reduced forest cover and infrastructure development. Although such perceptions require further scientific investigation, they highlight growing environmental awareness among local communities.

Another environmental concern is the lack of organized waste management systems and environmental regulations for tourism areas. Without proper planning and monitoring, tourism expansion may contribute to environmental degradation in the long term.

Therefore, sustainable tourism management strategies are necessary to ensure that tourism development does not negatively affect the natural and cultural environment of the district.

15. Conclusion

The study highlights that Namsai district represents an important example of emerging cultural tourism in the eastern Himalayan region. The rich cultural traditions of the Tai Khamti and Singpho communities, along with religious institutions and traditional festivals, form the foundation of tourism development in the region.

Cultural events such as the Sangken Festival and other community celebrations attract visitors interested in experiencing indigenous traditions and Buddhist cultural heritage. The presence of major attractions like the Golden Pagoda has further strengthened the tourism potential of the district.Tourism development has created new economic opportunities for local communities through employment in hospitality services, transportation, handicrafts, and small businesses. The emergence of resorts and tourism facilities has also improved the economic prospects of the region.

However, the findings of the study also indicate that increasing tourism activities have introduced environmental challenges such as waste management issues, pressure on natural resources, and land-use changes associated with infrastructure development.

For tourism to remain sustainable in the long term, it is important to adopt integrated planning strategies that balance economic development with cultural preservation and environmental protection. Strengthening community participation, promoting responsible tourism practices, and improving environmental management systems will be essential for maintaining the ecological and cultural integrity of Namsai.

Overall, the study demonstrates that cultural tourism in Namsai has significant potential for sustainable development if managed carefully with active involvement of local communities and appropriate policy support.

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Chapter 45: Maternal Grey Fog and the Politics of Reproductive Debt: Rethinking Sustainable Futures through Dalit and Adivasi Motherhood Narratives

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Abstract

In contemporary Indian motherhood narratives, the "Grey Fog" emerges as a strong metaphor for the deep maternal crisis, where everything feels off-balance, signifying temporal disorientation. Mothers suffering from early postpartum distress go through a thick confusion where senses fade, time loses shape, and the usual sense of self breaks apart. Employing Havi Carel's concept of bodily doubt and Simon J. Williams' idea on "biological reality of pain," this study treats maternal suffering not as a lone personal issue, but as a real "illness experience" that is shaped by structural forces in the Global South. The study looks closely into narratives from Dalit and Adivasi mothers, including Hansda Sowvendra Shekhar's The *Adivasi Will Not Dance*, Alma Grace Barla's *Indigenous Heroines*. It aims to reveal this crisis as reproductive debt, an accumulated burden of caste and gender oppression, ecological exploitation, and unsustainable models that ignore marginalised women. Uma Chakravarti's feminist lens on caste and gender intersection reveals the unique layers of vulnerabilities carried by Dalit and Adivasi women. Vandana Shiva's ecofeminist work *Staying Alive* aligns women's survival with ecological integrity, showing how dominant development acts as violence against maternal bodies and communities. This study challenges modern ideas of sustainability through the lens of post development dictionary *Pluriverse* (Kothari et al.). By looking at Dalit and Adivasi maternal narratives, like C.K. Janu's *Mother Forest*, we see a different kind of future. This study advances the conversation forward by showing how the experiences of marginalised mothers can challenge power and environmental injustice. It proposes a three-layered solution; first, immediate refusal through communal care networks; second, policy inversion embedding motherhood narratives; third, radical futurity where indigenous maternal epistemology reframes time and economy.

Keywords: Grey Fog, postpartum distress, reproductive debt, biographical disruption, bodily doubt

Introduction

In the landscape of a rapidly modernising India, the "Grey Fog" serves as a visceral marker of a crisis that is both medical and political. It is a metaphor for the state of sensory confusion, temporal loss, and identity breakdown. For Adivasi and Dalit mothers, development is often experienced as a form of sensory erasure. The concept is drawn from the clinically documented metaphor of "enveloping fogginess," a feeling that mothers themselves use to describe postpartum depression (Beck 114), and extended here beyond just the clinical into the structural.

C.K. Janu's *Mother Forest* published in 2004, starkly contrasts with this contemporary disorientation. Janu recounts a pre-displacement era in the Wayanad Forests in Kerala that was a complete life-support system without hunger or fear. As Shruti Das notes, the "migrants easily usurped the lands of the Adiyas because tribal concepts of communal living did not align with the state's rigid, exclusionary sense of ownership" (100). This displacement is not merely a loss of property. This is a fundamental disruption in the maternal role. When the forest is removed from the equation, the commodification or destruction of the nurturing role of the mother is left to find a place in a world that values her labour but not her children.

In order to understand this disorientation, we have to consider the relationship between "bodily doubt" and "biographical disruption" (Carel 237). The experience of illness or trauma often makes the body feel strange to the self. For marginalised women, this bodily doubt is exacerbated by structural violence. Simon J. Williams argues that chronic illness is a "biographical disruption" that forces a person to rewrite their life story (1). In the context of Dalit and Adivasi motherhood, this disruption is the norm rather than an exception. Their narratives, such as those found in Hansda Sowvendra Shekhar's *The Adivasi Will Not Dance* published in 2015, reveal a state of "reproductive debt." This is the accumulated burden of caste oppression and ecological ruin that mothers pay with their physical and mental health.

Unpacking the "Grey Fog"

The "Grey Fog" is a state of deep, structural hurt. Havi Carel's work, *The phenomenology of illness,* describes breathlessness as a form of hidden, invisible pain. Patients often tuck this suffering away because of the stigma attached to it. This leads to what Carel calls "bodily doubt." The body shifts from being a reliable tool to a strange, unpredictable presence (Carel 237). For mothers navigating the postpartum period, this disorientation is intense. In the lives of Dalit and Adivasi women, however, the system amplifies this doubt. Caste-based shaming and state-led land grabs create a reality where

these women are quite literally suffocating under the weight of the structure. Simon J. Williams explores whether this kind of "biographical disruption" is a total break or a permanent state. In chronic cases of oppression, there is no clean break. Instead, there is a daily wear and tear. Mothers are forced to patch together their life stories in the middle of chaos. This is evident in the lives of unwed tribal mothers in South India, studied in 2012 by Jose et al. and Cherayi et al., which was a qualitative inquiry conducted to explore and document the lived experiences of being in unwed motherhood, their positions in the contexts of current relationships with their men, family and community (Jose 1). Their children carry the mark of non-legitimate origin like a heavy chain. This alters the very fabric of kinship and maternal narrative. The concept of "reproductive debt" is the bill society charges these women for its own survival. Uma Chakravarti, in *Gendering Caste,* shows how caste purity is maintained through the control of women. Marginalised women are denied property and voice. Chakravarti points to matrimonial advertisements as proof. The demand for a "Brahmin, fair, and educated" bride is a code for caste purity. Dalit and Adivasi women do not fit this mould. Consequently, their motherhood is treated as disposable. Vandana Shiva connects this to the soil in the first chapter titled "Development, Ecology and Women" arguing that "maldevelopment" is a project of patriarchy that kills the "feminine principle" in nature (21).

Shekhar's *The Adivasi Will Not Dance* is a raw look at this debt, in the seventh shortstory "Baso-jhi," the midwife is the "life of the village," but is later branded a witch. This change from a "mother figure" to a target of caste-based violence is a commentary on how quickly the system turns on healers. The inner conflict that Baso-jhi experiences reflect the outer conflict she faces (Shekhar 81). Her exploitation is a direct result of her displacement. When she births a child without a husband, she is cast out. Her body become battlegrounds for state and social power. The tenth chapter, titled the same as the book, *The Adivasi Will Not Dance*, knots ecological ruin with maternal health. When forests are destroyed, mothers ache. They end up birthing sick children in camps, their bodies hitting a wall of systemic neglect (Shekhar 116). Displacement of coal mines poisons the community. Women give birth to sick children in camps because the dust has settled in their wombs. The refusal to dance is a refusal to allow their lands and bodies to bleed for the pleasure of others.

Ecological and Caste Layers in Heroines and Forests

Ecological violence and caste entwine in these narratives, eroding maternal foundations. Alma Grace Barla's *Indigenous Heroines,* which was first published in 2015, celebrates the ancient power of tribal women and is an important contribution towards building a tribal literature and history that have been passed down among tribes in different parts of the country. "This legend gave birth to 'Jani Shikar', which means

hunting by women, which takes place once every twelve years. To commemorate their bravery…women leave their homes on a hunting spree for one day" (Barla 8). Legends like 'Jani Shikar' show that radical feminism existed in tribal societies long before it became a political ideology in urban India. However, the ache of patriarchy still clings to these communities. Tribal women often suffer from a denial of property rights and decision-making power. Even as they maintain healthier child sex ratios than the rest of the country, they remain burdened by the state's "soft power." Barla dedicates this book honouring sacrifices: "This book is dedicated to all the indigenous tribal women and men of India who have sacrificed their lives to protect 'Mother Earth' (2). Indigenous identity and culture; to martyrs of the freedom movement; to the thousands of innocent women, men and children who are victims of violence in the conflict areas of the Northeastern and Central East Indian states; and to those who continue to work to safeguard the fundamental human rights of indigenous peoples by upholding democratic values in line with traditional knowledge systems and best practices. C.K. Janu's *Mother Forest,* in which she speaks of her childhood and her life in the forest, her political awakening as a party worker in the CPM, her growing disillusionment with it, and her break from it after she felt it had betrayed the tribals. It is further analysed by Shruti Das, who deploys soft power to dissect displacement, the same can be seen in "November Is the Month of Migrations," from *The Advasi Will Not Dance*, the story is about Talamai Kisku, a Santhal woman who is forced to migrate for work. Janu's *Mother Forest* is also a look at the pain of this trade. For Janu, the forest is a mother that never abandons her people. Displacement is a breaking of this bond. This is supported by Pant and Sharma's argument that Adivasi women are the primary protectors of the land. When the land is stolen, so is her identity and future. *Goth: Folklore from Gujarat,* edited by Kanji Patel and published in 2017, reinforces this. The tales show mothers as wise but battle-hardened. Birth is tied to the rain and the earth. When these ties are cut, the community's survival is at stake. This involves rejecting the isolation of this reproductive debt crisis; however, it is not unique or localised. It is a global phenomenon, reflecting the lived experiences of marginalised women worldwide.

In her review of Dána-Ain Davis's study of Black motherhood in the United States, Emily S. Mann identifies a striking structural parallel between racial inequality in the Global North and caste-based marginalisation in the Global South. She argues that this is because racism works as a chronic biological stressor, which impacts maternal health outcomes even before pregnancy is medically recognised (Mann 2). This is what is often termed as "weathering." This implies the prolonged exposure to social, economic, and institutional neglect, which eventually impacts the body's internal regulatory functions, leading to early senescence and adverse birth outcomes (Mann 3). Thus, maternal risk is not just a medical occurrence but also a body politic. Mann also argues that contemporary medical practice often favours technological interventions at

the expense of structural transformations. High-tech facilities such as neonatal intensive care units may increase infant survival rates, yet they do little to address the systemic violence that produced maternal vulnerability in the first place. The prevailing medical model secures the child's survival while leaving unchallenged the racial and social conditions that endanger the mother's body (Mann 4). In this sense, biomedical rescue coexists with structural neglect.

We, however, need to look towards a three-layered solution: the first being the immediate resistance of the community. We must embrace the collective care models found in Alma Grace Barla's chronicles of "indigenous heroines". The second is a radical policy inversion that means that the narrative of the mother needs to be placed at the centre of environmental law. Land rights are, in fact, maternal rights. The womb, in other words, is always in danger if the forest is in danger. And, finally, we need to think in radical futurity, a concept drawn from the Kothari et al.'s Pluriverse dictionary. This means that we move from the linear, extractive time of capitalism to the cyclical, regenerative time of indigenous epistemology. By focusing again on the native truths, we can overcome the debt, move out of the grey fog

The crisis of reproductive debt is not a local anomaly. It is a global phenomenon that maps onto the lived realities of marginalised women worldwide. Emily Mann highlights a haunting symmetry; she argues, "chronic stress resulting from a lifetime of discrimination contributes to higher rates of adverse birth outcomes among Black women" (1). In both the Global North and South, racism and caste function as biological stressors, leading to the process of weathering. Constant discrimination wears down the body's internal systems. It causes premature ageing and adverse birth outcomes long before a woman enters a delivery room. The medical establishment often ignores these structural roots.

Proposed Framework for Structural Reclamation

This study argues that the crisis of maternal disorientation cannot be resolved through clinical intervention alone. Instead, it proposes a shift toward indigenous and communal frameworks that challenge the extractive logic of the state. These interventions are organized into three distinct yet overlapping layers of resistance.

1. Immediate Refusal:

The first layer of the proposed solution simply focuses on an immediate refusal of the isolation and systemic detachments. Dalit and Adivasi women are frequently subjected to an administrative and clinical gaze that treats them as case files rather than subjects with legitimate claims to care. The Grey Fog, as this study argues, is not merely

a personal health crisis. It is a political condition produced by structural displacement, the removal of land, community, and belonging that forces these women into unstable time and space. As Barla writes on how the displacement forces them to settle in an environment that their physiology rejects, "It is painful to see children being born amidst the sounds of blasting mines, noise from crusher units, and the movement of hundreds of trucks day in and day out" (68). The first intervention, therefore, is not just pharmaceutical or procedural, but also relational; it demands a deliberate return to communal models of care that the state has systematically dismantled. But in the process of deliberate integration of past wisdom, it is always significant to apply great caution in a powerful scrutiny of the aspects of traditions that forced hierarchies, that pushed the women to the margins, and that justified inequality.

Instead of relying on a state establishment that justifies the "biological disruption": a term proposed in this study drawing on Michael Bury's concept of "biographical disruption" as a rupture that an individual experiences "in which the relations between body, mind and everyday life are threatened" (264). Here, the term is further complicated as "biological disruption" as a permanent condition of living under the violence of caste, gender, and ecology simultaneously. The paper argues against the narrow focus of clinics towards mothers, and emphasises the communal networks that prioritise the maternal experience as a community concern rather than a solitary failure. This shift moves away from the "bodily doubt" described by Havi Carel as "the breakdown of this tacit certainty, and leads to a radically modified embodied experience. It does this in three ways: loss of continuity, loss of transparency, and loss of faith in one's body" (238). The body becomes a strange and unpredictable presence under the weight of structure. This step demands moving toward a social framework where maternal suffering is met with communal recognition and resistance. Mothers' experiences are getting recognition with modern medicine, like the experience of postpartum depression (PPD), "a prevalent yet frequently unrecognised mental health condition, especially in marginalised groups such as tribal communities . . . 45% lacking formal education and 44% involved in agriculture" (Sharma et al. 2425). But this should not again be just clinically observing the maternal body as an object rather than a person with a more complex explanation of the sufferings; a community both backs these sufferings and strengthens the door of narrative medicine.

This layer ultimately calls for a return to the communal living concepts seen in Mother Forest by C.K. Janu. She considers the forest as a "metaphor for Adivasi culture's strength, resilience, and continuity" and considers it elevated from a physical location to a maternal figure, signifying a relationship of nurturance and "mutual dependence and respect" (Pant and Sharma 29).

2. Policy Inversion:

The second layer of the solution proposes an inversion of the frameworks that places the maternal narrative at the centre of environmental and social governance. State policies treat the land and the maternal body as separate entities, as it is governed by economic extractive logic. This layer synthesises the rights of the marginalised with the rights of the Adivasi and Dalit communities. The forest is not merely a source of livelihood but a symbol of cultural identity and spiritual connection of the Adivasi people. The whole human population once in history had this connection with nature, but lost it gradually. The agony of loss can be witnessed when C.K. Janu wrote: "The forest was not merely a place to live but our mother, nurturing us in every way" (45). When policymakers ignore this bond, they commit a form of violence against the maternal body itself.

"Reproductive debt," a term introduced by Robyn Lee based on feminist concept of reproductive labour; Lee defines it as "debt burdens imposed upon people who reproduce, as a consequence of global restructuring programmes, cuts to social services and the increasing financialisation of reproduction" (166). Dana-Ain Davis uses the term "reproductive injustice" documenting a parallel resistance in the United States where black women faced systemic discrimination, where community birth worker figures like Efe, who "identif[ies] as a Black radical doula," grounding their practice in "understanding the history and politics of reproduction and racism" and "making linkages between the practice of birth justice to broader justice movements takes the form of developing and building relationships with the community in which one is working" (Davis 184). The state policy frameworks rely on an exclusionary sense of ownership that distances indigenous people. Janu's assertion here shows the contrast; she states, "We did not own the land, but the land owned us" (89). This apparently suggests that they "maintained a deep connection with the land, particularly the forests that surround their villages" (Pant and Sharma 29).

This layer demands inverting the policies to recognise that environmental degradation is a direct invasion on the indigenous style of life and the social fabric of the community. The loss of land is not just a loss of property; rather, it is the loss of the very history and future of the people. By incorporating these narratives into policies, the state should acknowledge that the maternal experience is vulnerably linked to the danger on the forests. Current medical and social policies highly focus on high-tech solutions like NICU and ignore the structural roots of suffering. Systemic discrimination fueled by racism and casteism acts as a biological stressor that causes a constant tearing of the mother's internal systems. A radical policy inversion ensures that the systems will move from treating these issues as individual medical failures. Instead, it would incorporate an

ecofeminist perspective that links the survival of women to ecological integrity. As Vandana Shiva argues that dominant development acts as violence against the maternal bodies, calls this "maldevelopment". She calls for "the recognition of nature's harmony," and contends against the extractive development. Shiva states that, "Activity, productivity, creativity, which were associated with the feminine principle are expropriated as qualities of nature and women, and transformed into the exclusive qualities of man" (5). Therefore, in order to succeed in the future, which ensures environmental justice, the state should prioritise the "feminine principle". It should protect women's rights and treat them in a way that they are mutually dependent and cannot exist in isolation.

Finally, this layer calls for the active inclusion of Adivasi women in environmental justice movements as keepers of ecological knowledge. For these women, the ecological system was inseparable from their territory, their use of wood-cutting tools (tangi) and grass-cutting tools (dauli) in battle shows that their roles as gatherers and protectors of the land transitioned directly into their roles as warriors (Barla 5). Alma Grace Barla provides evidence of Sursibai, who "organised nearly 150 women...they vowed to Goddess Nagri Mata that they would not rest until they had chased the British from the region" (6).

3. Radical Futurity:

The final part of the study proposes a shift toward a radical futurity that breaks away from the harsh, linear, and fast-paced timing of modern capitalism. In the current developmental model, the lives and health of Dalit and Adivasi women are treated like a debt they must pay just so the rest of the world can progress. Radical futurity aims to focus on the wisdom of mothers as a real guide for the future. The burden of environmental destruction always falls on poor women, as their knowledge and labour are the keys to restoring damaged ecosystems; as Samantha Hargreaves writes, "In addition to immediate social and environmental costs to communities, the long-term climate change impacts of extractivism will be carried mostly by poor women who labour to restore damaged eco-systems" (64). This layer argues that indigenous ways of knowing provide a cyclical process and a sense of regeneration that is immune to the temporal disorientation of the Grey Fog.

For marginalised mothers, the experience of modern development is often a disruption of their identity. The state focuses on linear progress against the time when the forest was a complete life support system, as depicted in Janu's Mother Forest. Janu produces an instance that "[t]he Party always considered labourers and landless people as ingredients for their rallying songs and as a decoration to their speeches". She exposes

how systems work to undermine pain and hopelessness in the indigenous people. She writes that they "declared subsidies that we could not understand in times of starvation. They made people excited by showing them statistics of uncultivated land," branding them as "lazy" (42). Radical futurity involves a transition to the time where the economy is built on sustaining the lives of indigenous people rather than suppressing them. This layer demands that the native truths must be prioritised so that communities can overcome the burden of accumulated reproductive debt and shift into a world which embraces nuances. This transition does not focus on going back in time, but on using ancient wisdom to reframe the economy and the environment for a sustainable future.

Ultimately, this framework aims to achieve radical futurity through a collective refusal to allow maternal bodies and ancestral lands, embracing the radical feminist aspects and bravery found in tribal legends. Alma Grace Barla records these "networks" as continuous efforts to build community. Families, when they were forced to move out of the forests, were placed in colonies that lacked water, fertile soil, or access to traditional medicinal plants. The displacement from the forest to the colony created a total break in their story. As Havi Carel notes, they become "invisible" to the outsider; their suffering is seen as a newly defined justified cost for modernity in remote resettlement camps where "nothing more can be done" (235). So, this study demands stepping out of the Grey Fog of colonial hierarchies and realising a future where indigenous political reasoning defines the terms of survival and justice.

Conclusion

The crisis of the "Grey Fog" and the disturbing "reproductive debt" are not mere side effects of progress; rather, they are the intentional results of a system that sustains on the economic extraction of life from the marginalised bodies. This study establishes that the sensory confusion experienced by Dalit and Adivasi mothers is not just a clinical issue; it is a social and political injury embedded in their illness experience. When the state ignores this suffering, it treats these women as disposable parts of a liberal economy. By dismissing maternal inherent wisdom and the rhythm it has with nature, policymakers perpetuate a capitalist outlook that sees these mothers as problems to be managed and of themselves as liberal reformists. Capitalist economic frameworks fail to comprehend what Poelina mentions as the "trans-generational psychic trauma" caused by structural violence; it aligns with the concepts of grey fog and reproductive debt. She, much like Janu, argues that modern development that uproots traditions is a violent process that treats indigenous knowledge as invisible or valueless, as "the Anglo-Australian settler society disregards the value of our human 'capital' grounded in traditional knowledge systems and the rights of nature" (Pelina 143).

To move beyond this disorientation, the study demands recognition of the survival of the mother as inseparable from the survival of the land. As Vandana Shiva argues, the violence of "maldevelopment" is a direct attack on the system that nature built on the "feminine principle" (44). The conflict in the lives of indigenous mothers regarding their statecraft and epistemic hierarchies, this study identifies a fundamental clash between the two worldviews, "The ecological and feminine imperative demands that the former [maintaining the nutrient cycle] not be neglected, but the masculinist definition of 'rationality' and 'progressiveness' as profit maximisation forces the farmers to act against the ecological option" (Shiva 136). The narratives of C.K. Janu and Dana-Ain Davis prove that marginalised women are not passive victims, but they are active resisters of "medical racism" (Davis 20) and epistemic "hierarchies" (Das 115). Their narratives act as a refusal of the systemic gaze, demanding a world where land rights are protected.

The proposed three-layered solution, Immediate Refusal, Policy Inversion, and Radical Futurity, offers a path out of this fog. It shifts the paradigm from the extractive time of capitalism to the cyclical time possible in the pluriverse. Finally, a sustainable future is only possible when the state embraces indigenous epistemologies that value life and the forest over maldevelopment. It is the time that demands to clear the fog and transition into a world where plurality thrives.

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Chapter 46: Ethno-Spiritual Knowledge and Sustainable Living with Nature: Reclaiming Tai Phake Buddhist Traditions within Indian Knowledge Systems

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Abstract

Indigenous Knowledge Systems (IKS) are a collection of insights gained through interactions between human communities and their environments. Among the lesser-known indigenous groups in Northeast India, the Tai Phake Buddhist community in Upper Assam demonstrates a unique blend of spiritual beliefs, ecological ethics, and sustainable living practices. This paper explores how Tai Phake Buddhist customs serve as a framework for understanding the connection between humans and nature, promoting ecological balance and supporting community well-being. Using qualitative ethnographic methods, interpretations of Buddhist ethics, and various academic sources, the study examines indigenous environmental practices, ritualistic ecology, traditional farming techniques, and the moral beliefs present in Tai Phake life. It positions Tai Phake beliefs within the broader context of Indian Knowledge Systems and the contemporary conversation about sustainability. Tai Phake cosmology encourages conservation ethics through principles such as non-violence (ahimsa), moderation, respect for nature, and community stewardship. However, challenges like modernization, cultural blending, and environmental pressures pose significant threats to these traditions. The paper argues that reclaiming Tai Phake ethno-spiritual knowledge is essential not just for preserving culture but also for developing sustainability practices that can tackle current environmental challenges. This study contributes to indigenous studies, environmental humanities, and sustainability research by emphasizing Tai Phake Buddhism as a living knowledge system that aligns with global sustainability goals.

Keywords: Indigenous Knowledge Systems, Tai Phake, Buddhism, Ethno-spirituality, Sustainable Living, Nature Conservation, Assam.

1.Introduction

Indigenous communities around the world have developed complex knowledge systems closely connected to their local ecosystems. In India, these systems are gaining recognition under the name Indian Knowledge Systems (IKS). This includes traditional ecological wisdom, spiritual beliefs, ethical principles, and sustainable practices passed down through generations. Northeast India, a recognized biodiversity hotspot, is home to various indigenous groups whose lifestyles reflect a sustainable relationship with the environment. Among these is the Tai Phake Buddhist community of Upper Assam, which holds a unique cultural and ecological position.

The Tai Phake is a small Buddhist community that speaks Tai and mostly lives along the Burhi Dihing River in the Dibrugarh and Tinsukia districts of Assam. Their social and cultural lives are heavily shaped by Theravāda Buddhist teachings, which influence their worldview, ethical choices, and connection to the environment. Unlike mainstream development approaches that often separate religion from ecology; the traditions of the Tai Phake merge spiritual practice with environmental ethics. This offers a valuable example for understanding sustainability through indigenous spiritual perspectives.

This paper explores how the ethno-spiritual knowledge of the Tai Phake helps them live sustainably with nature. It aims to answer three main questions: (i) How do Buddhist ethical principles fit into Tai Phake environmental practices? (ii) How do Tai Phake traditions relate to Indian Knowledge Systems and sustainability science? (iii) What challenges threaten the preservation of these traditions in today's world? By addressing these questions, the study aims to position Tai Phake Buddhist customs as an important part of the conversation around indigenous sustainability.

2. Statement of the Problem

Despite increased global recognition of Indigenous Knowledge Systems (IKS) and faith-based environmental ethics, the spiritual and cultural wisdom of small indigenous Buddhist groups in Northeast India remains underrepresented in mainstream conversations on sustainability. The Tai Phake community in Upper Assam possesses a rich set of Buddhist-inspired ecological practices that affect agriculture, settlement patterns, resource use, and attitudes toward nature. However, rapid modernization, cultural integration, formal education systems, and environmental issues like riverbank erosion and loss of biodiversity create significant challenges for preserving this knowledge. Most research on the Tai Phake have mainly focused on language

endangerment, migration stories, or socio-cultural analysis, with little attention given to their ethno-spiritual ecological insights and their importance to Indian Knowledge Systems and modern sustainability models.

3. Research Objectives –

1. To analyse how Buddhist ethical principles influence environmental practices within the Tai Phake community.
2. To examine traditional Tai Phake ecological practices related to agriculture, food habits, and resource management.
3. To interpret Tai Phake ethno-spiritual knowledge within the broader framework of Indian Knowledge Systems and sustainability discourse.
4. To identify contemporary socio-cultural and environmental challenges affecting the transmission of Tai Phake ecological traditions.

4. **Study Area**

The research focuses on Tai Phake communities in Upper Assam, especially in the Dibrugarh and Tinsukia districts. Among these, Namphake village is notable. It is close to Naharkatia town in the Dibrugarh district and near the Burhi Dihing River. This region lies in the Brahmaputra Valley, which is recognized for its rich alluvial soils, humid subtropical climate, heavy rainfall, and diverse wildlife. The villages are typically located near rivers and forests, reflecting the Tai Phake's preference for ecologically favourable areas. Agriculture, particularly wet rice cultivation, is the main source of income

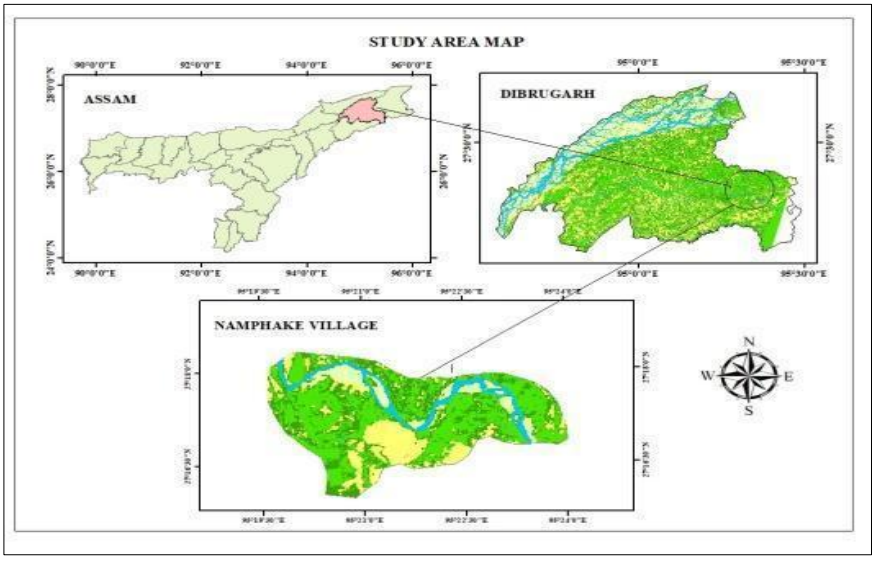


Fig1-Study Area Map

5. Research Methodology –

The research uses a qualitative and interdisciplinary method. It incorporates insights from anthropology, human geography, religious studies, and environmental humanities. The data comes from both primary and secondary sources. Primary insights are gathered through ethnographic observations, casual conversations, and the study of rituals and monastic teachings found in existing field studies of the Tai Phake community. Secondary sources include published research articles, books, ethnographies, and policy documents related to Tai Phake society, Buddhism, Indigenous Knowledge Systems, and sustainability.

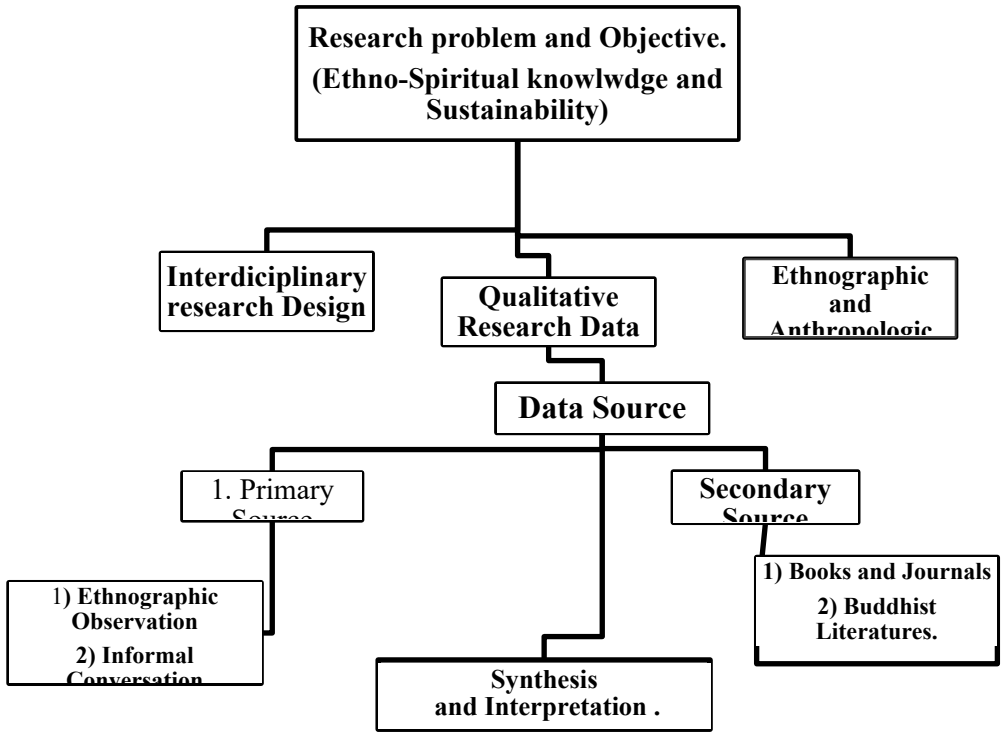


Figure 2 - Conceptual Methodological Framework of Ethno-Spiritual Sustainability Analysis

6. Conceptual Framework: Indian Knowledge Systems, Ethno-Spirituality, and Sustainability

Indian Knowledge Systems denote comprehensive ways of knowing that have emerged in the Indian subcontinent, incorporating physical, spiritual, and moral aspects of existence. These systems highlight the importance of balance between humanity and

nature, circular concepts of time, and a sense of ethical duty towards all forms of life. Indigenous wisdom *(Berkes, 2012),* frequently side-lined in colonial and postcolonial knowledge frameworks, is now gaining recognition for its significance in promoting sustainable development, adapting to climate change, and preserving biodiversity.

Ethno-spiritual knowledge *(Gadgil et al., 1993)* can be defined as the blending of cultural traditions, spiritual values, and ecological insights within a particular ethnic group. In numerous indigenous communities, spirituality transcends ritualistic practices, influencing daily activities such as farming, food choices, living arrangements, and resource utilization. In this framework, sustainability is perceived not as a contemporary scientific idea but as an ingrained ethic founded on restraint, interdependence, and reverence for the natural world.

Buddhism, especially within its Theravāda branch, provides a philosophical basis that supports sustainability. Essential tenets such as impermanence (*anicca*), non-self (*anatta*), non-violence (*ahimsa*), and the Middle Path promote balance, empathy, and moral responsibility. When interpreted within indigenous societies like the Tai Phake, these ideas take the form of practical environmental ethics rather than theoretical principles.

7. Ethno-Spiritual Knowledge of the Tai Phake -

The beliefs of the Tai Phake community form a deep connection between values, ethical behaviour, rituals, and care for the environment. This framework shapes their daily lives and promotes sustainable interactions with nature. Rooted in Theravāda Buddhism and enriched by local Tai customs, this belief system bridges the gap between spirituality and ecological care.

7.1- Buddhist Perspective and Moral Ecology -

Members of the Tai Phake community practice Theravāda Buddhism, emphasizing ethical behaviour, self-control, and compassion for all living beings. Principles like ***ahimsa*** (non-violence), ***anicca*** (impermanence), and ***dukkha*** (suffering) encourage a mindset that avoids extreme materialism and environmental harm. These values act as informal guides that promote ecological balance and responsible resource management. The Buddhist monastery basically serves as both a worship space and a hub for moral education. It teaches moderation, respect for life, and shared responsibility. Guidance from the monastic community and related rituals foster a sense of karmic duty, where harming nature is seen as having moral consequences that impact both individuals and the community.





Figure 3- Tai Phake Buddhist Ecology

7.2 Sacred Landscapes and Ritual Ecology -

In Tai Phake culture, natural elements like rivers, forests, fields, and public spaces hold significant spiritual value. The placement of Tai Phake settlements along the Burhi Dihing River reflects practical ecological needs and spiritual beliefs, with water viewed as a life-giving and purifying force. Seasonal rituals and festivals align closely with natural cycles, strengthening the bond between humans and the environment.

The ***Poi Sang Ken festival***, which marks the Tai New Year, exemplifies this connection, using water to symbolically cleanse moral shortcomings and restore balance. (Das, 2020). Such rituals emphasize the sacredness of ecological processes and heighten collective awareness of environmental issues.



Fig: 4. (**a)**



Fig: 4. (**b)**



Fig: 4. (**c)**



Fig: 4. (**d)**

(Figure 4 (a–d): Sacred landscapes and ritual practices of the Tai Phake community illustrating the integration of spirituality, ecology, and social life.)

7.3 Ethno-Spiritual Regulation of Subsistence and Food Practices -

For the Tai Phake, farming is more than just a way to make a living. It is a practice grounded in spiritual beliefs. Rice cultivation, their main source of income, is linked to rituals that stress seasonal cycles, restraint, and gratitude toward nature. Their traditional eating habits, favouring boiled foods with minimal oil, reflect Buddhist ideals of moderation and self-discipline, promoting sustainable consumption (Bora, 2017).

Sharing food during religious events and community gatherings is viewed as a virtuous act, strengthening social bonds and reducing self-cantered consumption. These deep-rooted traditions encourage sustainability through internal values rather than external rules.



Fig: 5 (**a)**



Fig: 5 (**b)**



Fig: 5. (**c)**



Fig: 5. (**d)**

Figure 5 (a–d): Ethno-spiritual regulation of subsistence practices among the Tai Phake community through food habits, collective living, and traditional livelihoods.

7.4 - Ethnomedicinal Knowledge as Spiritual-Ecological Heritage -

Traditional medicine knowledge is important to the Tai Phake's ethno-spiritual tradition. Their healing practices mix practical knowledge of herbs with spiritual beliefs and ethics. Gathering medicinal plants follows cultural guidelines about when and how to harvest, ensuring the protection of local biodiversity.

This sacred approach to healing shows a broad definition of health that includes physical, spiritual, and ecological elements. Thus, the conservation of medicinal plants

is supported by cultural values and spiritual beliefs, showcasing how their ethno-spiritual knowledge serves as a useful local strategy for protecting the environment.

Sl. No.	Scientific Name	Local / Tai Name*	Family	Part Used	Day-to-Day Ethno-Spiritual Use	Ethno-medicinal Use	Mode of Preparation
1	*Ocimum sanctum* L.	Tulsi	Lamiaceae	Leaves	Planted near houses; used in daily prayers and purification	Cold, cough, immunity booster	Leaf decoction / raw leaves
2	*Curcuma longa* L.	Halod	Zingiberaceae	Rhizome	Ritual purification; auspicious substance	Wounds, inflammation	Paste (external), oral
3	*Zingiber officinale* Roscoe	Ada	Zingiberaceae	Rhizome	Daily cooking with ritual purity norms	Cold, digestion	Decoction
4	*Centella asiatica* (L.) Urb.	Manimuni	Apiaceae	Whole plant	Daily consumption for mental clarity	Memory, stomach disorders	Raw / juice

***Clerodendrum glandulosum* Lindl.**	**Nephaphu**	**Lamiaceae**	**Leaves**	**Regular household vegetable**	**Hypertension**	**Boiled leaves**
***Azadirachta indica* A. Juss.**	Neem	Meli-aceae	Leaves	Used for cleansing house & body	Skin diseases, fever	Decoction / paste
***Psidium guajava* L.**	Madhuriam	Myrtaceae	Leaves	Household remedy; elder-guided use	Diarrhoea, dysentery	Leaf decoction
***Terminalia chebula* Retz.**	Hilika	Combretaceae	Fruit	Preventive health practice	Digestive disorders	Powder
***Tabernaemontana divaricata* (L.) R.Br.**	Chandramaloti	Apocynaceae	Leaves	Grown near homes; spiritual protection	Eye irritation, wounds	Leaf extract
***Eupatorium cannabinum* L.**	Ban-manimuni	Asteraceae	Leaves	Used during seasonal illness rituals	Fever, stomach pain	Leaf juice
***Jatropha curcas* L.**	Bongali-era	Euphorbiaceae	Leaves, latex	Ritual caution plant near fences	Wounds, skin infections	Paste / latex
***Citrus limon* (L.) Osbeck**	Nemutenga	Rutaceae	Fruit	Used in cleansing rituals	Indigestion, cold	Juice / infusion

Table 1 – Ethnomedicinal and Ritualistic plants used widely among Tai Phake Peoples.

(Compiled from Borgohain et al. (2018), Borthakur (1981), and field-based ethnographic documentation.)



Fig 6(a) - Urena lobata L.



Fig. 6(b). Senna alata L.



Fig 6(c) -Adhatoda vasica Nees



Fig 6(d) -Smilax macrophylla Roxb.

Figure 6 (a–d): Selected ethnomedicinal plants used by the Tai Phake community, illustrating the integration of spiritual beliefs, healthcare practices, and biodiversity conservation.

5.5 Transmission and Contemporary Relevance

Tai Phake ethno-spiritual knowledge is passed down through family teachings, monastic education, participation in rituals, and storytelling. Despite increased exposure

to modern education, tourism, and outside cultural influences, the Tai Phake community continues to uphold important spiritual practices that guide their social and ecological actions. Recent studies indicate that Buddhism remains an important cultural influence, supporting indigenous knowledge systems and the preservation of language in the community.

8 - Reclaiming Tai Phake Traditions within Indian Knowledge Systems

Reclaiming Tai Phake traditions in the context of Indian Knowledge Systems (IKS) shows the value of indigenous ways of knowing that link spirituality, ecology, and social ethics. IKS recognizes knowledge traditions formed through long-term cultural interactions with nature, where moral principles, belief systems, and practical wisdom exist together. Within this framework, the Tai Phake community in Upper Assam serves as a living archive of ethno-spiritual knowledge from Theravāda Buddhism and Tai cultural heritage.

One major contribution of Tai Phake traditions to IKS is their deep understanding of sustainability. Unlike mainstream development models that view nature as an external resource, Tai Phake cosmology sees humans as ethically responsible participants in a larger ecological system. Buddhist teachings like ahimsa (non-violence), moderation, and karmic responsibility shape daily practices related to food, agriculture, and health. These values act as informal guidelines that support ecological balance without needing formal legal rules (Das, 2020; Lahkar & Chakhap, 2019).

The role of Buddhism as a cultural authority also strengthens the inclusion of Tai Phake traditions in IKS. Monasteries function not just as religious spaces but also as centres for cultural exchange, ethical education, and community bonding. Recent studies show that Buddhist institutions in the Tai Phake community have been essential in preserving indigenous languages, rituals, and moral values, thus enhancing cultural resilience in the face of modern changes (Wongsathit, Sandman, & Yurayong, 2025). This highlights the importance of spiritual institutions in protecting indigenous knowledge systems beyond their written forms. The ethnomedicinal practices of the Tai Phake community present another key aspect of reclaiming indigenous knowledge in IKS. Traditional healthcare uses locally sourced plants for preventive and healing needs, blending spiritual beliefs with practical ecological wisdom. These practices promote biodiversity conservation through customary harvesting and ethical guidelines, aligning with IKS's focus on the balance between health, environment, and spirituality (Phukan Borgohain, Teron, & Tamuli, 2018).

However, reclaiming Tai Phake traditions faces modern challenges. Acculturation, language loss, and cultural commodification from tourism threaten the authenticity of ethno-spiritual practices (Devi et al., 2020; Kurmi, 2023). While thoughtful adaptation to modern education and economic opportunities has built community resilience, uncritical assimilation creates risks for passing down indigenous knowledge through generations. Therefore, integrating Tai Phake traditions into IKS should focus on community agency, ethical continuity, and practical relevance instead of just symbolic representation. From a broader perspective, including Tai Phake ethno-spiritual knowledge in IKS has important implications for sustainable development policies in Northeast India. Indigenous Buddhist views that emphasize restraint, collective well-being, and respect for nature offer alternative pathways to sustainability that can work alongside scientific methods. Acknowledging such traditions in academic discussions and policy frameworks promotes diverse knowledge systems and enhances culturally relevant responses to ecological challenges. Reclaiming Tai Phake traditions within Indian Knowledge Systems is not merely about preserving culture; it is a vital part of rethinking sustainability, ethics, and development. The Tai Phake perspective shows that indigenous ethno-spiritual knowledge is an active and significant resource for addressing today's environmental and social problems.

9- Conclusion

This research shows that the ethno-spiritual wisdom of the Tai Phake community is an important and changing part of Indian Knowledge Systems (IKS). Here, spirituality, ecology, health, and social ethics are closely linked. Grounded in Theravāda Buddhist philosophy, Tai Phake traditions promote sustainable living through moral discipline, respect for nature, and community-managed resource governance. Everyday activities related to farming, dietary habits, and traditional medicine reflects a holistic view that highlights the balance between people and the natural world. Even with rising challenges from modernization, cultural assimilation, and language loss, the Tai Phake community has Maintained k essential ethno-spiritual values through monastic networks, ritual ceremonies, and sharing knowledge across generations. Recognizing and reclaiming these indigenous practices within the IKS framework is essential for protecting culture and promoting ethical and inclusive sustainability methods. The Tai Phake approach offers valuable insights for modern environmental governance and development based on indigenous knowledge in Northeast India and beyond.

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Chapter 47: Gender Inequality, Health Expenditure, and Trade Openness: Panel Quantile Evidence on Growth in Emerging Economies

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Abstract

The education sector, health capital, and economic growth reflect country-specific development priorities and are closely aligned with the Sustainable Development Goals (SDGs). Within this context, gender inequality in education represents a key dimension of social inequality that shapes economic opportunities. This chapter examines the interlinkages between human capital, macroeconomic conditions, and sustainable development outcomes, with particular emphasis on gender disparities in education as a structural driver of unsustainable development paths in eleven emerging economies. To account for heterogeneity in the growth response to socioeconomic factors, the study employs quantile regression methods, allowing coefficients on liberalization and other determinants to vary across the conditional GDP growth distribution. The findings show that gender disparities in education have a stronger impact in high-growth countries, while investments in human capital unexpectedly exhibit a negative effect across all growth deciles. Trade openness reduces economic growth in both the lowest and highest growth deciles, highlighting heterogeneous effects across the distribution.

Key words : Economic growth ; emerging countries, panel quantile regression , determinants,

Introduction

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Economic growth is a central driver of economic activity in every country. It remains a major concern for policymakers. Growth is influenced by multiple factors across different dimensions, forming a complex and interconnected system. These factors also generate challenges that must be addressed to ensure sustainable development.

Human capital, globalization, monetary policy, and gender parity are key determinants of economic growth. They are also central components of the Sustainable Development Goals (SDGs). However, their effects often vary across countries and stages of development.

This chapter examines the effects of human capital and macroeconomic factors on economic growth in emerging economies, with a particular focus on gender inequality in education. Using a panel quantile regression (PQR) approach, the study investigates how education attainment, health expenditures, inflation, and trade openness influence growth across the conditional distribution of GDP growth. The analysis covers eleven emerging economies over the period 2006–2023.

By highlighting the heterogeneous effects of these determinants, the study provides evidence-based insights for policymakers. In particular, the findings underscore the importance of gender-inclusive education policies and investments in human capital as central elements of sustainable development strategies.

This chapter is structured as follows: Section 2 presents the literature review, followed by the methodology in Section 3. Section 4 is devoted to the findings, and Section 5 concludes the chapter.

2. Literature review :

The economic growth of emerging countries has attracted considerable attention from researchers and policymakers due to its implications for poverty reduction, human development, and global economic stability (Wu & Pan, 2021; Minh & Ngoc, 2025). Understanding the determinants of growth in these economies is particularly important because emerging countries often face different structural, institutional, and policy challenges (Hakimi et al., 2024; Beirne & Renzhi, 2024). The determinants of economic growth have been extensively studied in both theoretical and empirical literature, yet findings often vary depending on country context, methodology, and time period.

One core area of research focuses on globalization, specifically trade openness and its role in promoting or hindering economic growth. Classical trade theories suggest that trade liberalization enhances economic growth by enabling countries to exploit

comparative advantages, access larger markets, and benefit from technology transfer (Dollar, 1992; Frankel & Romer, 1999) . Some empirical studies support this positive link; for example, Yeboah(2023) ,found a positive impact from foreign direct investment and trade openness on economic development . However, other research indicates that the impact of trade openness may be conditional and context-specific. For instance, Farooq et al. (2019) find that trade openness and gender inequality in education both negatively impact GDP per capita in a sample of developing countries, implying that without complementary institutional and social structures, trade liberalization might not lead to expected growth outcomes. Several studies have investigated the effects of trade openness on economic growth in different contexts. Oppong Baah et al. (2022) focused on Nigeria and Ghana, while Hussein et al. (2023) examined Somalia over the period 1985–2017. Extending the analysis to a broader set of factors, Qiang et al. (2025) studied the impact of renewable energy consumption, trade openness, industrialization, and urbanization on economic growth and carbon emissions across 122 countries.

The literature also highlights the importance of gender inequality in education as a determinant of economic growth. Gender disparities in educational attainment reduce the effective utilization of human capital and limit productivity gains. Empirical evidence from panel data analyses suggests that greater gender equality in education contributes positively to economic growth. For instance, Esen and Seren (2022) analyzed the impact of gender-based inequalities in education and employment on economic performance in Turkey over the period 1975–2018. They found that improvements in gender equality, both in educational attainment and labor market participation, have a strong and significant positive effect on real GDP per capita in the long term. Bertay et al. (2025) found that reducing gender inequality boosts economic growth, as industries with more female workers grow faster in countries with lower inequality. Altuzarra et al. (2021) examined multiple dimensions of gender inequality—including education, labor market participation, and institutional representation—and found that these factors significantly influence economic growth in developing countries and sub-Saharan African nations. In India, Das and Basumatary (2020) found that gender inequality in education negatively impacted economic development during the period 1991–2011. Akinwande et al. (2026) focused on Nigeria from 1990 to 2020, showing that gender inequality in education and low gender empowerment negatively affect GDP per capita across all quantiles, using Quantile-on-Quantile and Frequency Domain Causality approaches. Earlier, Karoui and Feki (2018) also highlighted the adverse effects of gender disparities on economic performance in their study.

Empirical evidence suggests that higher public health spending can promote economic growth by improving population health, enhancing labor productivity, and reducing the disease burden. Dynamic panel analyses in OECD countries indicate that public health

expenditure has a significantly positive effect on GDP per capita once broader economic conditions, such as consumption and wages, reach certain thresholds (Hu & Wang, 2024). Similarly, advanced panel data estimations confirm that health expenditures act as a critical form of human capital investment, stimulating economic development across advanced economies (Ginn, 2025).

However, research in developing contexts, such as sub-Saharan Africa, shows that the strength and direction of this effect vary depending on sample composition and institutional environment. In these regions, health spending positively influences long-term growth outcomes primarily through improved life expectancy and other health indicators (Beylik et al., 2022; Dritsaki & Dritsaki, 2024).

Inflation can negatively affect economic growth when it is high or unstable. It erodes purchasing power, increases uncertainty, and discourages investment and consumption. Empirical evidence shows that inflation volatility particularly harms growth in developing economies (Es Sanoun et al., 2025).

Many studies have examined the link between inflation and growth. Su and Soon (2024) studied five Asian countries, Pappas and Boukas (2025) focused on Europe, and Uddin and Rahman (2023) analyzed developing countries. Maintaining stable and predictable inflation is a key policy challenge for long-term growth (Loso Judijanto, Kusnadi, & Wahab, 2024). In Vietnam, Tien (2021) also highlighted the negative impact of unstable inflation.

3. Methodlogy and sampling

The analysis examines how **health expenditures, gender gaps in education, inflation, and trade openness** influence sustainable economic development. These variables are included as key determinants of economic growth, as empirical evidence shows they significantly affect growth outcomes in emerging economies (Hu & Wang, 2024; Altuzarra et al., 2021; Farooq et al., 2019; Yeboah, 2023).

To assess the impact of socioeconomic factors on economic development, the study considers four explanatory variables: gender equity in education, globalization, monetary policy, and health capital, with GDP growth as the dependent variable. Gender equity is measured using the education attainment subindex of the Global Gender Gap Indicator. Globalization is proxied by trade openness. Monetary policy by the inflation rate; and health capital by current health expenditures (% of GDP). Data were obtained from the World Development Indicators, except for gender measures, which were collected from the annual Global Gender Gap Report published by the World Economic

Forum. The sample includes eleven emerging economies: the United Arab Emirates, Egypt, Brazil, India, Indonesia, China, Hungary, Saudi Arabia, Morocco, Colombia, and Romania, covering the period 2006–2023.

The definitions and units of the model variables are presented in the table below.

***Table 1:*Variables definitions Source : Author compilation**

Variables		**Definition**
EA		Educational Attainment
GGDP		GDP Growth
HE		Current Health Expenditure
ICP		Inflation, Consumer Prices
OTR		Trade

The first step of the empirical analysis consists of computing the descriptive statistics of all selected model variables. This allows for an initial assessment of their distributional properties. Next, a correlation matrix is calculated to examine the degree of association between variables and to detect potential multicollinearity issues.

Given that the dataset consists of panel data, it is necessary to test for time-series stationarity before proceeding with the econometric estimation. Accordingly, unit root tests and cross-sectional dependence tests are conducted (Mignon and Hurlin (2007). Therefore, first-generation panel unit root tests are applied (the Im-Pesaran-Shin test (IPS) and the Phillips–Perron Fisher test (PP-Fisher)). In addition, cross-sectional dependence is examined using the Pesaran CD test.

Subsequently, the impact of the explanatory variables on the dependent variable is examined not across the full sample mean, but rather across different deciles of the distribution using the Panel Quantile Regression (PQR) estimation method (Koenker , 2004; Canay (2011)). This approach allows for the analysis of heterogeneous effects and captures how the relationship between variables may vary across different levels of economic development.

Given that the study relies on macroeconomic aggregates, some variables are expressed in logarithmic form to reduce scale differences .

The baseline model to estimate the determinants of economic growth is specified as follows:

$GGDP_{it} = \alpha_0 + \alpha_1 EA_{it} + \alpha_2 LHE_{it} + \alpha_3 ICP_{it} + \alpha_4 + LOTR_{it} + \varepsilon_{it}$ (1)

t : 2006- 2023 , i :1….11

Where:

$GGDP_{it}$: is the real GDP growth of country i in year t,

EA_{it} : is Education Attainment of country i in year t,

LHE_{it} : is the logarithm of current health expenditures of country i in year t

ICP_{it} : inflation rate of country i in year t

$LOTR_{it}$: is trade openness (log-transformed), of country i in year t

ε_{it} : is the error term.

The PQR model is expressed as:

$Q_\tau(GGDP/X_{it}) = \beta_0 + \beta_1 \alpha_0() + \alpha_1() EA_{it} + \alpha_2() LHE_{it} + \alpha_3() ICP_{it} + \alpha_4() LOTR_{it} + \mu_{it}$ (2)

Where $Q_\tau(GGDP/X_{it})$ denotes the τ th conditional quantile of GDP growth given the explanatory variables, and $\alpha_j(\tau)$ are quantile-specific coefficients. This approach allows the effects of the determinants to vary across the growth distribution, capturing potential heterogeneous impacts that cannot be observed through mean regression.

4. Empirical findings

The following section presents and discusses the empirical findings derived from the analysis.

4.1 Descriptive statistics

Tables 2 and 3 present the descriptive statistics and correlation matrix of the selected variables, respectively.

Table 2 : Statistical indicators

	EA	GGDP	HE	ICP	OTR
Mean	0.96	4.07	5.3	5.03	72
Median	0.98	4.36	5.04	4.03	54.5
Maximum	1	14.15	9.73	33.88	199.04
Minimum	0.82	-8.69	2.32	-2.08	22.10
Std. Dev.	0.04	3.73	1.81	4.56	45.78
Skewness	-1.76	-0.76	0.55	2.48	1.22
Kurtosis	5.33	4.45	2.54	14.01	3.2
Jarque-Bera	146.66	36.2	11.76	1204.23	49.59
Probability	0	0	0	0	0
Sum	191.18	806.34	1049.1	996.34	14257.12
Sum Sq. Dev.	0.39	2739.56	648.65	4096.27	412967.3
Observations	198	198	198	198	198

Source : Author computing

	EA	ICP	OTR	HE
EA	1	-0.138	0.213	0.41
ICP	-0.138	1	-0.160	-0.061
OTR	0.213	-0.160	1	-0.055
HE	0.41	-0.061	-0.055	1

Table 3: Correlation matrix Source : Author computing

Analysis of the correlation matrix highlights the following key associations among the selected variables.

-There are no extreme positive or negative correlations between the explanatory variables, suggesting the absence of serious multicollinearity issues.

- There are moderate positive correlations between EA and HE.

- There are weak positive correlations between EA and OTR, weak negative correlations between EA and ICP and between ICP and OTR .

-Finally, there is a very weak negative correlation between ICP and HE as well as between OPTR and HE.

Tables 4 and 5 report the outcomes of the stationarity analyses, which comprise the panel unit root tests and the cross-sectional dependence (CSD) test. The results show that all series are stationary in levels, justifying their use in subsequent econometric estimation.

Table 4 : Panel unit root results

	GGDP	EA	ICP	HE	OTR
IPS	-4.84*	-3.78*	-1.86**	-2.71*	-1.54*
PP-Fisher	102.134*	308.729*	39.5303**	29.9524**	36.1497**
PP-CHOI	-7.38342*	-8.08642*	-2.12628**	-1.48505**	-1.72196**

*, **, *** indicate respectively significance at 1 %, 5 % & 10 %.

Source: Author's computing

Table 5: CSD Test Results

Variable	EA	GGDP	ICP	HE	OTR
CD-test	4.63*	13.71*	6.88**	7.561*	3.54*

*, **, *** indicate respectively significance at 1 %, 5 % & 10 %.

Source: Author's computing

4.2 Estimation results

This paragraph presents the results of the estimation using the panel quantile regression (PQR) approach. The outcomes of the model estimation are summarized in the table 6.

	C	ICP	LHE	LOTR	EA
10 th	16.37* (1.59)	0.1 (1.92)	-7.07* (-6.05)	-2.34* (-2.58)	4.18 (0.37)
20 th	19.61* (2.9)	0.03 (0.95)	-4.17* (-6.08)	-1.3* (-2.25)	-5.85 (-0.95)
30 th	17.33* (2.66)	0.01 (0.24)	-3.46* (-5.62)	-0.88*** (-1.63)	-5.46 (-0.92)
40 th	12.76* (2.09)	0.03 (0.77)	-3.06* (-4.89)	-0.21 (-0.42)	-3.72 (-0.64)
50 th	11.1* (1.85)	-0.0005 (-0.01)	-3.18* (-4.67)	-0.49 (-0.99)	0.29 (0.05)
60 th	14.41* (2.55)	-0.03 (-0.64)	-2.51* (-3.55)	-0.41 (-0.84)	-3.85 (-0.66)
70 th	16.32* (2.93)	-0.07 (-1.65)	-4.32* (-3.3)	-1.05** (-2.05)	1.2 (0.18)
80 th	11.88* (2.13)	0.01 (0.09)	-4.39* (-3.28)	-1.13** (-2.28)	6.88 (1.07)
90 th	6.25*** (1.22)	-0.005 (-0.05)	-5.64* (-3.39)	-1.15** (-2.02)	15.94** (2.43)

*Table 6:PQR estimation results**, **, *** indicate respectively significance at 1 %, 5 % & 10 %.

Source: Author's computing

An examination of the estimated coefficients reported in Table 6 reveals the following findings.

- The constant term remains statistically significant across all estimated quantiles. In contrast, the inflation variable (ICP) does not show a statistically significant impact on economic growth at any quantile.

− Regarding the variable LHE, the results indicate a statistically significant negative impact on the dependent variable across all quantiles, although the magnitude of the effect varies. Specifically, the coefficient decreases from −7 in the lower quantiles to −2.51 at the sixth quantile (Q6), before increasing again from the seventh to the ninth quantiles (Q7–Q9). This pattern suggests a heterogeneous effect across the conditional distribution of economic growth.

The variable LP exhibits a statistically significant negative impact on economic growth in several deciles, particularly in the three lower and the three upper quantiles. In the lower qunatiles , the magnitude of the coefficients decreases from –2.34 to –0.88. In

contrast, in the upper qunatiles, the effects remain relatively stable, with coefficients approximately equal to –0.1.

Finally, gender inequality in education appears to be statistically significant only in the last quantile, where it shows a strong contribution to the enhancement of economic growth..

4.3 Robustness check

As part of the robustness analysis, the model was estimated using both pooled OLS and fixed effects estimators. Subsequently, the Hausman test was performed to identify the most appropriate model specification. The results indicate that the p-value is below the 5% significance level; therefore, the fixed effects model is selected.

Table 7 summarizes the estimation results obtained from the two methods (the Pooled OLS and Fixed Effects Models) .

	C	ICP	LHE	LOTR	EA
Fixed	-17.79 (-1.52)	-0.007 (2.96)	-8.71* (-4.83)	4.45* (2.11)	18.28* (-0.11)
Pooled	12.64** (2.23)	0.01 (0.26)	-4.24** (-5.38)	-1.07** (-2.38)	2.68 (0.43)

*Table 7 : Comparative Estimation Results of the Pooled OLS and Fixed Effects Models**, **, *** indicate respectively significance at 1 %, 5 % & 10 %.

Source: Author's computing

The estimation results indicate that, in both estimation approaches, the inflation rate (ICP) does not have a significant effect on economic growth in emerging countries. EA is significant and positively affects GDP only in the fixed effects model. The variables that are statistically significant in both models are LHE and LOTR .

LHE exhibits a negative effect, which is stronger in the fixed effects model. Furthermore, LOTR displays a dual effect: it is significantly positive in the fixed effects model (4.45) but negative in the pooled OLS model (coefficient ≈ −1). These results suggest that accounting for unobserved heterogeneity

across countries can substantially alter the estimated impact of openness trade on economic growth.

Comparing the results of the pooled OLS and fixed effects models highlights the importance of accounting for unobserved heterogeneity across countries. While ICP (inflation rate) remains statistically insignificant in both approaches, the effect of EA (educational attainment) appears only in the fixed effects model. This finding suggests that cross-country differences may mask its influence in the pooled estimation.

LHE negatively impacts economic growth in both models, with a stronger effect in the fixed effects specification, indicating that country-specific factors amplify this relationship. **LOTR** exhibits contrasting effects: it is positive and significant in the fixed effects model, reflecting the productivity contribution of trade when unobserved country characteristics are controlled for, but negative in the pooled OLS model, suggesting that ignoring heterogeneity may lead to misleading conclusions.

4.4 Discussions :

Our results regarding the impact of health expenditure on economic growth align with those of Islam et al. (2023) for Saudi Arabia and Faruk et al. (2022) for the MENA region, who report a negative or insignificant effect. In contrast, Hu et al. (2024) find a positive effect of health spending on economic growth in OECD countries, suggesting that the relationship may vary across countries and contexts. The negative impact observed in our analysis may be attributed to inefficiencies within the health system and the reallocation of financial resources away from other productive sectors, which can limit the growth-enhancing potential of public health spending (Gök & Altındağ, 2018).

The non-significance of inflation rate (ICP) may reflect its complex relationship with economic growth. Su and Soon (2024) found negative effects in several Asian countries, while Keynesian theory suggests moderate inflation can stimulate investment and spending (Blinder, 2020).Our results are alined with Pappas and Boukas (2025) in Europe. Whereas Uddin and Rahman (2023) reported a positive effect in developing countries, highlighting that the impact of inflation varies across contexts.

Regarding the impact of gender equality in education (EA) on GGDP, the effect is positive and statistically significant in the upper deciles, indicating that higher education levels contribute more strongly to economic growth in countries or periods with higher growth rates. Generally, gender inequality in education is associated with lower economic growth, while improvements in gender equality positively influence GDP (Esen & Seren, 2022; Bertay et al., 2025; Altuzarraet al (2021). Evidence from Nigeria

(Akinwande et al., 2026) and India (Das & Basumatary, 2020) confirms that greater educational disparities between men and women hinder economic performance.

In terms of the effect of globalization on economic growth, our PQR results and pooled estimations indicate a negative relationship, which contradicts the positive impact reported by Oppong Baah et al. (2022) and Qiang et al. (2025) . Similarly, Hussein et al. (2023) found that trade openness has a negative and significant effect on long-run economic growth in Somalia.

5. Conclusion

The paper estimates a growth regression for **11 emerging economies** over the period 2006–2023, applying the methodology proposed by Canay (2011) for panel quantile regression. This approach allows us to identify growth determinants that exhibit heterogeneous or non-linear effects across the distribution of GDP growth.

The analysis highlights the differential impacts of some key determinants on economic growth. Results show that health expenditures negatively affect growth across most quantiles, while trade openness has a negative effect only in certain quantiles. Educational attainment contributes positively to growth primarily in higher-growth quantiles. Inflation, in contrast, does not show a statistically significant effect across quantiles.

These findings underscore the importance of gender-inclusive education policies, efficient health investments, and context-aware trade strategies for promoting sustainable and equitable growth in emerging economies.

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Chapter 48: Marginal Heritage to Global Visibility: Tourism Opportunities from the UNESCO Charaideo Maidams and the Historic City of Sivasagar

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Abstract

The recognition of the Charaideo Maidams as a UNESCO World Heritage Site marks a historic milestone in bringing the cultural legacy of Assam into global focus. Located in Charaideo, these royal burial mounds of the Ahom dynasty represent a unique sacred landscape that reflects centuries of indigenous political, spiritual, and architectural traditions. Despite such global recognition, the broader heritage region comprising Sivasagar home to monumental structures such as Rang Ghar, Talatal Ghar, and Sivadol remains underrepresented in international tourism discourse. This study examines the potential of heritage-led tourism development in Upper Assam through an analytical review of secondary data drawn from UNESCO documentation, Ministry of Tourism reports, Assam Tourism publications, and heritage records. The paper argues that the integration of Charaideo's UNESCO recognition with the historical assets of Sivasagar can create a culturally coherent tourism corridor capable of attracting international visitors. By positioning these sites not merely as historical monuments but as living cultural landscapes, the study highlights their relevance in promoting sustainable tourism, strengthening local economies, and preserving indigenous identity. Further, the paper identifies key structural challenges including limited global visibility, infrastructural constraints, and absence of integrated destination branding. It proposes a strategic framework for promoting international tourism through heritage circuits, cultural storytelling, and community-based participation. The study concludes that heritage recognition, when supported by policy alignment and sustainable tourism planning, can transform culturally marginalized regions into globally visible destinations while fostering inclusive development in the Global South.

Keywords: Heritage Tourism, Sustainable Tourism, UNESCO World Heritage, Charaideo Maidams.

1. Introduction

Tourism in the Global South has evolved from being merely a revenue-generating sector to a multidimensional instrument for socio-economic transformation. Countries and regions historically located at the margins of global economic systems increasingly rely on cultural and heritage tourism to reposition themselves within international circuits of mobility and exchange. In this context, heritage functions not only as a memory of the past but also as a strategic developmental resource.

Sustainable development discourse, particularly following the United Nations Sustainable Development Goals (SDGs) **[1]**, emphasizes the role of tourism in poverty alleviation, cultural preservation, and inclusive growth. Cultural heritage tourism is particularly significant because it integrates economic activity with identity formation, community participation, and conservation ethics. For regions like Northeast India, which have often remained peripheral in mainstream tourism narratives, heritage recognition can provide a transformative opportunity.

The recent inscription of the Charaideo Maidams on the UNESCO World Heritage List marks a historic milestone for Assam. The Maidams, serving as royal burial mounds of the Tai-Ahom rulers, represent a unique sacred landscape that combines political authority, spiritual cosmology, and architectural ingenuity. UNESCO recognition does not merely confer symbolic prestige; it repositions the site within a global heritage network, increasing its visibility, conservation legitimacy, and tourism potential.

However, Charaideo does not exist in isolation. The historic city of Sivasagar, the erstwhile capital of the Ahom Kingdom, contains monumental architectural assets such as Rang Ghar, Talatal Ghar, Kareng Ghar, and Sivadol. These structures collectively narrate the civilisational depth of a dynasty that ruled Assam for nearly six centuries. Despite possessing such rich heritage capital, the region remains underrepresented in international tourism flows.

Thus, the central argument of this chapter is that integrating Charaideo's UNESCO recognition with Sivasagar's architectural and cultural heritage can create a coherent heritage tourism corridor capable of attracting international visitors. The need of the hour is to reposition Upper Assam within global tourism discourse through strategic heritage-led development.

2. Literature Review

Existing scholarship highlights that heritage tourism functions as an important interface between cultural preservation, economic development, and destination branding. Ashworth and Tunbridge argue that historic urban landscapes are increasingly

transformed into tourism spaces where heritage is selectively interpreted and mobilized for economic purposes. Their study demonstrates that heritage is not a static historical entity but a socially constructed resource shaped by contemporary political and economic priorities, often creating tensions between conservation and commercialization [2]. Similarly, Timothy and Boyd conceptualize heritage as a structured tourism product and emphasize that successful heritage tourism development depends on key dimensions such as authenticity, interpretation, community participation, conservation management, and integrated marketing strategies. They also caution that unmanaged tourism growth may lead to over-tourism, highlighting the importance of sustainable visitor management and carrying capacity planning [3].

Empirical studies further demonstrate the tourism-enhancing effects of UNESCO recognition. Yang et al., through panel data regression analysis across multiple countries, find that UNESCO World Heritage inscription generally leads to increased international tourist arrivals. However, the magnitude of this impact varies significantly depending on infrastructure readiness and effective marketing strategies. Their findings suggest that UNESCO designation functions primarily as a quality certification signal rather than a guarantee of sustained tourism growth [4].

Within the Indian context, government statistical reports and tourism studies provide important empirical insights. The Ministry of Tourism's statistical publications indicate a strong recovery in international tourism following the COVID-19 pandemic, particularly during 2022–2023, although regional disparities remain significant with Northeast India receiving only a small share of international visitors [5]. Singh's study of the Golden Triangle heritage circuit (Delhi–Agra–Jaipur) further demonstrates that integrated branding, improved infrastructure, and coordinated marketing significantly enhance destination competitiveness and international tourist inflows. The study highlights the importance of clustering related heritage sites within a single itinerary to increase visitor engagement and tourism revenue [6].

Regional research on Assam similarly highlights both potential and structural constraints. Bora's analysis of tourism statistics reveals that although domestic tourism has grown steadily in Assam, foreign tourist arrivals remain relatively low due to weak international marketing and limited connectivity. The study emphasizes the need to diversify tourism beyond wildlife attractions toward cultural and heritage-based tourism [7]. Complementing this perspective, Dey and Borah's exploratory study on Sivasagar identifies the region's strong architectural and cultural assets but also highlights challenges such as inadequate interpretation facilities, limited accommodation capacity, and weak destination branding. Their findings stress the importance of integrated heritage circuits and improved tourism infrastructure [8].

Documentation produced during the UNESCO nomination process further reinforces the cultural significance of the region. The UNESCO nomination dossier recognizes the Charaideo Maidams as a unique sacred burial landscape reflecting the political and spiritual traditions of the Tai-Ahom civilization and emphasizes the importance of authenticity, integrity, and conservation protection [9]. Historical research by Sahu on monuments such as Rang Ghar, Talatal Ghar, and Kareng Ghar also demonstrates the architectural sophistication and cultural richness of Ahom heritage structures, while noting the absence of systematic interpretation facilities required for heritage tourism development [10].

Collectively, the literature indicates that heritage tourism development requires a combination of cultural narrative construction, infrastructure readiness, and integrated marketing strategies. While UNESCO recognition significantly enhances global visibility, existing studies consistently show that inscription alone does not automatically translate into sustained tourism growth. Within Assam, research highlights a clear gap between the region's rich cultural heritage and its limited international tourism presence. However, most existing studies examine heritage conservation, tourism performance, or regional tourism development separately rather than as an integrated framework. This study addresses that gap by examining how the UNESCO recognition of the Charaideo Maidams can be strategically integrated with the heritage assets of Sivasagar to create a coherent heritage tourism cluster capable of enhancing international tourism visibility in Upper Assam.

3. Objectives of the Study

1) To examine the global significance of Charaideo Maidams following UNESCO recognition.
2) To assess the tourism potential of Sivasagar's heritage monuments.
3) To analyse tourism trends using official statistical reports.
4) To explore strategic pathways for promoting international tourism in Upper Assam.

4. Research Methodology

This study employs a qualitative, secondary data-driven research design to critically examine the tourism development potential emerging from the UNESCO inscription of the Charaideo Maidams and its integration with the heritage assets of Sivasagar. The research is interpretative in orientation, seeking to analyse how global heritage recognition interacts with regional tourism structures and policy frameworks.

The study relies on documentary and statistical data drawn from authoritative institutional sources, including UNESCO World Heritage Centre nomination and inscription documents, the Ministry of Tourism (Government of India) statistical publications, Assam Tourism Development Corporation reports, and records of the Archaeological Survey of India. These sources provide validated information on heritage valuation, tourism flows, conservation status, and regional tourism performance. The use of official datasets ensures reliability, institutional authenticity, and methodological transparency.

Tourism statistics were subjected to descriptive trend analysis to examine patterns of domestic and foreign tourist arrivals at national and state levels. These quantitative trends were then interpreted within the broader theoretical framework of heritage tourism and destination branding literature. A contextual comparative approach was adopted to position Assam's tourism performance relative to national patterns, thereby identifying structural gaps between heritage potential and global visibility.

The analytical strategy integrates documentary analysis with policy interpretation. UNESCO documentation was examined to assess the articulation of Outstanding Universal Value (OUV) and its implications for international positioning. Tourism performance data were interpreted to evaluate the extent to which global recognition translates into measurable tourism growth. This combined approach enables the study to move beyond descriptive statistics toward a policy-relevant understanding of heritage-led regional development.

As the research is based entirely on secondary sources, it does not involve primary fieldwork or human participants. The methodological design is exploratory and policy-oriented, aiming to contribute to scholarly debates on heritage tourism governance in emerging destinations while proposing a strategic framework for international tourism promotion in Upper Assam.

5. Data Analysis and Interpretation

5.1 National-Level Tourism Recovery Trends

Year	Foreign Tourist Arrivals (Million)	% Change from Previous Year
2019	10.93	—
2020	2.74	–74.9%
2021	1.52	–44.5%
2022	6.43	+323.0%
2023 (Prov.)	9.20	+43.1%

Table 1: Foreign Tourist Arrivals (FTA) in India (2019–2023)*Source: Ministry of Tourism, Government of India* ***[5]***

Analysis: The data clearly illustrates the structural disruption caused by the COVID-19 pandemic. Between 2019 and 2020, India experienced a 74.9% decline in foreign tourist arrivals. The decline continued into 2021, reaching its lowest level at 1.52 million arrivals.

However, 2022 marks a dramatic recovery phase, with a 323% growth compared to 2021. The upward momentum continues in 2023 with a further 43.1% increase. Although the 2023 provisional figure (9.20 million) remains slightly below the 2019 peak, the recovery trajectory indicates strong international demand reactivation.

Interpretation

1) **Post-Crisis Tourism Reorientation:** Global tourism demand is rebounding strongly, particularly in cultural and heritage segments.
2) **Strategic Timing for UNESCO Sites:** Newly inscribed heritage destinations, such as Charaideo Maidams, can capitalize on this recovery window.
3) **Branding Leverage:** UNESCO designation during recovery phase enhances competitive positioning in international markets.
4) **Market Readiness Requirement:** However, recovery growth benefits only those destinations that are infrastructure-ready and well-branded.

Thus, macro-level tourism recovery creates a conducive environment for heritage-led international positioning of Upper Assam.

5.2 State-Level Tourism Performance: Assam

Year	Domestic Tourists (Million)	% Change	Foreign Tourists (Thousand)	% Change
2019	6.2	—	39	—
2020	1.8	–71.0%	8	–79.5%
2021	2.1	+16.7%	5	–37.5%
2022	5.1	+142.9%	18	+260.0%
2023 (Prov.)	6.7	+31.4%	28	+55.6%

Table 2: Tourist Arrivals in Assam (2019–2023)*Source: Directorate of Tourism, Government of Assam **[11]**; Ministry of Tourism, Government of India **[5]***

Analysis: The domestic tourism sector in Assam demonstrates remarkable resilience. While domestic arrivals declined by 71% in 2020, the recovery phase shows substantial rebound growth, particularly in 2022 (+142.9%) and 2023 (+31.4%). Notably, 2023 domestic arrivals exceed pre-pandemic levels, indicating structural strength in internal tourism demand.

Foreign tourist arrivals, however, display a different pattern. Despite a strong rebound in 2022 (+260%), the absolute numbers remain modest. Even in 2023, foreign arrivals (28,000) remain below the 2019 level (39,000), indicating incomplete recovery.

5.3 Comparative Share Analysis

Table 3: Assam's Share in National Foreign Tourist Arrivals

Year	India FTA (Million)	Assam Foreign Tourists (Thousand)	Assam Share (%)
2019	10.93	39	0.36%
2022	6.43	18	0.28%
2023	9.20	28	0.30%

Interpretation

1) **Marginal International Share:** Assam contributes less than 0.5% of India's total foreign tourist arrivals.
2) **Underutilized Heritage Potential:** Given Assam's cultural and ecological assets, this low percentage indicates significant untapped international demand.
3) **Structural Visibility Gap:** The disparity between national growth and Assam's share confirms limited global branding penetration.
4) **UNESCO as Share Multiplier:** If strategically leveraged, UNESCO recognition of Charaideo could potentially increase Assam's international share through niche heritage tourism marketing.

5.4 Gap Between Potential and Performance

From the data analysis, three structural gaps emerge:

1) **Domestic–Foreign Imbalance:** Assam's tourism growth is heavily domestic-driven. While this ensures local economic stability, it limits foreign exchange earnings and global visibility.
2) **Heritage Underrepresentation:** Despite possessing monumental heritage assets (Sivasagar complex and Charaideo Maidams), international inflow remains minimal compared to wildlife tourism hubs.
3) **Marketing and Circuit Integration Gap:** Absence of integrated heritage circuits reduces the multiplier effect of tourism clustering.

5.5 Implication for Charaideo–Sivasagar Cluster

The statistical evidence suggests:

- Strong domestic base can support initial heritage circuit development.
- Foreign tourism growth remains the primary opportunity area.
- UNESCO inscription provides a catalytic branding opportunity during national tourism recovery.
- Integrated marketing and infrastructure development can help convert symbolic recognition into measurable tourist growth.

Therefore, the data confirms the central thesis of this research: **heritage potential exists, but strategic integration is required to convert it into international visibility and economic transformation.**

6. Findings and Discussion

The findings of this study reveal a structural disconnect between heritage recognition and measurable international tourism performance in Upper Assam. While the inscription of the Charaideo Maidams as a UNESCO World Heritage Site enhances symbolic capital and international legitimacy, the statistical analysis indicates that such recognition alone does not automatically translate into substantial foreign tourist growth. Assam's contribution to national foreign tourist arrivals remains below 0.5%, highlighting the limited conversion of cultural capital into economic capital. This observation aligns with international scholarship suggesting that UNESCO designation functions as a quality signal but requires complementary infrastructure, marketing integration, and governance capacity to generate sustained tourism expansion.

The analysis further demonstrates that Sivasagar's monumental heritage assets Rang Ghar, Talatal Ghar, Kareng Ghar, and Sivadol constitute a coherent architectural and civilizational ecosystem. These monuments collectively narrate political authority, religious continuity, and military sophistication of the Ahom dynasty. However, they are presently promoted as isolated attractions rather than as components of an integrated heritage circuit. The absence of structured thematic interpretation, curated visitor pathways, and coordinated branding reduces their collective experiential value in international tourism markets.

A significant sectoral imbalance is also evident. Assam's tourism economy remains predominantly wildlife-oriented, with destinations such as Kaziranga National Park dominating international attention. While wildlife tourism contributes substantially to visitor inflow, overreliance on a single tourism segment limits diversification and resilience. Heritage tourism, despite possessing deep historical and architectural richness, has not yet been positioned as a core pillar of the state's international tourism strategy. This imbalance restricts Assam's ability to attract culturally motivated global travelers seeking civilizational narratives and sacred landscapes.

Importantly, the study identifies strong complementarities between Charaideo and Sivasagar. Charaideo offers sacred symbolism, global legitimacy, and UNESCO-backed credibility, whereas Sivasagar provides tangible architectural depth and immersive visitor engagement opportunities. When conceptualized as a unified heritage cluster, these destinations form a multi-layered tourism system capable of delivering narrative continuity—from royal burial traditions to political and religious institutions of the Ahom era. Such clustering enhances destination competitiveness by increasing length of stay, visitor spending, and experiential intensity.

From a theoretical perspective, the findings reinforce the argument that heritage becomes economically transformative only when embedded within integrated destination management frameworks. UNESCO recognition should therefore be treated

not as an endpoint of conservation achievement but as a strategic entry point for regional repositioning. The transformation from "marginal heritage" to "global visibility" requires coordinated branding, infrastructure alignment, stakeholder collaboration, and sustainable planning mechanisms.

Overall, the discussion suggests that heritage-led development in Upper Assam must shift from monument-centric promotion toward cluster-based integration and global narrative positioning. Only through such strategic consolidation can UNESCO recognition translate into sustained international tourism growth and inclusive regional development.

7. Conclusion

The inscription of the Charaideo Maidams as a UNESCO World Heritage Site represents a critical turning point in the international recognition of Assam's cultural landscape. This study set out to examine whether such global recognition can translate into meaningful tourism development when integrated with the historic assets of Sivasagar. The findings demonstrate that while UNESCO status significantly enhances symbolic legitimacy and international visibility, its economic and tourism impacts are not automatic. Instead, they depend on strategic alignment between heritage recognition, infrastructure readiness, destination branding, and policy coordination.

The statistical analysis revealed a structural imbalance in Assam's tourism performance: strong domestic tourism resilience coexists with limited foreign tourist penetration. Despite possessing exceptional architectural and civilizational depth, the Charaideo–Sivasagar region contributes only a marginal share to India's international tourist inflow. This gap between heritage potential and global tourism performance underscores the need for systematic intervention rather than isolated monument promotion.

Importantly, the study establishes that Charaideo and Sivasagar are not competing destinations but complementary components of a unified heritage ecosystem. Charaideo provides sacred symbolism and global certification through UNESCO inscription, while Sivasagar offers immersive architectural and cultural experiences that extend visitor engagement. When conceptualized as a cluster-based heritage corridor, these sites collectively enhance destination competitiveness by increasing narrative continuity, visitor retention, and experiential value.

From a broader developmental perspective, the research reinforces the proposition that heritage should be understood not merely as a preserved past but as a strategic

developmental resource. In emerging regions such as Upper Assam, heritage recognition can function as a catalyst for economic diversification, cultural revitalization, and inclusive growth—provided that governance structures, marketing mechanisms, and sustainable planning frameworks are effectively integrated.

In conclusion, the transformation from "marginal heritage" to "global visibility" requires more than international inscription; it demands coordinated heritage management, integrated tourism circuits, digital global outreach, and community participation. If such strategies are implemented, the Charaideo–Sivasagar cluster holds the potential to reposition Upper Assam within global cultural tourism networks and to serve as a replicable model for heritage-led regional development in the Global South.

8. Recommendations

Based on the findings, several strategic measures are necessary to convert UNESCO recognition into tangible tourism outcomes.

1) An integrated Charaideo–Sivasagar heritage circuit should be developed to promote the region as a unified cultural landscape supported by interpretation centers, multilingual signage, and trained heritage guides.
2) A coherent international branding strategy should position the region under a distinctive narrative such as *"Sacred Royal Landscapes of the Ahom Civilization"* and promote it through global tourism platforms and partnerships.
3) Infrastructure improvement, including better connectivity, accommodation facilities, and visitor amenities, is essential to meet international tourism standards while ensuring heritage conservation.
4) Digital promotion through virtual tours, documentaries, and targeted social media campaigns can enhance global visibility and visitor engagement.
5) Community-based tourism initiatives such as homestays, handicrafts, and cultural performances should be encouraged to ensure inclusive development and cultural preservation.
6) Public–private partnerships should be promoted to mobilize investment in heritage-sensitive tourism infrastructure under appropriate regulatory frameworks.

These measures can help transform UNESCO recognition into sustainable tourism growth and strengthen the global visibility of Upper Assam's heritage landscape.

9. Limitations of the Study

This study is primarily based on secondary data derived from official statistical reports, UNESCO documentation, and institutional publications. While such sources ensure reliability and policy relevance, the absence of primary field data limits the capacity to capture micro-level visitor perceptions, stakeholder attitudes, and community responses to heritage tourism development. The findings therefore reflect macro-level tourism trends and structural positioning rather than experiential or behavioral dynamics.

Moreover, the limited availability of disaggregated district-level foreign tourist statistics specific to Sivasagar and Charaideo constrains granular econometric evaluation of site-specific tourism performance. The study does not employ advanced quantitative modeling techniques to estimate the economic multiplier effects of UNESCO recognition, nor does it assess long-term causal relationships between inscription and tourism growth. Consequently, the conclusions are interpretative and policy-oriented rather than predictive in a strict econometric sense.

Finally, as the research adopts a regional case study approach, its contextual findings may not be directly generalizable to all UNESCO heritage destinations without consideration of local socio-political and infrastructural conditions. These limitations, however, also open pathways for deeper empirical and comparative investigation.

10. Scope for Future Research

Future research can extend this study in several theoretically and methodologically significant directions. First, empirical investigations employing structured visitor surveys and stakeholder interviews in Charaideo and Sivasagar would provide insights into perception, satisfaction, destination image formation, and behavioral intentions. Such primary research could validate and refine the policy implications identified in this study.

Second, econometric modeling and input–output analysis may be employed to quantify the economic multiplier effects of UNESCO recognition at the district level. Longitudinal data analysis could further examine whether inscription produces sustained growth trajectories or short-term visibility effects.

Third, sustainable carrying capacity assessments are necessary to evaluate the ecological and infrastructural limits of increased tourist inflow. Integrating environmental sustainability metrics with tourism planning would ensure that heritage commercialization does not compromise site integrity.

Fourth, comparative research examining other UNESCO heritage clusters in India or the Global South could generate a broader theoretical framework for heritage-led regional

development. Such cross-case analyses would enhance generalizability and contribute to global debates on cultural tourism governance.

Finally, future studies may explore the role of digital heritage storytelling, virtual tourism technologies, and destination branding analytics in shaping international tourist engagement. As digital mediation increasingly influences travel decision-making, understanding its interaction with UNESCO recognition will be critical for strategic destination positioning.

Collectively, these research directions would deepen scholarly understanding of how global heritage recognition can be transformed into sustainable regional development outcomes in emerging tourism destinations

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Chapter 49: Surviving Genocide: Yazidi Women, ISIS, and the Politics of Sexual Violence

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Abstract

The Yazidi community, a religious minority primarily located in the Sinjar region of northern Iraq, has historically preserved distinct socio-cultural traditions and religious practices. However, in 2014, the Islamic State of Iraq and Syria (ISIS) launched a large-scale attack on the Sinjar region, marking a devastating turning point in the history of the Yazidis, particularly for Yazidi women. Thousands of women and girls were abducted, subjected to sexual slavery, forced marriage, and forced religious conversion. These atrocities have been widely recognized as acts of genocide against the Yazidi population (United Nations Human Rights Council [UNHRC], 2016). The targeted gender-based violence inflicted not only physical harm but also deep social, cultural, and psychological trauma within the Yazidi community. Despite these inhumane crimes, many survivors demonstrated remarkable resilience through survival strategies, escape, and continued advocacy against ISIS atrocities. Against this backdrop, this chapter examines the nature and causes of gendered violence against Yazidi women under ISIS captivity and highlights the experiences, trauma, and long-term consequences faced by survivors.

Keywords: *Yazidi Women, ISIS, Genocide, Sinjar, Iraq*

1.1 Introduction

The Yazidis (also spelled Yezidis or Ezidis) are a monotheistic religious community whose traditional settlement areas include southeastern Turkey, northern Iraq, and northeastern Syria. Their historical origins remain uncertain; however, scholars have identified elements of ancient Iranian religious traditions within Yazidism (Piecha,

2024). The Yazidis consider their religion to be extremely ancient, tracing its origins to a period preceding Christianity (Piecha, 2024). Historically, Yazidi religious teachings were transmitted orally rather than through written scriptures, and there is no single canonical holy text. Yazidi identity is hereditary, meaning that an individual is recognized as Yazidi only if both parents belong to the community. Due to linguistic and cultural connections, Yazidis are often associated with Kurds, though attempts have also been made to classify them as Arabs in certain political contexts (Piecha, 2024).

The Yazidis are a small ethno-religious minority indigenous to Mesopotamia who share a strong collective identity rooted in both ethnicity and religion. As an ancient monotheistic tradition, Yazidism incorporates elements found in other Middle Eastern religions but differs in key aspects, including ritual practices, belief in reincarnation, and reverence for the Peacock Angel, Tawusi Melek, who is considered the chief messenger of God (Allison, 2004). Because of these unique religious beliefs, Yazidis have experienced centuries of persecution and discrimination (Murad, 2017). Yazidi historical narratives recount seventy-three episodes of genocide, the most recent being the genocide perpetrated by ISIS in 2014 (Murad, 2017). Continuous threats of persecution led many Yazidis to settle in the mountainous areas of northern Iraq, particularly the Sinjar region, where the terrain provided natural protection from external attacks (Murad, 2017). Historically, the community has remained relatively isolated and has often been misunderstood by neighbouring populations, sometimes being incorrectly labelled as "devil worshippers." The majority of Yazidis currently reside in Iraq, particularly within the Nineveh Governorate (Allison, 2004). Population estimates vary significantly, ranging from approximately 70,000 to 500,000 individuals worldwide (Allison, 2004). The largest Yazidi communities are concentrated in the Shekhan district northeast of Mosul and the Sinjar district near the Syrian border. The Shekhan region contains Lalish, the most sacred site of the Yazidi religion and the shrine of Sheikh Adi ibn Musafir (Allison, 2004).

The persecution of Yazidis has deep historical roots. During the rule of Saddam Hussein, Yazidis were subjected to Arabization policies that involved changing village names and forcibly relocating populations (Piecha, 2024). Since the 1960s, hundreds of Yazidi villages in the Sinjar region were destroyed, and residents were resettled into government- controlled "collective towns" to strengthen state control (Piecha, 2024). Similar forms of persecution occurred earlier under the Ottoman Empire and other regional powers that attempted to force Yazidis to convert to Islam (Jalabi, 2014). The Yazidi religion has frequently been misunderstood by surrounding communities. Some followers of other monotheistic religions have incorrectly equated the Peacock Angel with Satan, which led to the false accusation that Yazidis were "devil worshippers,"

thereby intensifying discrimination and violence against them (Asatrian, 2014; Jalabi, 2014). Historical evidence suggests that Yazidis have experienced repeated persecution since at least the seventh century (Allison, 2017; Naby, 2009).



Figure: 1.1. The settlement of the Yazidi population particularly in Iraq Source: The Economists

In August 2014, ISIS launched a large-scale attack on the Sinjar region of Iraq. Thousands of Yazidis were killed, while many others fled to Mount Sinjar in an attempt to escape the violence. Those who remained were either executed or captured. Women and girls were abducted, trafficked, and subjected to sexual slavery, while men were forced to convert to Islam or face death (Murad, 2017; UNHRC, 2016). Understanding this historical background is crucial in explaining why the Yazidi community places great importance on preserving its identity and religious traditions. Their belief system, oral traditions, and strict endogamy have helped maintain cultural continuity across generations. However, these same characteristics have also contributed to misunderstanding and persecution by external groups. The violence in Sinjar in 2014 represents one of the most tragic episodes in Yazidi history, resulting in mass killings, abductions, and displacement. Families were separated, and women and children endured extreme suffering. The consequences of this tragedy continue to shape the lives of survivors today.

1.1 Significance and Research Gaps

This study is significant because it documents the experiences of the Yazidi

community during the 2014 Sinjar genocide and contributes to a broader understanding of the violence inflicted upon marginalized religious minorities. By examining the experiences of Yazidi survivors, the study highlights the urgent need for justice, humanitarian assistance, and long-term support for affected communities. Despite the growing body of literature on the Yazidi genocide, several research gaps remain. Much of the existing scholarship focuses on the events of the attack itself, while relatively fewer studies examine the long-term recovery processes of survivors. There is also limited research on how Yazidi communities are rebuilding their social structures, cultural identity, and livelihoods following displacement and trauma. Furthermore, survivor testimonies remain underrepresented in academic literature. Addressing these gaps can provide a more comprehensive understanding of the genocide and its lasting impacts.

1.2 Research Objectives

- To examine the events surrounding the ISIS attack on Sinjar in 2014.
- To understand how and why the Yazidi community was targeted by ISIS.
- To analyse the processes of recovery and rebuilding within the Yazidi community following the genocide.

1.3 Methodology

This research adopts a qualitative and analytical research methodology to examine the 2014 ISIS attack on Sinjar and the systematic gender-based violence perpetrated against Yazidi women. Both primary and secondary sources are utilized to develop a comprehensive understanding of the genocide and its aftermath. Primary sources include survivor memoirs, interviews, testimonies, and speeches. One of the most significant primary sources is *The Last Girl* by Nadia Murad (2017), which provides a detailed account of her abduction, sexual enslavement, and eventual escape. Survivor narratives documented in media reports and human rights investigations are also examined to understand the lived experiences of Yazidi women, including trauma, resistance, and survival strategies. Secondary sources include scholarly books, journal articles, demographic studies, and official reports published by international organizations such as the United Nations and the United Nations Investigative Team to Promote Accountability for Crimes Committed by Da'esh/ISIL (UNITAD). These materials provide broader contextual information on the genocide and its social and political implications. The research is informed by theoretical perspectives from genocide studies and gendered violence scholarship. Analytical techniques such as

thematic analysis and content analysis are used to identify patterns of persecution, displacement, cultural destruction, and long-term social impacts on the Yazidi population. Survivor narratives are treated with ethical sensitivity and used only within appropriate research boundaries.

Study Area

The study area is located primarily in Sinjar (Shingal), a district in the Nineveh Governorate of northern Iraq. The region lies near the Iraqi-Syrian border and is dominated by the Sinjar Mountain range, a limestone ridge extending east-west across a semi-arid plain. The mountain range serves not only as a major geomorphological feature but also as a historical refuge during periods of persecution, shaping settlement patterns, agricultural practices, and collective memory among the Yazidis (Allison, 2017). Sinjar occupies a strategic location linking northern Iraq with eastern Syria, which has historically made it vulnerable to political and military conflicts. The rural population largely depends on traditional agricultural practices such as mixed farming, livestock herding, and seasonal migration between upland and lowland areas. The spatial organization of villages, shrines, and pilgrimage routes has reinforced religious cohesion and strong attachment to ancestral land.

Before 2014, Sinjar represented the demographic centre of the Yazidi homeland. Population estimates indicate that the global Yazidi population ranged between 600,000 and 700,000, with a significant proportion residing in Sinjar and surrounding districts (Cetorelli et al., 2017). Long histories of marginalization and displacement fostered strong communal solidarity and reliance on kinship networks for survival (Allison, 2017). The regional order collapsed in August 2014 when ISIS forces captured Sinjar. The attack resulted in mass killings, abductions, and forced displacement on a massive scale. Thousands of civilians fled to Mount Sinjar without adequate food or water, creating a severe humanitarian crisis that attracted international attention. Research estimates indicate that approximately 6,417 Yazidis were kidnapped during the initial attack, many of whom were women and children trafficked through organized systems of captivity (Cetorelli et al., 2017; Yazidi Rescue Bureau, 2021). Subsequent investigations by UNITAD documented numerous mass graves scattered across villages, agricultural fields, and roadside areas (UNITAD, 2021).

Table 1: Estimated Yazidi Population Distribution before the 2014 Genocide

Region	Estimated Yazidi Population	Percentage (%)
Sinjar District (Iraq)	300,000 - 350,000	~50%
Shekhan District (Iraq)	120,000 - 150,000	~20%
Other parts of Iraq	100,000 - 120,000	~15%
Syria	40,000 - 60,000	~7%
Turkey	15,000 - 20,000	~3%
Diaspora (Europe & others)	50,000 - 70,000	~5%

Source: Allison (2017); Cetorelli et al. (2017).

Physical Violence against Yazidi Women

In August 2014, ISIS launched a large-scale attack on the Sinjar region. Thousands of Yazidis were killed, while many others fled to Mount Sinjar to escape the advancing militants. Those who remained were either executed or captured and subjected to forced labour, sexual slavery, torture, and religious persecution (UNHRC, 2016). ISIS militants regarded the Yazidis as "infidels" and demanded that men either convert to Islam or face death. Women and girls were systematically abducted and trafficked through organized slave markets across ISIS-controlled territories (Murad, 2017). Sexual violence was deliberately used as a weapon of war and was justified within ISIS propaganda and administrative documents (Loken & Zelenz, 2018). Research indicates that thousands of Yazidi women and children were kidnapped during the initial stages of the attack and subsequently transported across Iraq and Syria. Investigations by international organizations have also documented the existence of numerous mass graves in Sinjar and surrounding areas (UNITAD, 2021).

Table 2: Key Statistics of the Yazidi Genocide (2014)

Category	Estimated Number
Total Yazidi population in Sinjar before attack	400,000 (approx.)
People killed during initial attack	3,100 - 5,000
Women and children abducted	6,417
People displaced	200,000 - 300,000
Yazidis trapped on Mount Sinjar	50,000 (approx.)
Mass graves discovered in Sinjar region	80+
Women and children rescued (by 2021)	3,500 (approx.)
Missing Yazidis (as of 2021)	2,800 (approx.)

Source: Cetorelli et al. (2017); UNHRC (2016); UNITAD (2021); Yazidi Rescue Bureau (2021).



Plate: 1.1. People of Sinjar fleeing from ISIS. Source: DW.COM



Plate: 1.2. Conditions of women Source: The Guardian

Nadia Murad, a member of Yazidis minority was born in the village of Kojo in northern Iraq. Yazidis are an ancient ethno-religious group that primarily residing in the Sinjar region of Iraq (United States Holocaust Memorial Museum [USHMM], n.d.). In 2014, the Islamic State (IS) militants conquered Kojo and killed several hundred men and elderly women in the area. The IS claimed that the Yazidis were "devil worshippers" and therefore should be exterminated (Human Rights Council, 2016). Nadia Murad of 21 years old and other young women were harassed and held as sex slaves. Nadia was repeatedly raped and threatened with execution unless she converted to the IS version of Islam (Murad, 2017; Human Rights Council, 2016). After several months in captivity, Nadia Murad managed to escape, and in 2015 she arrived in Germany. There she chose to tell the international community about the atrocities she had suffered (Murad, 2017). Murad hoped that speaking publicly would help ensure that her abusers would be brought to justice for their crimes. In 2016, she was appointed the United Nations' first Goodwill Ambassador for the Dignity of Survivors of Human Trafficking (United Nations Office on Drugs and Crime [UNODC], 2016). The United Nations had earlier recognized that the use of sexual violence in war and conflict constitutes a war crime and a crime against humanity (United Nations Security Council, 2008).



Plate:1.3. Nadia's Speech at Nobel Prize Acceptance.

Source: France24



Plate:1.4. Yazidi Genocidal Memorial Source: Nadia's Initiative

Nadia Murad later published her autobiography, *The Last Girl*, in which she recounts the atrocities committed against the Yazidi community and describes her own experiences of captivity and survival. Through her testimony, she aims to ensure that future generations of girls and young women do not become victims of sexual violence in conflict (Murad, 2017; Nobel Prize Outreach, n.d.). Through Nadia's Initiative, a Yazidi memorial has been constructed in Solagh Village just outside Sinjar City. The Memorial stands as an important monument to those who suffered and died during the ISIS genocide and serves as a place of remembrance and healing for families who were never reunited with their loved ones (Nadia's Initiative, 2023). The memorial was inaugurated on 18 October 2023 during an event hosted by Nadia's Initiative and the International Organization for Migration (IOM). The event was attended by survivors, members of the local community, government officials, and representatives from diplomatic missions across Iraq (Nadia's Initiative, 2023).

During the ceremony, Nadia Murad called on the Iraqi government to increase support for Yazidi survivors and emphasized the importance of the memorial site as both a reminder of the depths of human cruelty and a testament to the resilience of the Yazidi community as they rebuild their lives after genocide (Nadia's Initiative, 2023). The "Grave of Mothers," located within the memorial complex, marks the site where Nadia Murad's own mother was killed by ISIS militants (Nadia's Initiative, 2023).

Kocho: A Case Study within the Sinjar Genocide

On 3 August 2014, as ISIS forces advanced across the Sinjar region, Kocho village was attacked. After brief coordination with Peshmerga forces stationed in the village, the Peshmerga withdrew and did not return. Several residents tried to fled toward Mount Sinjar, but many were arrested by the ISIS militants (USHMM, n.d.; Cooper & Shear, 2014). Unlike many other Yazidi villages, Kocho experienced nearly two weeks of negotiations between ISIS commander Abu Hamza and village leaders. During this period, the Yazidi population was given an ultimatum: convert to Islam or face execution (Independent International Commission of Inquiry on the Syrian Arab Republic [CoI Syria], n.d.).

On 15 August 2014, negotiations collapsed and approximately 1,200 Yazidis were ordered to gather at the village school (USHMM, n.d.). Men and adolescent boys were separated from women and younger children. The males were then taken away in groups and executed at nearby sites (Rovera, 2014; CoI Syria, n.d.). Since ISIS forces were removed from the area in 2017, at least eleven mass graves have been discovered within the borders of Kocho village (Bor et al., 2018). Excavations have confirmed large-scale killings, although the exact number of victims remains unknown (CoI Syria, n.d.). Women and children were transported to holding locations in Sinjar, Tel Afar, and Mosul, where many were registered, sold, and forced into sexual slavery. Young boys were separated from their families, indoctrinated, and trained for combat (Human Rights Council, 2016). The destruction of Kocho reflects the broader pattern of violence carried out by ISIS across the Sinjar region in August 2014. These actions included the systematic execution of men and older boys, the enslavement of women and girls, the forced transfer and indoctrination of children, and the deliberate destruction of Yazidi social and cultural life (Human Rights Council, 2016; USHMM, n.d.).



Plate:1.5. (The Graveyards of Kocho Village) Source: Nadia's Initiative

1.4 Trauma and Post-Traumatic Stress Disorder (PTSD)

The genocide committed by ISIS against the Yazidi community represents one of the most extensively documented cases of systematic sexual violence in contemporary conflict (UNHRC, 2016). Sexual violence was strategically deployed as a weapon of genocide aimed at destroying Yazidi social structures and cultural continuity (Cetorelli et al., 2017). One of the most common psychological consequences experienced by survivors is Post-Traumatic Stress Disorder (PTSD). Yazidi women endured repeated rape, forced marriage, physical abuse, and the execution of family members (UNHRC, 2016). The disable Yazidi people in research revealed that, they faced an extremely high levels of PTSD, depression, and anxiety disorders compared with global averages in during the genocide situation (Ibrahim & Hassan, 2017).

Prolonged captivity and repeated exposure to violence often result in complex PTSD, characterized by emotional dysregulation, dissociation, chronic fear, and identity. fragmentation (Herman, 1992). Continued displacement in refugee camps further intensifies psychological distress due to insecurity and uncertain futures (UNHCR, 2018). Depression is also widespread among survivors. Many experienced persistent sadness, hopelessness, and suicidal thoughts due to the loss of their family members and uncertainty

regarding missing relatives (Boss, 1999; Ibrahim & Hassan, 2017). Women who returned with children born from sexual violence face particularly complex social and cultural challenges within Yazidi society (Cetorelli et al., 2017). Despite these challenges, Yazidi women have demonstrated remarkable resilience. Survivor advocacy has become an important mechanism for psychological recovery and social recognition. Nadia Murad, for example, transformed her personal trauma into global activism against sexual violence in conflict zones (Murad, 2017).

1.7 Conclusion

The attack on the Yazidi community in 2014 was not merely a military operation but a deliberate attempt to eradicate an entire ethno-religious group. ISIS targeted Yazidis specifically because of their religious identity. Thousands of men were executed, boys were forcibly recruited and indoctrinated, and women and girls were enslaved and subjected to systematic sexual violence. Homes, farms, and religious sites were destroyed in order to prevent displaced populations from returning to their ancestral lands. Even after escaping captivity, many survivors continue to suffer from deep psychological trauma. Families were separated, and thousands of individuals remain missing. Large numbers of Yazidis continue to live in displacement camps or diaspora communities. Nevertheless, the Yazidi community has demonstrated remarkable resilience. Survivors have courageously shared their experiences and advocated for justice and international recognition of the genocide. Their voices have played a crucial role in raising global awareness of the atrocities committed in Sinjar. Achieving justice for the Yazidi genocide requires more than acknowledgment of past crimes. It demands long-term reconstruction efforts, psychosocial support for survivors, and legal accountability for perpetrators. Ensuring that such atrocities never occur again remains a responsibility shared by the international community.

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Chapter 50: Imagining Survival: Gender, Inequality, and Sustainable Futures in Global Cinema

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Abstract

This study examines how contemporary cinema narrativizes the intersections of gender, social inequality, and the imagination of sustainable futures, focusing on how film becomes a cultural site where power structures are both reinforced and contested. Using a comparative textual and thematic approach, the research analyses five films *Hidden Figures* (2016), *Erin Brockovich* (2000), *Mad Max: Fury Road* (2015), *Parasite* (2019), and *Okja* (2017) to explore how gendered labour, class exploitation, ecological crisis, and survival are represented across different socio-political contexts. While *Hidden Figures* foregrounds the invisibilized contributions of Black women within institutionalized racism and patriarchal scientific spaces, *Erin Brockovich* highlights gendered activism and environmental justice through grassroots resistance. *Mad Max: Fury Road* reimagines sustainability through feminist rebellion against resource monopolization and bodily control, while *Parasite* exposes the structural violence of class inequality as a systemic barrier to equitable futures. Finally, *Okja* critiques capitalist consumption and corporate ecological harm, positioning gendered empathy and ethical resistance as central to sustainable imaginaries. Collectively, these films demonstrate that sustainable futures cannot be separated from struggles against gender oppression and socio-economic exclusion, particularly when viewed through intersectional frameworks that highlight overlapping structures of marginalization (Crenshaw 1241). The study argues that cinema functions not merely as representation but as ideological critique, offering narrative frameworks through which more just, inclusive, and sustainable futures can be envisioned (hooks 2).

Keywords: Intersectionality, Gender Inequality, Class Exploitation, Environmental Justice, Sustainable Futures

Introduction

Cinema has long functioned as a powerful cultural medium through which societies reflect upon and critique social realities. Films do not merely entertain audiences; they also shape collective understandings of power, inequality, and the possibilities for social transformation. In recent decades, global cinema has increasingly engaged with questions of sustainability, social justice, and survival in the face of ecological and socio-economic crises. These themes are often intertwined with representations of gender and class, revealing how systemic inequalities influence access to resources, opportunities, and environmental safety. As cultural texts, films offer narrative spaces where dominant power structures can be reinforced, questioned, or reimagined. Through their visual and emotional storytelling, they encourage audiences to reconsider existing social hierarchies and imagine more equitable futures.

This study examines how contemporary cinema narrativizes the intersections of gender, social inequality, and sustainability. It argues that cinematic representations of survival and environmental justice cannot be separated from struggles against gendered and socio-economic oppression. By analysing five films *Hidden Figures* (2016), *Erin Brockovich* (2000), *Mad Max: Fury Road* (2015), *Parasite* (2019), and *Okja* (2017) this research explores how filmmakers across different cultural contexts address systemic inequalities and environmental concerns through storytelling. These films were selected because they collectively address gendered labour, environmental activism, class conflict, corporate power, and ecological exploitation.

Drawing on feminist theory, intersectionality, and cultural studies, the analysis investigates how these films construct narratives of resistance and survival. The concept of intersectionality, first articulated by Kimberlé Crenshaw, highlights how systems of oppression such as race, gender, and class intersect to shape lived experiences (Crenshaw 1241). Similarly, feminist cultural critics have emphasized that media representations can challenge dominant ideologies by exposing structures of inequality and imagining alternative possibilities (hooks 2). Through this theoretical lens, the films analyzed in this paper reveal how cinema can act as a site of ideological critique. They demonstrate that the pursuit of sustainable futures requires confronting deeply embedded social inequalities.

By examining the narrative strategies and thematic concerns of these films, the study illustrates how contemporary cinema encourages audiences to imagine survival not merely as individual resilience but as collective transformation grounded in justice and equality.

Literature Review

Scholars in film studies and cultural theory have long argued that cinema plays a significant role in shaping social consciousness. Film narratives often reflect dominant ideological structures while simultaneously offering opportunities to challenge them. According to cultural theorist Stuart Hall, representation is central to how meaning is produced and circulated within society (Hall 15). Films therefore function as cultural texts that participate in broader conversations about power, identity, and social change.

Feminist film theory has been particularly influential in examining how gender operates within cinematic narratives. Early feminist scholars such as Laura Mulvey focused on how classical Hollywood cinema often objectified women through what she famously described as the "male gaze," positioning female characters as passive objects of visual pleasure (Mulvey 11). Later scholars expanded this critique by examining how gender representation intersects with race, class, and other forms of identity. Intersectional feminist theory emphasizes that experiences of oppression cannot be understood through a single category such as gender alone. Instead, multiple forms of inequality intersect to produce complex social realities (Crenshaw 1241).bell hooks further argues that cultural texts can serve as spaces of resistance when they challenge dominant narratives and foreground marginalized voices (hooks 2). In cinematic contexts, stories centered on women, racial minorities, or economically disadvantaged communities often disrupt traditional representations and create opportunities for alternative perspectives. Such narratives highlight how systems of oppression shape everyday life while also offering possibilities for resistance and empowerment.

Another important area of scholarship relevant to this study concerns environmental humanities and ecocriticism. Scholars in these fields explore how cultural texts represent environmental crises and humanity's relationship with nature. Ursula Heise suggests that global narratives about ecological sustainability frequently intersect with social justice concerns, emphasizing that environmental problems disproportionately affect marginalized communities

(Heise 50). Films addressing ecological issues therefore often engage with broader questions about capitalism, consumption, and inequality.

Recent research in film studies has also explored the relationship between cinema and the imagination of future societies. Scholars argue that speculative or dystopian narratives frequently highlight the consequences of current social and environmental practices (Buell 64). By depicting worlds shaped by environmental collapse or resource scarcity, films encourage audiences to reconsider contemporary political and economic systems. At the same time, these narratives often foreground the role of marginalized individuals or communities in challenging oppressive structures.

Within this scholarly framework, the films examined in this paper offer particularly compelling examples of how cinema connects gender justice, class inequality, and environmental sustainability. Each film presents characters navigating systems of power that restrict access to resources, recognition, or safety. Through their struggles, these narratives reveal how sustainable futures depend on dismantling systemic inequalities and fostering collective resistance.

Methodology

This study employs a qualitative textual and thematic analysis of selected films. Textual analysis is a common method in film studies, focusing on narrative structures, character development, visual symbolism, and thematic patterns to interpret how meaning is constructed within cinematic texts (Bordwell and Thompson 32). By closely examining the narrative elements of each film, the study identifies recurring themes related to gender, power, and environmental justice.

The five films analyzed in this research were selected because they represent diverse geographical contexts and thematic concerns. *Hidden Figures* explores racial and gender discrimination within a historical scientific institution in the United States. *Erin Brockovich* focuses on grassroots environmental activism against corporate negligence. *Mad Max: Fury Road* presents a dystopian future shaped by ecological collapse and authoritarian control over resources. *Parasite* critiques economic inequality and class division within contemporary South Korean society. Finally, *Okja* addresses global capitalism and the environmental consequences of industrial food production.

Through comparative analysis, the study identifies how these films portray survival and sustainability in relation to gendered labor, class inequality, and environmental exploitation. Particular attention is given to the ways in which

female characters challenge institutional power structures and articulate alternative visions of justice. The analysis also considers how visual imagery, narrative conflicts, and character relationships reinforce or subvert dominant ideologies.

Gendered Labor and Institutional Inequality in *Hidden Figures*

Hidden Figures, directed by Theodore Melfi, recounts the real-life story of three African American women mathematicians who worked at NASA during the early years of the United States space program. The film highlights the systemic racism and sexism that shaped their professional experiences, revealing how institutional structures often erase or minimize the contributions of marginalized groups.

The narrative focuses particularly on Katherine Johnson, Dorothy Vaughan, and Mary Jackson, whose mathematical expertise played a crucial role in the success of NASA's space missions. Despite their contributions, these women faced discriminatory policies that limited their access to professional opportunities. For example, segregated facilities and workplace hierarchies reinforced racial inequality while patriarchal attitudes dismissed women's intellectual abilities. Scholars have noted that the film demonstrates how race and gender intersect to create compounded forms of discrimination (Cole and Stewart 22).

By foregrounding the perseverance and brilliance of these women, *Hidden Figures* challenges historical narratives that exclude marginalized voices. The film emphasizes the importance of recognizing invisible labor and acknowledges the role of women in shaping scientific progress. In doing so, it also suggests that inclusive institutions are essential for building equitable and sustainable futures. Social progress, the film implies, depends not only on technological advancement but also on dismantling systemic inequalities that restrict participation.

Environmental Justice and Grassroots Activism in *Erin Brockovich*

Steven Soderbergh's *Erin Brockovich* presents another narrative of resistance against institutional power. Based on a true story, the film follows a single mother who uncovers a corporate conspiracy involving water contamination in a small California community. The narrative highlights how environmental crises often affect vulnerable populations who lack the resources to challenge powerful corporations.

Erin Brockovich's activism emerges from empathy and determination rather than formal legal training. Her investigation exposes how Pacific Gas and Electric deliberately concealed evidence of toxic pollution, endangering the health of local residents. Environmental scholars have argued that cases like this illustrate the broader dynamics of environmental injustice, where marginalized communities bear the disproportionate burden of ecological harm (Heise 56).

The film also challenges traditional gender stereotypes by portraying Brockovich as a powerful agent of change. Despite being dismissed by male professionals due to her appearance and lack of formal credentials, she successfully mobilizes community members and gathers evidence to support a landmark legal case. Through this narrative, the film suggests that sustainable futures require not only environmental awareness but also the empowerment of individuals willing to confront corporate accountability.

Feminist Resistance and Resource Politics in *Mad Max: Fury Road*

George Miller's *Mad Max: Fury Road* offers a dystopian vision of a world devastated by environmental collapse. In this harsh landscape, water and fuel have become scarce resources controlled by a tyrannical leader known as Immortan Joe. The film depicts how ecological destruction can intensify social hierarchies and create systems of exploitation.

Central to the narrative is Imperator Furiosa, a warrior who rebels against the patriarchal regime controlling women's bodies and reproductive capacities. Furiosa's decision to rescue enslaved women and escape the oppressive Citadel represents a powerful act of resistance against authoritarian control. Scholars have noted that the film reconfigures the action genre by positioning female characters as leaders in the struggle for survival (Tasker 134).

The quest for a "green place" symbolizes the search for ecological renewal and collective freedom. Although the characters initially believe that such a place no longer exists, their journey ultimately leads them to reclaim the Citadel and redistribute its resources among the population. This conclusion suggests that sustainability is inseparable from social justice. The film's emphasis on cooperation and resistance highlights how collective action can challenge systems of domination and create possibilities for equitable futures.

Class Inequality and Structural Violence in *Parasite*

Bong Joon-ho's *Parasite* explores the devastating effects of economic inequality within contemporary capitalist societies. The film follows the Kim family, who live in poverty and gradually infiltrate the wealthy Park household by posing as highly qualified professionals. Through its darkly satirical narrative, the film exposes the stark divisions between social classes.

The spatial arrangement of the film's settings visually reinforces this inequality. The Kim family resides in a semi-basement apartment vulnerable to flooding, while the Parks inhabit a luxurious hilltop home surrounded by modern architecture and lush gardens. Film critics have argued that these spatial contrasts symbolize the structural barriers that prevent social mobility (Cho 78).

As the narrative progresses, tensions between the characters escalate, ultimately culminating in violence. The film reveals how systemic inequality breeds resentment, desperation, and conflict. Rather than portraying poverty as an individual failure, *Parasite* emphasizes that economic disparities are deeply embedded within social structures. By highlighting these inequalities, the film challenges viewers to confront the moral and political implications of a society organized around extreme wealth disparities.

Capitalism, Ecology, and Ethical Resistance in *Okja*

Bong Joon-ho's *Okja* examines the global food industry and its environmental consequences through a story centered on a genetically engineered "super pig." The film follows a young girl named Mija, who forms a deep bond with Okja and attempts to rescue the animal from a multinational corporation that plans to exploit it for profit.

The narrative critiques corporate marketing strategies that disguise industrial exploitation as environmentally friendly innovation. The fictional Mirando Corporation promotes its genetically modified animals as sustainable solutions to global food shortages, yet the film reveals the brutal realities of factory farming and corporate greed. Scholars have noted that the film highlights the ethical dilemmas surrounding modern food production and consumer culture (Klein 169).

Mija's emotional connection with Okja serves as a powerful reminder of the ethical dimensions of environmental responsibility. Her determination to protect the animal challenges the logic of profit-driven exploitation and emphasizes the importance of empathy in imagining sustainable futures. Through this narrative,

Okja critiques the global capitalist system while advocating for more compassionate relationships between humans, animals, and the environment.

Conclusion

The films analyzed in this study demonstrate that cinematic narratives play an important role in shaping public conversations about sustainability, justice, and survival. Through their diverse stories and cultural contexts, *Hidden Figures*, *Erin Brockovich*, *Mad Max: Fury Road*, *Parasite*, and *Okja* collectively reveal how environmental and social crises are deeply interconnected. Each film highlights different dimensions of inequality racial discrimination, gender oppression, corporate exploitation, and class division—while emphasizing the need for systemic change.

By foregrounding the experiences of marginalized individuals, these films challenge dominant narratives that ignore the structural roots of injustice. They illustrate how struggles for environmental sustainability are inseparable from broader movements for social equality. Whether through scientific achievement, grassroots activism, feminist rebellion, or ethical resistance, the characters in these films demonstrate that survival depends on collective action and solidarity.

Ultimately, cinema functions as more than a form of entertainment. It serves as a cultural platform through which societies imagine possible futures and critically examine present realities. By revealing the intersections of gender, inequality, and ecological responsibility, these films encourage audiences to envision more inclusive and sustainable worlds. In doing so, they reaffirm the transformative potential of storytelling in shaping social consciousness and inspiring change.

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Chapter 51: Subaltern Ecologies: Gendered Resistance in the Stories of Mahasweta Devi

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Abstract

The literary-critical oeuvre of Mahasweta Devi, especially her short stories *Draupadi* and *The Witch*, offer a profound critique of the entrenched culture/nature dichotomy, through a robust ecofeminist lens. This paper explores how Devi's narratives transcend traditional boundaries as these expose the intersecting oppressions of capitalism, patriarchy, and environmental exploitation. Devi's characters, such as Dopdi in *Draupadi* and Somari in *The Witch* embody a radical resistance against their marginalization—both as subalte women and as symbols of the silenced voice of nature. The study reveals how Devi utilizes intricate metaphors and metonymies to illustrate the struggle of marginalized women and the degradation of nature. In this process, their interconnected forms of revolt against systemic exploitation are highlighted. Devi's approach critiques Cartesian dualism, emphasizing instead a symbiotic relationship between nature and womanhood. By illustrating the mutual oppression faced by both, Devi redefines feminine agency and underscores the urgent need for ecological and gender justice. Her literary techniques unveil the deep kinship between the oppressed female body and the exploited natural world, advocating for a unified vision of resistance and reclamation. This reappraisal not only challenges conventional paradigms but also offers novel insights into Devi's reinterpretations of the dynamics of oppression and liberation. The paper seeks to fathom this transformative perspective on the interplay between environment and gender, proffered through the short stories aforementioned.

Keywords: Ecofeminism, nature, marginal womanhood, environment and gender, patriarchy

Introduction

Mahasweta Devi's presentations of aboriginal Indian women in her feminist fiction rip into the postcolonial meta-narrative of expropriated gender roles, and the imposition of passivity on womanhood. Her works vividly depict the struggles of aboriginal women, challenging mainstream gender roles and norms. Through her portrayal of non-conformist female characters in her novels and short stories, Devi critiques both colonial legacies and contemporary gender classifications. Within the framework of her short stories, in particular, she has carefully crafted dissident, defiant, and downtrodden female characters who wield an essentially needful scepticism towards the overhauling enterprise of decolonisation and ethnographic demarcation within tribal formations. Devi's characters use emir bodies as symbols of protest as they characters use their bodies as symbols of protest as they advocate for a redefined gender model. To inflate his selfhood, man, quite strategically, has reduced women to his inferior other. The intolerant and exclusionary framework of patriarchy has fettered her being to an infrahuman state. Within the schema of masculine hegemony, she is mystified and dubbed inferior to her male counterpart to reinstate men's monopolists control over the pivot of power. She has been traditionally defined as the inexorable other to the symbolic phallic order, which controls the power structure. She has been deemed the lesser human being steeped in "jouissance" (an obscure, paradoxical signifier located beyond the phallic scheme of masculine rationalism) that trails along with consequent psychic instabilities and turmoil (Lacan, 2006, p. 575-584). In this respect, it is imperative to mention that Lacan's notion of jouissance delineates a realm of emotional and experiential excess that exists beyond the confines of masculine rationality. Thus, the feminine is re-figured as an entity foreign to the symbolic order. This exclusion casts her as the inexorable "other," whose subjectivity, deemed disruptive, is systematically marginalized within the structures of patriarchal society. Stripping her of agency and rendering her an object to reinforce the very boundaries she strives to transcend. Consequently, any assertion of autonomy or resistance to this imposed identity is met with intensified dehumanization and commodification, severe dehumanization and commodification, stripping her of her subjectivity and reducing her to an object of othering. Thus, she is relegated to the socio-economic-political margins of the land she belongs to. She is equated with the non-human entities of nature.

Under the mammonistic influences of capitalist patriarchy, nature, too, is systematically commodified and reduced to an exploitable resource. The intrinsic value entwined with it is erased guilefully. Much like the treatment of marginalized aboriginal women of the nation, nature is cast as an object of

extraction rather than a subject with agency. Its existential signification is reframed in relating to the demands of mercantile gain. Through a symbolic nexus that feminizes nature, capitalist patriarchy reinforces the notion of both women and the natural world as entities meant to serve others. Both are associated with passivity, fertility, and cyclical renewal. This association justifies male control and exploitation, relegating them to the status of "other" within a phallocentric, productive sphere. A dualistic hierarchy reinforces this perspective that positions nature as chaotic, irrational, and thereby inferior to the ordered realm of human civilization. This dichotomy, indeed, empowers capitalist forces to legitimize domination. Nature is forged as an entity to be tamed, controlled, and consumed for the advancement of men's progress. Within this framework, nature is not only subjected to relentless exploitation but is also rendered a disposable entity akin to the marginalization of women. As discussed earlier, women, too, are viewed as disruptive within patriarchal constructs. Once again, the Lacanian elucidation aforementioned articulates an experience of excess that transcends the confines of rationality and illuminates this connection; both nature and women embody a form of excess that challenges and destabilizes patriarchal norms.

This positioning invites systematic repression of their inherent agency since both are perceived as threats to the structured and rational world that capitalist patriarchy seeks to uphold. Thereby, the exploitation of nature mirrors broader societal tendencies to subjugate those who defy categorization within the rigid binaries of order and chaos, human and other, rational and irrational. This shared trajectory of marginalization and commodification robs both nature and women of their agency and reinstates a worldview that privileges control and domination over relationality and reciprocity. By reducing nature to a mere resource and women to an object of consumption, capitalist patriarchy perpetuates a cycle of exploitation that denies the inborn value and complexity of both. Thus, the very foundations of ecological and social harmony are undermined. In this context, nature is not only subjected to exploitation but is also aestheticized as an exotic, passive landscape. Its dynamic, multifarious essence is reduced to a utilitarian image that distances it from its ecological role. This transformation renders nature a symbol of passive beauty, ripe for appropriation. It's true, that regenerative power is cunningly obscured. Such aestheticization remoulds nature as a site of endless consumption devoid of moral consequence. Nature is strategically severed from the interconnected fabric of life that patriarchal capitalism seeks to dominate. In this reductive lens, both nature and women become mere reflections of an extractive order. Their potential for agency and connection is invisibilized in the pursuit of profit and power. Thus, enmeshed in his constrictive ego, man

divorces himself from nature and woman. The unheard voices of nature are, as it were, embodied in the forced silence of the feminine. Man seeks to erase his attachment and affiliations with both his human and non-human others. To reinforce the meta-narrative of paternalistic man-made civilisation, man has manufactured a culture/nature dichotomy. Man (man's civilisation) is recreated as an autonomous whole, independent of nature. Similar dichotomous dynamics have riddled man-woman relationships. These manoeuvres of othering sink into absolute debasement as the state apparatus struggles to invisibilize marginalised, aboriginal feminine entities.

Literature Review

Devi's fiction got significant attention from scholars because of its insightful depictions of marginalized groups, women, and indigenous peoples. Scholars have continuously highlighted her importance as a politically active writer who utilizes her fiction as a means of social criticism. To illustrate the politics of dehumanisation, it would be wise to refer to Julia Kristeva. Her investigations have brought to the fore the horrific truth behind their abjection. In *Powers of Horror* (From Filth to Defilement) she points out: "Asserted to be a non-object of desire, abominated as abject, jettisoned from the symbolic system. It is what escapes the social rationality, the logical order on which a social aggregate is based" (Kristeva, 1982, p. 65). The three-pronged machinery of oppression comprising the national authority, the male counterparts of the tribal community, and the discourse about the othered, undesired woman seek to curb the life force of Dopdi in *Draupadi* and Somari in *The Witch.* This has been pointed out by Gayatri Chakraborty Spivak in the preface to the translation of *Draupadi*. From an ecofeminist perspective alone, it is possible to fathom this oppressive mechanism of capitalist patriarchy as it invites a critical examination of the interplay between gender, nature, and systemic exploitation that further marginalizes both women and the environment. This holistic approach allows for a deeper understanding of how capitalist patriarchy not only sustains the oppression of women but also contributes to the broader ecological crisis, revealing the interconnectedness of their struggles. In *Women Writing in India*, Susie Tharu and K. Lalita say that Dopdi's refusal to follow orders goes against conventional stories of women being submissive and victims, making her a figure of strength. (Tharu, 1993, p.12) Researchers have compared Dopdi's act of stripping herself to Helene Cixous's theory in *The Laugh of the Medusa*, which says that women should take back their bodies as a way to fight back. (Cixous, 1976, pp. 880) Feminist and anthropological perspectives have also looked at

Devi's work's unique issue of witch-hunting. *In Seeing Like a Feminist*, Nivedita Menon notes that calling women witches is a way to restrict their sexuality, work, and freedom of movement. (Menon, 2012, p.56) This aligns with Silvia Federici's *Caliban and the Witch*, which posits that witch-hunting traditionally functioned to reinforce patriarchal power and reorganize economic relations. (Federici, 2004, p.40) The sad end of Devi's narrative is not only in stories. Even on July 7, 2025, at Tetgama village, Purnea district, Bihar, a fifty-year-old lady called Sita Devi and four of her family members were burnt alive by their neighbours on charges of practicing witchcraft. ("Bihar horror", 2025) Critics have pointed out that the supernatural elements in Mahasweta Devi's tales are not only made-up things, but ways of expressing cultural trauma. Deepti Misri (2014) observes that Devi employs supernatural imagery to depict "the epistemic violence of poverty and patriarchy," (Misri, 2014, p.35) whereby folklore serves as a conduit for articulating communal pain. *The Witch* is a symbol of hundreds of years of terror, need, and cruelty against women. Devi reworks the witch from a conventional folklore person who is mysterious into a victim of societal violence.

Research Methodology

This study adopts a qualitative and interdisciplinary research methodology that combines literary analysis with ecofeminist, feminist, and subaltern theoretical frameworks. The research primarily focuses on the representation of marginal womanhood, nature, environmental exploitation, patriarchy, and gendered violence in the works of Mahasweta Devi. The research predominantly examines the portrayal of marginalized womanhood, ecological exploitation, male dominance, and gendered violence in her works. The two primary texts discussed in this research are *Draupadi* and *The Witch*. This paper examines how Devi depicts the convergence of ecological oppression, male dominance power, and the tribal women's suppression. The text starts with an in-depth analysis of Draupadi, which focuses on the portrayal of Dopdi Mejhen and her struggle against the male dominace society. The narrative places significant emphasis on symbolic moments, especially on Dopdi's choice to remain unclothed following custodial violence, which serves as a profound act of resistance against the male supremacy. The analysis examines Devi's linguistic choices, narrative tone, and symbolic imagery to understand how the author transforms the mythological figure of Draupadi from the Mahabharata into a modern tribal woman who resists oppressive socio-political structures. Furthermore, this analysis conducts a textual examination of *The Witch*, scrutinizing the narrative's portrayal of superstition, patriarchal violence, and the socio-psychological factors that

underpin the persecution of marginalized women. The story is examined through the character of Somari, a psychocultural lens that combines literary interpretation with insights from psychology and cultural anthropology. Concepts such as hallucination and mass hysteria, discussed by scholars like Ronald K. Siegel, help interpret the collective fear and social paranoia surrounding witch-hunting. Feminist scholarship on witch-hunting and patriarchal control of women's bodies and knowledge also informs the analysis. The research further situates both stories within the broader socio-political context of twentieth-century India, particularly the violence against tribal communities during the Naxalite period and the ongoing marginalization of indigenous populations. Secondary sources used in the study include critical works on ecofeminism, feminist theory, subaltern studies, anthropological research on tribal societies, and reports on contemporary witch-hunting and environmental displacement in India. The study employs textual analysis alongside historical and theoretical frameworks to interpret these stories not solely as literary narratives, but as reflections of authentic socio-cultural conditions. Ecofeminist theory is essential in linking the exploitation of women to the exploitation of nature, illustrating how patriarchal and state systems concurrently marginalize female bodies and natural environments.The interdisciplinary methodology thus enables the research to examine the intersection of gender, ecology, and power, demonstrating how Devi's narratives foreground the voices and resistance of marginalized women within oppressive socio-political and environmental structures.

Discussion

In her short story titled *Draupadi* (1978), Devi interrogates how contrived dichotomies in man/ nature, and man/woman relationships operate through the quasi-rational logic of economic-cultural progress. The author's critique of environmental exploitation in postcolonial India reveals the interconnectedness of ecological deterioration and oppression based on gender, class and race. Such exploitation calls for an examination of postcolonial environmental issues from an ecofeminist viewpoint. The critical lens uncovers how the policy of extractivism lies at the core of the exuberance of capitalist patriarchy. It proffers nothing but unbridled plundering of natural resources and extortions of the potential of the human other which is a woman. Dopdi Mejhen emerges as a strong woman. Despite being marginalised and exploited, she transgresses conventional sexual and societal standards. Dopdi subverts the physicality of her body from powerlessness into powerful resistance. She is a Naxalitie activist. She is ready to sacrifice herself for her revolutionary cause. She is ready to withstand

torture to save her comrades. Her devotion is as pure as the Earth. And so is her strength. As Dopdi attacks her oppressors, she ululates. This ululation embodies the unalloyed zest of nature. Her war cry remains dauntless and becomes one with nature. Even when she is captured, her spirit remains unbroken. Dopdi is impervious and is one with nature: She "ululates with the force of her entire being" (Devi, 1988, p.195). To silence the voice of protest and extinguish the spirit of defiance and resistance in the woman, militaristic, male oppressors unleash dehumanizing sexual abuse. The aim is to induce shame and self-loathing so that an indelible trauma crushes her spirit. Despite utter dehumanisation, she continues to exercise her agency. Needless to say, in both the epic and its titular short story, patriarchal motifs engage in dialogues. While *The Mahabharata* upholds patriarchal dominance till the end, Devi's *Draupadi* challenges gender norms by depicting Dopdi's retribution as a form of resistance. This climactic moment subverts the patriarchal and nationalist suppression of female subjectivity, transforming Dopdi into a Herculean figure. She reclaims her agency and dismantles Senanayak's authority. The author writes:

> Draupadi stands up. She pours the water down on the stound. Tears her piece of cloth with her teeth. Seeing such strange behaviour, the guard says, She's gone crazy and runs for orders. He can lead the prisoner out but doesn't know what to do if the prisoner behaves incomprehensibly....Draupadi stands before him (Senanayak), naked. Thigh and pubic hair matted with dry blood. Two breasts, two wounds…. The object of your search, Dopdi Mejhen. You asked them to make me up, don't you want to see how they made me? (Devi, 1988, p.196)

In this moment, she defiantly asserts her identity and resists the objectification that patriarchy imposes. Through her powerful ululation, Dopdi not only articulates her defiance but also resonates with the primal forces of nature, revealing the profound interconnectedness of her struggle against patriarchal oppression and the exploitation of the natural world. This synthesis of resistance positions her not merely as a victim but as an embodiment of the very life force that capitalist patriarchy seeks to dominate and control. She defies male-chauvinist nationalist and military discourses and mingles into the uninhibited precincts of unbounded nature.

In *The Witch*, Mahasweta Devi encapsulates the trials of marginalized womanhood through the character of Somari who is branded *The Witch* by Hanuman Misra. Physically disabled and mentally impaired from Tura village, Somari is deprived of agency who is attacked by the villagers with stone and tried

to burn her alive in a cave. Despite suffering repeated attacks and sexual assaults, she remains utterly silenced and powerless to defend herself. The author enfolds her unvoiced state of plight (both literal and metaphorical) in the following line: "She is dumb! She can't speak. Her body grew, but not her!" (Devi, 1988, p.122) Hanuman Misra, the affluent, influential priest weaponises illiteracy and the superstitious beliefs of the villagers to camouflage Thakur's son's sexual abuse of Somari. He continues his exploitations of ignorant aboriginals and the rustic land. She is persecuted by people from her community including her father. Her screams of "anhanhanh" (Devi, 1988,p.79), which are repeated protestations of innocence and cries for help, are misread as the growls of a witch. Once banished to the forest, she resorted to eating raw flesh to satisfy her hunger. The portrayal of Somari in the story reduces her to the state of an animal. Through this narrative, Devi corroborates the idea that the victim of patriarchal oppression cannot remain human; oppression dehumanizes human beings. But her deprivations, paradoxically, bring in her redemption. During the witch-hunting, Somari, the alleged witch turns her face. She is "distended grotesque figure." Hundreds of villagers gather in front of the cave and "The mood is vengeful violence" (Devi, 1988, p.117). Even her tribal counterparts perceive her as the diabolical other. The conduct of the whole town in "The Witch" may be analyzed through the lens of mass hysteria. The inciting stimuli is Hanuman Misra's vision of the witch. The pervasive stresses include "endemic hunger, starvation, famine, drought, bonded labor, [and] mahajan oppression" (Devi, 1998, p.71). The group is closely bonded, lacks education, and has no scientific foundation to comprehend its afflictions. The dread of the witch offers a straightforward, culturally accessible rationale for their intricate suffering. This collective conviction becomes infectious, resulting in the violent eruption directed against Somari.

In her book *The Gendered Society* (2003), Angela Nubile explains that women are "traditionally regarded as a field" and men "as the seed," a view that leads to and reinforces "oppressive bondage for women" by men (Nubile, 2003, p.23). In the short story, just as land is ploughed and sown, Somari's body has been ravaged by a male tyrant. When Somari is exiled, she connects herself entirely with Nature. "The daini began to run towards the forest" (Devi, 1988, p.102). The author personifies nature as an empathetic protector and refuge in distress. Society has driven her insanity, but nature accords her with a safe, comfortable shelter. In *Healing the Wounds: The Promise of Ecofeminism* (1989) Judith Plant's statement regarding the link between the exploitation of women and ecological crisis is of primary relevance in this context: "The rape of the earth, in all its forms, becomes a metaphor for woman in all is many guises" (Plant,

1989,p.238). Ecofeminism is grounded in the socio-cultural critique that the domination of both women and nature by patriarchal ideology and the accidental model of development are interlinked. Indubitably, the effects of the oppression of women and the ecological devastation, as Sydee and Beder point out in "Ecofeminism and Environmental are symptoms of the same illness" (Sydee and Beder, 2001, p.281). This shared struggle underscores the imperative for an integrated approach to confront the multifaceted crises of gender inequality and environmental degradation. It reveals that the battle against patriarchal oppression is inextricably linked to the fight for the preservation and respect of the natural world. By recognizing the interconnectedness of these issues, we can cultivate a more holistic understanding of the dynamics of power and exploitation. The exploitation of women and the environment are not isolated phenomena; rather, they are manifestations of a singular, oppressive framework that privileges domination over relationalily.

In this context, ecofeminism emerges as a vital lens through which we can examine how patriarchal ideologies perpetuate systemic violence against both women and nature. It challenges us to interrogate how the subjugation of marginalized bodies parallels the exploitation of natural resources, thereby fostering a comprehensive discourse that acknowledges the profound entanglements between ecological health and social justice. The recognition that the degradation of the environment and the marginalization of women stem from similar ideological roots compels us to seek transformative solutions that advocate for equity and sustainability. Thus, the fight for gender justice becomes a crucial element in the broader struggle for ecological integrity, encouraging us to envision a future where both women and the natural world are valued, respected, and empowered. Through this integrative perspective, we can aspire to create a more just and sustainable society that honours the complex interdependencies between all forms of life. Growing concerns over the destruction of the natural environment have spurred environmental movements at both local and global levels. As Laura Pulido emphasises in *Environmentalism and Economic Inequality*, these movements have revealed "structural forces that produce conditions of environmental degradation," (Pulido, 1996,p.14) with development-oriented agendas and prevailing global economic forces that have brought forth ecological destruction and the displacement of people from their livelihoods. This acknowledgement underscores the intricate interplay between socioeconomic structures and environmental crises, highlighting how the struggles for ecological justice cannot be divorced from the broader struggles against economic inequality. Environmental movements in developing countries

and postcolonial societies have linked environmental issues with economic, racial, and sexual inequities. Critics have noted that post-colonialism and environmentalism share common concerns.

In *Postcolonial Ecocriticism: Introduction* (2006), Pablo Mukherjee identifies the interconnections between the two fields as their "comprehensive critique of European modernity, in particular its core components of capitalism, colonialism/imperialism, and patriarchy," with both positioning themselves "as being integral to the oppositional activism of decolonization and environmental/green movement" (Mukherjee, 2006, p.145). These overlapping critiques emphasize how colonial legacies continue to shape contemporary environmental struggles, thereby enriching our understanding of both disciplines. Moreover, Ramachandra Guha's accounts of peasants' revolt against state-sponsored development plans in postcolonial India in *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya* clearly illustrate the intersections between postcolonial and environmental issues and expose the underlying economic an ironial factors of environmental exploitation. (Guha, 2000, p.23) Similarly, Graham Huggan and Holen Tiffin in *Postcolonial Ecocriticism: Literature, Animals, Environment* (2010) accentuate the conjunctions of postcolonial and environmental crises and assert that one of the major tasks of postcolonial ecocriticism is to "contest Western ideologies of development" (Huggan and Tiffin, 2010, p.27). This perspective invites a critical examination of the power dynamics embedded in development narratives, further illuminating how marginalized communities often bear the brunt of such initiatives. They argue that postcolonial ecocritical critique of development-oriented views as causes of environmental exploitation reveals the neocolonial economic interests underlying development projects. A key question is whose interests are served by development plans. Huggan and Tiffin claim that if the development project is administered by the state, "the top-down forms of economic management (are) bound to the neocolonialist imperatives of global corporate commerce and the post-independence state" (Huggan and Tiffin, 2010, p.52). In this sense, postcolonial ecocriticism unfolds an economic and ecological response to neocolonial globalization and development projects backed by global capital. Global capitalism's predatory economic domination is based on unequal power relations between developed and developing countries. This inequality at both local and global levels causes othered countries and subjugated peoples to be exploited in the name of development. Of particular concern is how globalization, as "an extension of patriarchal capitalism" (Eaton and Lorentzen, 2003, p.5), as Heather Eaton and Lois Ann Lorentzen describe it, has precipitated

ecological crises and gender concerns, and how patriarchal capitalist development agendas have promoted the ideology of linear progress. Spivak highlights the connections between patriarchal capitalism and global capital, emphasizing the convergence of patriarchy and neocolonial globalization in India. (Devi, 1988, p. 179). In the same vein, Vandana Shiva describes development as a "new project of Western Patriarchy" (Shiva, 1989, p.1), and argues that "ecological destruction" and the marginalization of subjugated women are "inevitable results of most development projects" (Shiva, 1989, xvii). These insights reveal how gender and environmental issues are intricately linked, necessitating a framework that considers the voices and experiences of those who are often marginalized in both contexts.

Spivak's and Shiva's counter-development ideas align with both postcolonial environmental agendas and ecological feminist (ecofeminist) concerns. To operate this complex exploitative manoeuvre, capitalist patriarchy relies on its ideological state apparatus to strengthen the culture/nature dichotomy. It homogenises and invisibilizes women. Yet when exploitation crosses the threshold, nature brings in calamities. It threatens to destroy and it devastates man-made civilisation. Marginal women too rebel. By dint of their undaunted defiance, marginal women like Dopdi and Samri reclaim their subjectivity. In this struggle for agency, these women embody the resistance against both ecological degradation and patriarchal oppression, thus highlighting the intertwined fates of women and the environment. As we explore the symbiotic relationship between woman and Nature through the re-reading of *The Witch* and *Draupadi*, we can discern the author's art of effacing the contrived boundaries between culture and nature.

Conclusion

Both *Draupadi* and *The Witch* pave the way for a critique of the major ecofeminist conceptual discourse, which surfaces in the proposition of Ruether in *New Woman/New Earth: Sexist Ideologies and Human Liberation* (1975). Ruether argues that "patriarchal self-deception about the origin of consciousness ends logically in the destruction of the earth" (Ruether, 1975, p.195). This assertion resonates with the urgent need to rethink the intersections of gender, ecology, and power, particularly in postcolonial contexts where these dynamics play out with unique intensity. This is the crux of ecofeminism in the postcolonial context. Though Mahasweta Devi is not an ecofeminist in the technical sense of

the term, she harbours greater gender inclusiveness. Her work transcends the confines of traditional ecofeminism, offering a nuanced perspective that emphasizes the complexity of women's experiences and their interconnectedness with the environment. She re-establishes woman-nature connectivity on a novel dynamic of comprehension. Her narratives refrain from homogenizing the tribal women of India. Instead, she exhumes diverse constituents of marginal femininity that redesign feminine subjectivities across India. She decenters bourgeois patriarchy and centralizes the oppressed women's potential to disarm and disintegrate the subjugators. In doing so, she not only critiques existing power structures but also illustrates the resilience and agency of marginalized women in reclaiming their narratives. Mahasweta Devi's deft applications of metonymies and metaphors crystallize the unfathomable revulsive defiance of the exploited non-human other. She reasserts that the plinth of mankind is entrenched in Mother Nature and the feminine. It is the need of the hour to nurture nature. It is high time that man reverses the subject position of his female counterpart. The machination of othering has been dissected and nullified. Moreover, Devi is ironically critical of modern technology-oriented progress. As Singh points out in Mahasweta Devi's *Fiction: A New Perspective* (2011), Devi's writing has a double focus: "In her, we find the concrete alternative to resist and destroy not only the injustice of gender politics but also the incursion upon tribal land and forest by feudalism, colonialism and global capitalism" (Singh, 2011,p.9). This duality in her work highlights the need for an integrated approach to understanding the multifaceted struggles against oppression and ecological degradation. Therefore, Mahasweta Devi reviews and recreates multipotent discourses to coalesce environment and womanhood. She draws out alternate possibilities of embracing ecofeminist insight into the neglected lives of the marginalized. Through her narratives, she not only challenges dominant paradigms but also reimagines the potential for a more equitable and sustainable future. She disinters promises of newfound agency for the battered feminine on the periphery of the socio-political-cultural framework of the nation.

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Chapter 52: Reclaiming the Table: Indigenous Food Systems and Decolonial Approaches to Geriatric Nutrition

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Abstract

Ageing is characterized by progressive physiological decline and heightened nutritional vulnerability, often exacerbated by chronic diseases, multimorbidity, polypharmacy, social isolation and psychological distress. In contemporary food environments, these vulnerabilities are further compounded by the dominance of ultra-processed food systems, which contribute to metabolic dysfunction, systemic inflammation and diminished quality of life among older adults. Rooted in Western biomedical paradigms, conventional geriatric nutrition typically privileges standardized dietary prescriptions while overlooking the cultural, ecological and historical contexts that inform food practices and health outcomes. Grounded in a decolonial framework, this chapter critically examines how colonial food policies, globalization and industrial agriculture have systematically displaced Indigenous food systems and undermined traditional dietary wisdom. It contends that reclaiming Indigenous food wisdom represents both an act of cultural restoration and a public health imperative. Indigenous dietary practices are being characterized by biodiversity, seasonal and cyclical consumption patterns, traditional grains, locally adapted crops and community-based food sharing. Hence, offering nutritionally dense, ecologically sustainable and culturally appropriate alternatives for promoting health in ageing populations. By contesting Eurocentric nutritional paradigms and foregrounding Indigenous epistemologies, this chapter advances a transformative shift toward culturally rooted and ecologically integrated food systems for ageing populations. The reintegration of Indigenous food knowledge not only supports physiological well-being but also strengthens cultural

autonomy, dignity, intergenerational knowledge transmission and community resilience. Essentially, this decolonial framework envisions a comprehensive, sustainable and justice-oriented model of geriatric nutrition one that reconciles health with cultural sovereignty and ecological stewardship.

Keywords: Decolonial nutrition; Food sovereignty; Geriatric health; Healthy ageing; Indigenous food systems; Sustainability; Traditional ecological knowledge

1.Introduction

Ageing is closely linked to nutrition and is strongly influenced by contemporary food systems shaped by industrialization and globalization. These transformations have altered dietary patterns and food environments, increasing the risk of malnutrition and diet-related chronic diseases among older adults. Conventional geriatric nutrition approaches often rely on standardized dietary prescriptions rooted in biomedical perspectives, frequently overlooking the cultural, ecological, and historical contexts that shape food practices. At the same time, colonial food policies, industrial agriculture, and globalized food markets have contributed to the erosion of Indigenous food systems and traditional dietary knowledge.

Integrating Indigenous food wisdom, dietary biodiversity, and ecologically sustainable food practices into geriatric nutrition may therefore help promote culturally appropriate and nutritionally resilient food systems for ageing populations.

1.1 Ageing and Nutritional Transition

As societies across the world grow older, ageing is no longer simply a matter of added years but a complex lived experience shaped by health inequalities, changing food systems, and shifting social realities. While increased longevity reflects advances in medicine and public health, later life is frequently accompanied by progressive physiological decline, multimorbidity, and heightened vulnerability to nutritional inadequacy. Age-related changes in metabolism, appetite regulation, muscle mass, and gastrointestinal function often intersect with chronic diseases and polypharmacy, creating a fragile balance between nutrient requirements and dietary intake. Social determinants, including economic insecurity, social isolation, and psychological distress further

compound these vulnerabilities, influencing both food access and dietary behaviour among older adults. (1)

Contemporary dietary transitions are unfolding within rapidly transforming food environments increasingly dominated by ultra-processed foods that are energy dense yet nutrient poor. These foods are typically characterized by refined ingredients, food additives and preservatives, and high levels of salt, sugar, and unhealthy fats, which contribute to metabolic dysfunction, systemic inflammation, and the progression of chronic diseases among ageing populations. Consequently, nutritional change in later life is not merely a biological process but also a structural phenomenon shaped by industrial agriculture, globalized food markets, and shifting socio-economic realities. Conventional geriatric nutrition frameworks have largely evolved within Western biomedical paradigms that emphasize standardized dietary recommendations, quantified nutrient targets, and clinical risk management. While such approaches have improved disease detection and management, they often overlook the broader cultural, ecological, and historical contexts that shape food practices and dietary behaviour.

Colonial histories and globalization have further restructured food systems by displacing Indigenous crops, agricultural practices, and culinary traditions through the promotion of monoculture farming, export oriented agriculture, and standardized food commodities. This transformation has contributed to the erosion of dietary biodiversity and the weakening of food sovereignty, while traditional practices such as seasonal consumption patterns, fermentation techniques, traditional grains, and communal food-sharing systems have been marginalized by industrial food supply chains. In this context, a decolonial perspective offers a critical framework for re-examining geriatric nutrition by foregrounding Indigenous knowledge systems, ecological balance, and culturally rooted dietary practices. Indigenous food systems characterized by biodiversity, locally adapted crops, seasonal consumption patterns, and community-based food sharing provide nutritionally dense and ecologically sustainable dietary patterns that align with the principles of healthy ageing.

Reclaiming Indigenous food wisdom can represent both cultural restoration and a public health strategy. Reintegration of traditional dietary knowledge can enhance physiological resilience, support metabolic stability, and foster gut health while simultaneously strengthening cultural autonomy and dignity among older adults. Moreover, positioning elders as custodians of ecological and

culinary knowledge reinforces intergenerational knowledge transmission and community cohesion.

This chapter therefore examines the intersection of ageing, nutritional transition, and food system transformation through a decolonial lens by bridging biomedical evidence with Indigenous knowledge systems. Through this integration, a more comprehensive, sustainable, and justice oriented framework for healthy ageing can be envisioned.

1.2 Problem Statement

Older adults are ageing within food environments profoundly shaped by industrialization, globalization, and the growing dominance of ultra-processed food systems. The shift from biodiverse traditional diets to energy dense commercial foods has significantly altered dietary patterns and food availability, contributing to metabolic dysfunction and an increasing burden of diet-related diseases among ageing populations. Conventional geriatric nutrition frameworks, largely rooted in Western biomedical paradigms, respond to these challenges through standardized dietary prescriptions, supplementation strategies, and nutrient-based interventions. While clinically valuable for disease management, these approaches frequently conceptualize food primarily as a biochemical entity, often detached from its cultural, ecological, and historical contexts. As a result, such reductionist models may inadequately address the broader structural transformations in food systems that have undermined dietary diversity and community-based food practices.

Historical processes including colonial food policies, industrial agriculture, and the expansion of globalized food markets have further reshaped food systems, often displacing Indigenous crops, agricultural knowledge, and culinary traditions. Traditional grains, seasonal consumption patterns, fermentation practices, wild foods, and communal food-sharing systems have increasingly been marginalized by industrial food supply chains. This displacement has not only reduced dietary biodiversity but has also disrupted intergenerational knowledge transmission and weakened cultural autonomy factors closely linked to health and well-being in later life. These dynamics highlight the need to reconsider geriatric nutrition through a broader socio-ecological lens. Moving beyond a purely biomedical understanding toward a decolonial and systems-based perspective can help reconnect nutrition with ecological sustainability,

cultural knowledge, and community agency, thereby supporting healthier and more culturally meaningful ageing food systems.

1.3 Rationale for a Decolonial Lens

A decolonial perspective in nutrition means questioning Western-dominated nutrition models and recognizing the importance of Indigenous and traditional food knowledge. It emphasizes culturally relevant, locally sourced, and sustainable dietary practices for health.

The nutritional transition has not occurred in isolation. It is embedded within historical and political-economic processes shaped by colonial expansion, land dispossession, agricultural restructuring, and globalization. Colonial food policies frequently promoted monoculture cash crops and export-oriented agriculture, displacing biodiverse subsistence systems and reshaping local food economies (2). These structural transformations continue to influence contemporary dietary patterns, food availability, and nutrition policy landscapes.

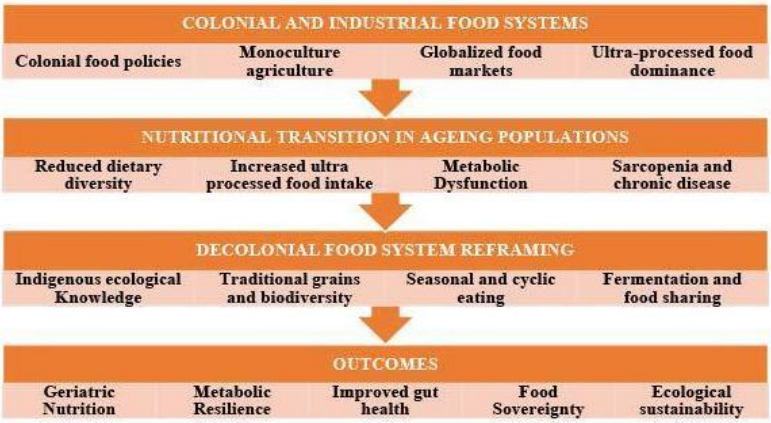
A decolonial lens is essential for examining how knowledge and power operate within nutrition and public health. Decolonial scholarship emphasizes that coloniality persists beyond formal colonial rule through enduring hierarchies that shape institutions, policies, and epistemic legitimacy (3)

In nutrition science, this can appear as a privileging of standardized, reductionist dietary prescriptions rooted in Western biomedical paradigms, while culturally embedded food practices and Indigenous ecological knowledge are treated as peripheral or anecdotal.

In the context of ageing, the decolonial perspective is particularly relevant because elders often serve as custodians of ecological and culinary knowledge. Traditional food wisdom knowledge of seasonal cycles, local crops, wild foods, fermentation practices, and therapeutic diets may be marginalized as ultra-processed foods and standardized dietary models dominate. This erosion is not merely nutritional; it disrupts intergenerational knowledge transmission, weakens cultural continuity, and reduces community resilience.

A decolonial approach does not reject biomedical science; rather, it challenges epistemic exclusivity and seeks integration. By foregrounding Indigenous epistemologies and local ecological knowledge alongside biomedical evidence,

geriatric nutrition can be reframed as a justice-oriented and sustainability-oriented field one that links health to food sovereignty, cultural autonomy, and ecological stewardship.



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Figure 1: Rationale for decolonial approach (Source: Author generated)

Dominant Biomedical Models of Geriatric Nutrition

Biomedical models are diagnostic and prognostic framework used to evaluate, monitor and manage the nutritional status.

Dominant biomedical models of geriatric nutrition are grounded in Western scientific paradigms that conceptualize ageing primarily as biological decline measurable through standardized clinical indicators. Within this framework, nutrition is approached as a tool for preventing, managing, or treating age-related disorders often through quantified nutrient targets, clinical screening tools, and biomarker-based monitoring. Diet is commonly interpreted in terms of macronutrient ratios, micronutrient requirements, and supplementation protocols,

with success assessed through laboratory parameters (e.g., serum micronutrient levels, lipid profiles, glycaemic indices) and anthropometric indicators.

Biomedical approaches have contributed substantially to improved disease management and structured geriatric care. Nutrition screening, guidance on healthy dietary patterns, and targeted supplementation can help reduce morbidity and improve functional outcomes (4). In clinical settings, biomedical models are particularly valuable where acute risk exists (e.g., severe undernutrition, high fracture risk, anaemia, dysphagia) and rapid intervention is required.

However, the dominance of biomedical models can narrow the understanding of food and ageing. Food is frequently reduced to its nutrient components, while the cultural, ecological, historical, and relational dimensions of eating may receive limited attention. This nutrient-centric orientation can encourage reliance on fortified products and supplements, especially in environments where traditional diets have been disrupted. In addition, biomedical guidelines often derived from datasets in industrialized contexts may not translate seamlessly across diverse cultural and ecological settings.Biomedical approaches may also unintentionally medicalize normal processes of ageing by framing older bodies primarily through risk and pathology. As a result, attention may shift from structural determinants of diets such as land dispossession and the spread of ultra-processed foods to individualized correction of nutrient deficiencies**.**

In contexts undergoing rapid nutritional transition, this corrective orientation can become reactive: the diet becomes poorer in diversity due to food system change, and the response becomes increased supplementation rather than rebuilding food-based diversity.A more comprehensive model of geriatric nutrition would integrate biomedical assessment with socio-ecological and cultural perspectives.

Such integration is not a rejection of clinical nutrition but an expansion of its scope. Nutrient adequacy should therefore be addressed alongside food sovereignty, dietary biodiversity, culturally meaningful eating practices, and ecological sustainability.

2.1 Protein-Energy Malnutrition Focus

Protein–energy undernutrition (PEU), is a form of malnutrition that is defined as a range of conditions arising from coincident lack of dietary protein

and/or energy(calories) in varying proportions. The condition has mild, moderate, and severe degrees (5)

Protein-energy malnutrition (PEM) remains a central concern in geriatric nutrition due to its association with frailty, impaired immunity, delayed recovery, and increased mortality.

Age-related changes such as reduced appetite, chewing and swallowing difficulties, chronic disease burden, and anabolic resistance contribute to insufficient energy and protein intake. Sarcopenia, defined by low muscle strength and reduced muscle quantity or quality, is now widely recognized as a major determinant of disability and adverse outcomes in older adults. In response, clinical guidance increasingly emphasizes higher protein intake for older adults, particularly in the presence of illness, frailty, or reduced physical function (6).

Nutritional screening tools identify risk through indicators such as weight loss, low BMI, and reduced dietary intake. While clinically important, this approach may overlook food-system factors that influence protein inadequacy.

Historically, many traditional diets achieved adequate protein through diversified plant sources pulses, legumes, seeds, fermented grain-legume combinations, and region-specific preparations often optimized through culinary methods that improve digestibility. Nutritional transition has contributed to the displacement of these protein-rich foods by refined carbohydrates and ultra-processed products, reducing both protein quality and dietary diversity.

Addressing PEM effectively therefore requires more than supplementation or isolated protein targets. A sustainable approach integrates clinical screening with restoration of diverse, culturally appropriate, whole-food protein sources and preparation techniques that support digestibility and adherence.

2.2 Supplementation Paradigm

The supplementation paradigm has become increasingly central in geriatric nutrition due to age-associated risks of micronutrient deficiency and the clinical emphasis on measurable correction.Commonly targeted nutrients include vitamin D (bone health and muscle function), vitamin B12 (neurological function), calcium (bone integrity), and iron (anaemia), among others (7). Supplementation is often necessary and evidence-based when deficiency is confirmed or when risk

is high due to malabsorption, restricted diets, limited sun exposure, or chronic illness.

At the same time, the expanding role of supplements must be considered within broader food-system transitions. As traditional diets based on biodiversity and seasonal variety are displaced by standardized staples and ultra-processed foods, dietary diversity diminishes, increasing the likelihood of nutrient gaps (8) In such contexts, supplements and fortified products may function as substitutes for lost dietary diversity rather than adjuncts to a nutrient-rich diet.

This shift carries practical and ethical concerns. Over-reliance on commercial supplements can reinforce dependence on nutraceutical industries and may be financially burdensome, especially for older adults and marginalized communities. It can also divert attention from structural interventions that would rebuild food-based nutrient adequacy: revitalizing local food systems, improving access to traditional foods, and strengthening community-level dietary diversity.

A balanced geriatric nutrition approach recognizes supplements as supportive tools when clinically indicated, while prioritizing "food-first" strategies that restore dietary diversity and culturally coherent nutrient sources.

2.2 Limitations in Indigenous Contexts

Age-related Functional Constraints: Mobility limitations, chronic illness, dental problems, and sensory decline may reduce elder's ability to gather, cultivate, or prepare traditional foods without community support.

These limitations indicate that revitalization of Indigenous food systems cannot rely on cultural appeal alone. It requires structural policy support land and biodiversity protection, community food infrastructure, and participatory health strategies that recognize Indigenous knowledge as a legitimate Although Indigenous food systems and traditional ecological knowledge can offer strong foundations for healthy ageing, their application in present-day geriatric nutrition is constrained by intersecting structural, environmental, and institutional barriers.

Structural and Environmental Barriers**:** Land dispossession, ecological degradation, industrial agriculture, and climate change have reduced access to ancestral lands and threatened biodiversity. Declines in native crop availability

and restricted access to wild foods directly weaken dietary diversity and food sovereignty (9).

Socio-Economic Marginalization: Poverty, limited infrastructure, and inadequate healthcare access reduce the ability of older adults in Indigenous settings to obtain diverse, nutrient-rich foods. Market dependency may increase reliance on cheap, shelf-stable, low-nutrient products.

Erosion of Intergenerational Knowledge: Migration, modernization, and reduced engagement with traditional livelihoods disrupt the transmission of ecological and culinary knowledge. As younger generations become less connected to seasonal calendars, preparation techniques, and medicinal food practices, dietary continuity weakens.

Health System Biases: Standardized biomedical models frequently dominate policy and service delivery, often undervaluing culturally grounded food practices. This misalignment can reduce acceptability and relevance of interventions.Age-related Functional Constraints: Mobility limitations, chronic illness, dental problems, and sensory decline may reduce elders' ability to gather, cultivate, or prepare traditional foods without community support.These limitations indicate that revitalization of Indigenous food systems cannot rely on cultural appeal alone. It requires structural policy support land and biodiversity protection, community food infrastructure, and participatory health strategies that recognize Indigenous knowledge as a legitimate and necessary component of sustainable geriatric nutrition.

3 Indigenous Ecological Knowledge and Food Systems

Indigenous ecological knowledge reflects cumulative understanding developed through long-term relationships with specific landscapes and ecosystems. It encompasses cultivation methods, seed preservation, soil and water stewardship, wild food identification, medicinal plant knowledge, and food preparation practices.Unlike industrial food systems that fragment production and consumption, Indigenous food systems often operate as integrated socio-ecological networks in which nourishment, culture, health, and land stewardship are inseparable.

Indigenous food systems are frequently multifunctional supporting food, medicine, social cohesion, and cultural identity. Their organizing principles

emphasize reciprocity, respect for ecological limits, and attentiveness to natural cycles. Such systems align closely with the principles of sustainable diets outlined by FAO, which emphasize nutritional adequacy, biodiversity, cultural acceptability, and ecological sustainability (10).

Mahua flowers (Madhuca longifolia) are a traditional forest food collected by Indigenous communities in India. They are naturally sweet and used in porridges, sweets, and fermented foods. Mahua provides energy and nutrients, making it useful for older adults with reduced appetite. Its sustainable harvesting reflects Indigenous food wisdom and supports biodiversity and culturally appropriate diets for ageing populations.

From a nutritional standpoint, Indigenous dietary patterns often support dietary diversity and nutrient density. Traditional grains, pulses, seeds, wild greens, and seasonal produce supply fibre, micronutrients, and phytochemicals that contribute to metabolic regulation. Preparation methods such as soaking, sprouting, fermentation, and slow cooking can improve nutrient bioavailability and digestive tolerance particularly relevant for older adults whose digestion and absorption are compromised.

An example of fermentation is ragi ambli**,** a traditional fermented porridge made from finger millet by Indigenous communities in South India. Fermentation enhances nutrient bioavailability, digestibility, and probiotic benefits**,** making it suitable for older adults. This practice reflects Indigenous food wisdom and sustainable use of local grains**,** supporting culturally appropriate diets for ageing populations.

Beyond nutritional biology, Indigenous food systems carry deep social and cultural meaning. Food practices are embedded in rituals, communal labour, and intergenerational knowledge transmission. Elders often serve as custodians of seasonal calendars, seed selection, preservation techniques, and therapeutic culinary practices. This participation supports psychosocial well-being by reinforcing identity, belonging, and purpose dimensions increasingly recognized as important for healthy ageing.

In the context of nutritional transition, the displacement of Indigenous food systems reduces dietary diversity and contributes to increasing dependency on commercial market foods. Revitalizing Indigenous ecological knowledge within

geriatric nutrition therefore represents both a public health strategy and a pathway to cultural and ecological resilience.

3.1 Sustainable Diets

The concept of "sustainable diets" emerged from recognition that human health and planetary health are interdependent. Sustainable diets are those that promote nutritional adequacy while protecting biodiversity, ecosystems, and future food security (11). For decades, global policy and agricultural development emphasized caloric sufficiency and yield maximization, often at the expense of agro-ecological diversity. The consequences include soil degradation, biodiversity loss, dietary homogenization, and increased vulnerability to climate shocks.

The HLPE has emphasized that nutrition outcomes are shaped by food systems and that sustainable dietary patterns require interventions across production, processing, distribution, and consumption (12). Food-system change has contributed to both undernutrition and diet-related NCDs, illustrating that more calories does not necessarily mean better nutrition.

Indigenous food systems frequently exemplify sustainable diet principles. Biodiversity-rich cultivation patterns polyculture, crop rotation, mixed farming enhances ecological resilience and dietary diversity. Dietary diversity is a strong predictor of micronutrient adequacy and overall diet quality (13). For ageing populations, biodiversity-based diets offer protective nutrients (e.g., antioxidants, fibre, micronutrients) that can help counter oxidative stress and inflammation associated with ageing (14).



Figure 2: Social and Cultural Benefits of Seasonal Eating (Source: Author generated)

Sustainable diets also intersect with livelihoods. Supporting local crops and traditional grains can strengthen local economies and reduce dependency on volatile market supply chains. In many contexts, revitalization of traditional grains such as millets has been promoted for both nutritional and climate-resilience benefits (15). For older adults, improved access to locally produced, culturally familiar foods can enhance dietary adherence and strengthen food sovereignty.

Thus, sustainable diets provide a framework that integrates metabolic health, cultural continuity, and environmental stewardship central goals in decolonial approaches to geriatric nutrition.

3.2 Seasonal and cyclic eating

Seasonal and cyclic eating refers to aligning consumption with the natural availability of foods across seasons, thereby reflecting ecological rhythms in dietary practice. Seasonal foods harvested at peak maturity are often more nutrient-denser, fresher, and less dependent on long storage and transport. Seasonal variety also promotes dietary diversity across the year, which can improve micronutrient adequacy (16).

For older adults, seasonal and cyclic eating offers several physiological benefits. Variation in plant intake introduces diverse fibres and phytochemicals that support gut microbiome diversity which is an important factor as microbial

diversity tends to decline with age and is linked to inflammatory burden (17). Seasonal diets may also be better aligned with climate-related bodily demands. Traditional practices often emphasize warm, cooked, easily digestible foods in colder months and lighter, hydrating foods during warmer periods, thereby reducing digestive strain for older adults with slower gastrointestinal function.

Seasonal eating has social and cultural benefits as well. Seasonal harvesting, communal cooking, and preservation practices foster social interaction, reduce isolation, and reinforce cultural continuity. For elders, participation in seasonal food practices can strengthen identity, support intergenerational exchange, and enhance psychological well-being. Seasonal and cyclic eating therefore functions as a holistic nutritional strategy that links food quality and diversity with ecological awareness and cultural resilience.

3.3 Fermentation and Gut Health

Fermentation is a traditional method of food processing and preservation involving beneficial microorganisms that transform raw ingredients into foods with enhanced nutritional and functional properties.

Ageing is associated with gastrointestinal changes and alterations in gut microbiota composition, including reduced microbial diversity and increased susceptibility to inflammation and infection (18). These changes can contribute to constipation, impaired nutrient absorption, and chronic low-grade inflammatory states.

Fermented foods can support gut health by introducing beneficial microbes and metabolites that promote microbial balance and intestinal barrier integrity. Fermentation can increase bioavailability of nutrients by reducing anti-nutritional factors such as phytates and enhancing certain vitamins, including B vitamins. For older adults with compromised absorption or reduced dietary intake, these properties are particularly valuable.Traditional fermented foods such as cultured dairy products, fermented batters, and fermented vegetables represent culturally embedded strategies that can complement modern clinical objectives without requiring expensive supplements. While supplements may be clinically useful in some cases (19), fermentation offers a food-based approach that integrates microbial support into ordinary diets.

Given growing evidence linking gut health to immune function, inflammation regulation, and potentially cognitive and emotional well-being, fermented foods can be positioned as a culturally grounded and scientifically consistent component of sustainable geriatric nutrition.

3.4 Wild and Forest Food

Wild and forest foods include edible plants, fruits, seeds, tubers, mushrooms, and other foods gathered from natural ecosystems. These foods contribute substantially to dietary diversity and are often rich in micronutrients, fibre, and bioactive compounds. Biodiversity-based diets are associated with improved diet quality and micronutrient adequacy (20). For older adults, wild foods can support metabolic and immune health by providing antioxidants and phytochemicals that counter oxidative stress and inflammation processes closely linked to ageing (21). Wild leafy greens often contain higher micronutrient concentrations than many cultivated varieties. Forest fruits provide polyphenols that support vascular and metabolic health.Wild foods also carry cultural significance. Knowledge of seasonal harvesting, plant identification, and sustainable gathering is often held by elders and transmitted through practice. This reinforces elder's social roles and strengthens intergenerational continuity.

However, access to wild and forest foods is increasingly threatened by deforestation, land dispossession, environmental degradation, and climate change (22). Reduced access can accelerate dependence on market foods and ultra-processed products, undermining food sovereignty and dietary resilience. Protecting ecological territories and community access rights is therefore integral to preserving both biodiversity and culturally grounded nutrition strategies.

4. Nutritional Transition and Its Impact on Indigenous Elders

The nutritional transition has profoundly reshaped dietary patterns in Indigenous and rural communities, with marked implications for older populations. Ultra-processed foods formulations largely derived from refined substances and additives have become increasingly accessible across diverse geographies, including previously remote regions (23). These products are typically high in added sugars, sodium, unhealthy fats, and energy density, while low in fibre, micronutrients, and protective phytochemicals. Their rising

consumption is strongly associated with diet-related non-communicable diseases (NCDs), including obesity, type 2 diabetes, and cardiovascular disorders (24).

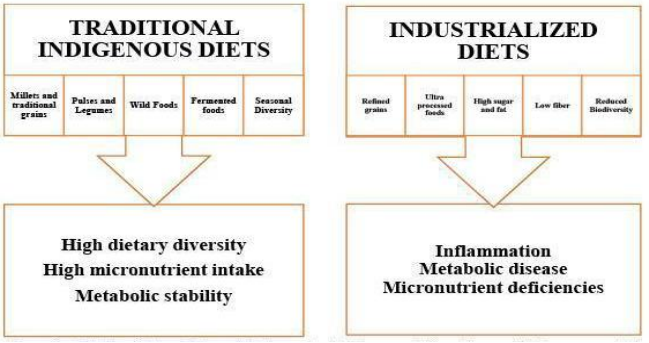


Figure 3: Nutritional Transition and its Impact on Indigenous Elders (Source: Author generated)

For Indigenous elders, the health effects of this transition are compounded by age-related metabolic vulnerability. Reduced insulin sensitivity, altered lipid metabolism, and chronic low-grade inflammation increase susceptibility to diet-induced metabolic dysfunction. Inflammaging a state of persistent, low-grade systemic inflammation associated with ageing may be exacerbated by dietary patterns high in ultra-processed foods and low in fibre and plant diversity (25). Consequently, older adults in transitioning food environments may experience a convergence of sarcopenia, obesity, hypertension, and glucose dysregulation.

Importantly, the nutritional transition also undermines food sovereignty. As traditional grains, pulses, wild foods, and fermented preparations are replaced by purchased, packaged foods, communities lose control over food production and distribution (26). For elders with limited income, dependency on market foods increases vulnerability to price volatility and supply chain disruptions. Economic precarity may further restrict access to fresh, nutrient-dense foods, reinforcing reliance on inexpensive, shelf-stable products.

Cultural consequences accompany metabolic changes. Traditional meals historically functioned as sites of communal gathering, ritual practice, and intergenerational exchange. Their erosion disrupts cultural continuity and may diminish elders' roles in knowledge transmission. The displacement of labour-intensive preparation methods with ready-to-eat products can marginalize elders' culinary expertise, weakening psychosocial well-being.

The impact of nutritional transition on Indigenous elders therefore extends beyond biochemical markers. It represents a structural shift that intersects with land rights, ecological degradation, economic marginalization, and cultural fragmentation. Addressing these effects requires systemic interventions that re-centre biodiversity, local food production, and culturally meaningful eating practices alongside clinical nutrition strategies.

5. Elders as Custodians of Knowledge

In many Indigenous and traditional societies, elders occupy central positions as custodians of ecological, agricultural, and culinary knowledge. Their expertise is derived from lived experience and long-term engagement with specific ecosystems. This knowledge includes seasonal planting cycles, seed preservation practices, wild food identification, medicinal plant use, and preparation methods that enhance digestibility and nutrient bioavailability.

Intergenerational transmission of such knowledge is foundational to food sovereignty and dietary continuity. Through storytelling, shared labour, ritual participation, and everyday meal preparation, elders convey ecological principles that sustain biodiversity and community resilience. Disruptions to these exchanges through urban migration, modernization, or institutionalization risk permanent loss of ecological memory.

Gendered dimensions are particularly significant. In many contexts, older women act as seed keepers and guardians of fermentation and preservation techniques. These practices contribute directly to dietary diversity and food security. Recognition of women's knowledge systems is essential for equitable and culturally responsive nutrition policy.

Elder's roles also have psychosocial implications. Active participation in food systems whether through gardening, seed saving, or culinary instruction supports purpose, dignity, and social engagement. Psychological well-being is closely linked to physical health outcomes in ageing populations. Conversely, marginalization of elders from food production and decision-making processes may exacerbate social isolation and reduce perceived social value.

From a decolonial perspective, repositioning elders as active knowledge holders rather than passive care recipients is central to transforming geriatric nutrition frameworks. Their ecological literacy offers insights into biodiversity

conservation, sustainable harvesting, and dietary adaptation to climatic variability issues of increasing relevance in the context of global environmental change (27).

Strengthening elder's roles in community food systems thus contributes not only to cultural preservation but also to metabolic health and ecological sustainability.

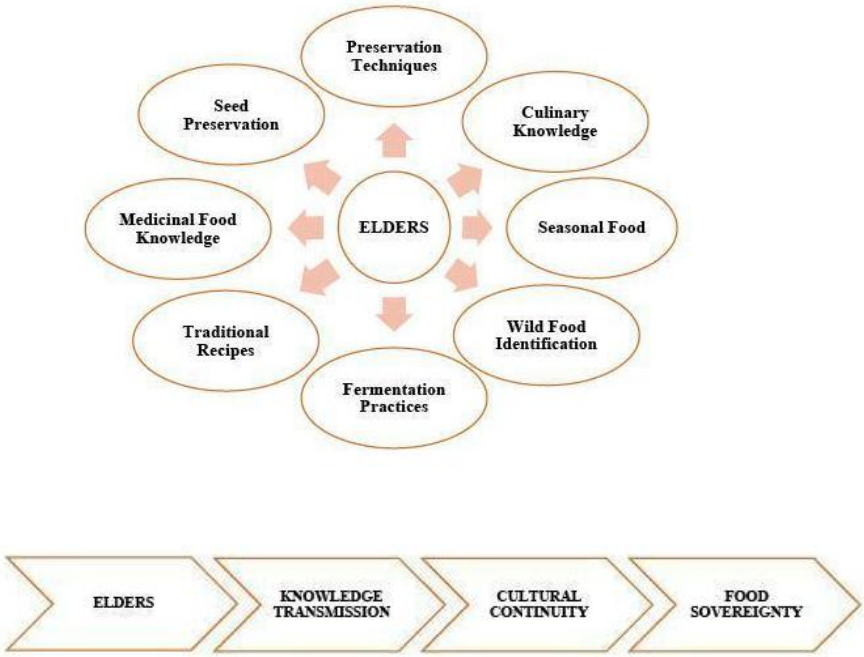


Figure 4: Role of Elders in Sustaining Indigenous Food Systems (Source: Author generated)

6. Decolonial Framework for Sustainable Geriatric Nutrition

A decolonial framework for sustainable geriatric nutrition seeks to address structural inequities embedded within food systems and knowledge hierarchies. Decolonial scholarship emphasizes that coloniality persists through enduring power relations that shape land access, agricultural policy, and epistemic legitimacy (28). Within nutrition science, this can manifest as privileging

standardized biomedical dietary models while marginalizing Indigenous ecological knowledge.

Central to a decolonial framework is food sovereignty the right of peoples to define their own food systems, prioritize culturally appropriate crops, and control modes of production and distribution. For ageing populations, food sovereignty restores access to familiar, biodiverse diets and strengthens autonomy in food-related decision-making.

Ecological stewardship constitutes another pillar. Biodiversity-based agriculture enhances resilience to climate variability and reduces reliance on external inputs. Sustainable diets those with low environmental impact and high nutritional quality are integral to long-term food security. By integrating traditional crops, seasonal diversity, and fermentation practices, geriatric nutrition strategies can support both planetary and human health.

A decolonial framework also calls for epistemic integration. Biomedical research on protein requirements, micronutrient adequacy, and disease prevention remains valuable. However, it must be contextualized within culturally grounded food practices and ecological realities. Rather than positioning supplementation as a primary solution, interventions should prioritize rebuilding dietary diversity and strengthening local food systems.

Policy implications include protection of Indigenous land rights, support for agro-ecological farming, investment in community food infrastructure, and inclusion of elders in participatory decision-making processes. Such reforms shift the focus from reactive supplementation toward structural transformation.

Ultimately, a decolonial approach reframes geriatric nutrition as relational. Health outcomes are linked to land stewardship, cultural continuity, and community autonomy. This perspective aligns metabolic resilience with social justice and ecological balance.

7. Policy and Practice Recommendations

7.1 Integrating Indigenous Foods in Elderly Welfare Schemes

Public nutrition programs targeting older adults often rely on standardized staples or fortified processed foods. Incorporating traditional grains (e.g., millets),

region-specific pulses, seasonal vegetables, and fermented foods can enhance nutrient density and cultural familiarity. Procurement policies that prioritize smallholder and Indigenous producers strengthen local economies and biodiversity conservation (29). Culturally aligned meals may improve dietary adherence and appetite among elders experiencing anorexia of ageing.

7.2 Community-Based Nutrition Models

Community kitchens, intergenerational cooking initiatives, home gardens, and seed-sharing networks can improve access to fresh, diverse foods while reducing social isolation. Engagement in cultivation and preparation supports physical activity and reinforces psychosocial well-being. Such initiatives exemplify food sovereignty in practice and create supportive environments for healthy ageing.

7.3 Participatory Research Approaches

Participatory methodologies involving elders and community stakeholders in research design and implementation ensure that nutrition interventions are culturally grounded and contextually relevant. Collaborative documentation of seasonal food calendars, wild food species, and fermentation practices can inform locally adapted dietary guidelines. Integrating community knowledge with biomedical evidence strengthens intervention sustainability and ethical accountability.

Conclusion

Healthy ageing cannot be fully addressed through reductionist nutrient-based models alone. While biomedical interventions remain important for deficiency correction and disease management, they are insufficient to address structural drivers of dietary change and metabolic vulnerability.

Reclaiming Indigenous food systems through a decolonial framework offers a pathway toward sustainable and justice-oriented geriatric nutrition. By foregrounding food sovereignty, ecological stewardship, and intergenerational knowledge transmission, societies can promote ageing trajectories characterized by dignity, autonomy, and resilience.

Integration not opposition defines this approach. Biomedical evidence regarding protein needs, micronutrient adequacy, and disease prevention must

coexist with biodiversity-rich, seasonal, and culturally meaningful dietary systems. Such integration enhances not only lifespan but health span, aligning individual well-being with planetary sustainability.

In this vision, geriatric nutrition becomes a relational practice linking metabolism to land, culture to health, and longevity to ecological continuity. By centering epistemic justice and structural reform, ageing can be reimagined as a phase of sustained contribution, cultural continuity, and collective well-being.

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Chapter 53: National Urban Policy in Cameroon and International Governance Instruments for Cities: Between Strategic Challenges and Osmotic Imperatives for Sustainability

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Abstract

The analyses proposed in this article aims to highlight the extent to which Sustainable Development Goal (SDG) 11, the 2036 Agenda, and SDG 13 are considered in Cameroon's national urban policy. It is anticipated that the formulation of the national urban policy takes only minimal account of the aforementioned international urban governance instruments. The research approach was primarily analytical, based on documentary analysis. This approach allowed for the updating of information related to these international instruments and the national urban policy. It then involved defining the index to be used to evaluate the compliance of the national policy concerning the considered international instruments. The results showed that Cameroon's national urban policy scores an index of 0.62 regarding SDG 11, an index of 0.54 concerning the 2036 Agenda, and an index of 0.66 regarding SDG 13. This corresponds overall to a moderate degree of consideration of these international instruments by the national urban policy. Urban space governance thus remains insufficiently inclusive of transnational normative frameworks for urban planning and construction. The national urban governance policy should be revised and corrected for better alignment, a decrease in slum conditions in Cameroonian cities, and the achievement of the objectives of international sustainable urban development agendas.

Keywords: Urban Governance, Urban Policy, Cameroon, SDG 11, SDG 13, Agenda 2036

Introduction

The global urban population is constantly growing, which gives cities a major

role in economic development and in addressing the environmental problems that threaten humanity's survival. Projections indicate that the urban population in Africa will triple between 2010 and 2050, reaching 1.3 billion people. In West Africa, for instance, the urban population is expected to be approximately 84 million people by 2050. For Central Africa, this estimate is about 185.9 million people (UN-Habitat, 2010). The urban situation in countries south of the Sahara is marked by a prevalence of slums with numerous consequences. The governance landscape for cities presents a rather problematic image, notably with the institutional vagueness that often misguides the actual political orientations in urban construction. It is even tempting to generalize the current context as one of "governance without government" (Rosenau & Czempiel, 1992), given the diffuse centers of responsibility. This diversification has the effect of diluting the centrality of resources (expertise, material, and financial) in this governance, as well as the logical decision-making systems regarding urban construction. This article specifically targets three primary international instruments, whose integration into urban governance policies could provide more clarity on the trajectory of African cities.

I. Background

The foundation of the questioning around the congruence of national urban governance tools in relation to international tools derives from a stark observation by the International Monetary Fund (IMF) (2000) which stated: "Despite commitments made at the Earth Summit in Rio in 1992, less than half of the countries in the world have adopted strategies, and even fewer countries have implemented them." Cameroon is not particularly different in this regard; however, it expresses the desire to reach this point, considering some legislative and programmatic choices, but to what extent? Analyses often postulate that the trajectory is toward sustainable urban development. Nonetheless, amidst the "euphoria of modernity myths" (Latouche, 2004: 78), researchers often too readily posit a rationalization of urban governance and, consequently, sustainable development. Yet, the situation of African cities is still far from reflecting the ideals of modernity.

In East Africa, for example, a significant portion of the population lives in slums and precarious housing, as in Madagascar where the estimate is at 78%, 79.1% in Ethiopia, and 54.8% in Kenya. This widespread precariousness in African cities hinders access to basic urban services, notably in cities like Porto-Novo, Malabo, Ouagadougou, and Niamey in West Africa, which have low access rates to running water (UN-Habitat, 2014). In addition to the problem of

urban slum development in African cities, climate change vulnerability must be considered.

Indeed, according to the work of Reinert (2015) on climate change challenges in the South, particularly in the Sahel region, an increase in temperatures of about 1.5°C has been observed since 1950, followed by a drastic decline in precipitation during the 1970-1980 decade. This extended drought period affected not only the Sahelian countries but also those in more humid climates. Furthermore, research by Servat et al. (1998) for West and Central Africa during the period from 1950 to 1980 highlighted a significant and widespread decrease in annual rainfall across non-Sahelian West and Central Africa. This situation has led to a resurgence of extreme weather events in African cities, particularly heavy rains and floods in Kinshasa, Malabo, Lagos, Kano, Niamey, and Luanda, as well as severe heat waves in N'Djamena, Maroua, and Garoua (UN-Habitat, 2014).

Cameroon is no exception, characterized by rapid, unchecked urban population growth. The urbanization rate rose from 28.5% in 1976 to 37.8% in 1987, 48.8% in 2005, 52% in 2010, and 54% in 2014. This corresponds to an annual spatial growth rate of cities estimated at 5%, significantly above the African average of 3.2%, and an annual growth of slums where 67% of the urban population resides, estimated at 5.5% (UN-Habitat, 2007; 2015; 2016). Consequently, 21% of the population still relies on unimproved sources for drinking water, and only 25% of the Cameroonian population has a tap at home. Moreover, 33% of this population still uses unimproved sanitation facilities, and 5% defecate in the open (Cameroun National Institute of Statistics, 2020). Concerning vulnerability to climate change, reports from the National Observatory on Climate Change (ONACC, 2020) indicate the reality of climate changes in Cameroon. Similarly, Servat et al. (1998) noted a rainfall deficit of 16% in the Cameroonian territory. In the face of these common problems, cities must coordinate their actions globally with a compass that directs and harmonizes their strategies.

In this regard, the 2030 Agenda was adopted at the end of 2015, replacing the Millennium Development Goals (MDGs), followed by the 2036 Agenda for cities in 2016. The 2030 Agenda, which came into force in 2016, consists of 17 Sustainable Development Goals (SDGs), two of which are particularly relevant to this article: SDG 11 for safe, inclusive, resilient, and sustainable cities and communities, and SDG 13 to combat climate change. In conjunction with the third World Habitat Conference held in Quito, the 2036 Agenda was adopted, thereby establishing the New Urban Agenda (NUA).

The global situation regarding the implementation of these goals is such that the number of countries with local risk reduction strategies has increased from 51 in 2015 to 98 in 2021. Solid waste collection stands at 82%, with 55% managed in controlled facilities. However, around one billion people live in slums, and in sub-Saharan Africa, less than a third of urban dwellers have access to public transport, while 99% of the global urban population breathes polluted air (United Nations, 2022). Furthermore, more than half of the indicators for SDG 11 in 2023 were far from being achieved (UN-Habitat, 2023).

According to the UN's 2020 Sustainable Development Report, 2019 was the second hottest year on record, and by 2100, temperatures are expected to rise by 3.2%. The 2022 report reminds us that a warming of approximately 2°C will completely eliminate coral reefs, with sea levels projected to rise by 30 to 60 cm by 2100, alongside a 40% increase in climate disasters by 2030 compared to 2015 levels. Moreover, drought is expected to displace around 700 million people by 2030. In 2021, greenhouse gas emissions from energy increased by 6%, reaching the highest level ever recorded (United Nations, 2020, 2022).

The 2036 Agenda, also known as the New Urban Agenda, was designed in a global context marked by the adoption of the UN program for sustainable development (2030 Agenda), the Paris Agreement on climate change, and especially in the context of unprecedented rapid urbanization. Hence, the city is no longer perceived merely as the cause of environmental problems but as the appropriate space for implementing sustainable development. This is provided that such urbanization is well-planned and controlled. Cities should henceforth be viewed as engines of sustainable economic growth, social and cultural development, and environmental protection (UN, 2016).

These programs constitute international instruments of urban governance in this article. To effectively address the urban problems identified within its territory, Cameroon has established a national urban policy. Given the common and pressing nature of the human and environmental problems induced by the chaotic growth of cities, along with the global challenges posed by climate change, this chapter aims to assess the adequacy of Cameroon's national urban policy to the aforementioned international urban governance instruments. It is posited that the level of alignment of Cameroon's national urban policy with these international instruments is low and requires revision and alignment. The interest in studying such a topic is multifaceted. On one hand, globally, the results of the study will contribute to facilitating the achievement of the objectives of the international programs targeted by the study, and on the other, to the reduction of slum conditions in Cameroonian cities.

II. Methodology

This research work straddles urban geography, urban sociology, and international relations. International relations are filled with facts occurring on the international stage or within the international community. Several approaches were used, including analytical description and documentary research.

II.1. Analytical Description

The analytical description allowed for the deconstruction of the studied theme to highlight its constituent elements and guide the analysis. It thus became possible to provide content to the international instruments of urban governance. Subsequently, the content elements of these tools and the national urban policy were meticulously analyzed to identify the most significant constituents that could explain, understand, and compare them. In this case, these constituents include the vision, objectives, pillars, guiding principles, strategic axes, and targets of the examined national tools and international instruments.

II.2. Data Analysis

After analyzing the documents, the examination of the adequacy of the national urban policy to the international urban governance instruments followed several steps. Initially, it was necessary to develop the logical frameworks specific to the national urban policy and to each instrument based on their objectives, principles, pillars, axes, or targets stated above. In a second phase, the index meant for evaluation was developed. Given that the various instruments are not uniform, the following formula is adapted to each of them, specifically for SDG 11, the 2036 Agenda, and then SDG 13.

From the logical frameworks of each instrument, a coefficient strictly equal to one (1) was assigned to each target or objective, depending on the instrument considered and the dimensions of those targets or objectives. In carrying out the evaluation, there were several scenarios:

- When the target consists of a single dimension, and the analyzed national urban policy is fully compliant with it, the coefficient 1 is assigned.
- When the target includes two dimensions and the analyzed national urban policy complies with only one of the dimensions, a coefficient of 0.5 is assigned.
- When the target includes three dimensions and the analyzed national urban policy complies with one or two dimensions, coefficients of 0.33 or 0.66 are assigned.

- When the target consists of four dimensions and the studied national urban policy is compliant with only one dimension, a coefficient of 0.25 is assigned.
- When the target includes six dimensions and the studied national urban policy complies with only one dimension, a coefficient of 0.16 is assigned.

The coefficients obtained were added and divided by the total number of targets or objectives each time. The quotient obtained from this division serves as the index that reflects the level of adequacy, consideration, or compliance of the studied national urban policy with respect to the international urban governance instruments. According to the value of the quotient, this level of compliance is deemed low, medium, or high (see Table 1).

Index Formula

$$I = \frac{CC1 + CC2 + \cdots CCn}{N}$$

- I: Compliance analysis index (SDG 11, 2036 Agenda, and SDG 13)
- CC: Coefficient of the target or objective
- N: Total number of targets or objectives

Table 1: Interpretation Range of the Index

Value of the Index	Value Judgment
[0 - 0.5[	Poorly considered
[0.5 – 0.75[	Moderately considered
[0.75 – 1]	Strongly considered

Source: Authors, 2026

III. Findings

III.1. Development of Logical Frameworks for the National Urban Policy

The pillars and guiding principles are the key elements of the national urban policy that were used to design the logical framework.

III.1.1. Designing the Logical Framework of the National Urban Policy

The pillars mentioned here are also referred to as the Five Ps of sustainable development: planet, people, prosperity, peace, and partnership. In the analyzed document, the objective of protecting natural resources and the planet's climate for present and future generations is assigned to the pillar "planet." The objective

of ending poverty and hunger in all their forms and ensuring dignity and equality is assigned to the pillar "people." The pillar "prosperity" aims to ensure a prosperous and fulfilling life. The pillars "peace" and "partnership" have no specific objectives. However, each of these pillars is equipped with recommendations that have been considered as indicators in the logical framework (see Table 2).

There are six guiding principles, including the geographic principle of territorial equity, the principle of ecosystem preservation, the principle of social equity, the principle of economic foresight, the political principle of territorial autonomy, and the principle of sustainable management of satellite cities, new cities, border cities, and port cities. The objectives to be achieved within the framework of these principles are considered as indicators in the designed logical framework (see Table 3).

Pillars	Objectives	Recommendations
Planet	Protect natural resources and the climate of our planet for present and future generations	Reduce urban sprawl
		Allocate land reserves for future generations and open spaces for current generations
		Establish a coherent sewage network
		Promote sustainable mobility
		Continuously monitor climate dynamics
		Monitor greenhouse gas emissions
		Preserve and restore ecosystems
People	End poverty and hunger in all forms and ensure dignity and equality	Provide cities with human capital to combat poverty
		Establish local public service
		Promote access to decent housing
		Control land use
Prosperity	Ensure a prosperous and fulfilling life	Integrate energy efficiency in urban construction
		Promote sustainable, smart, green, and climate-resilient cities
		Mandate planning in all state decision-making spheres and decentralized territorial communities
		Create a national database enabling spatial integration of key urban development and spatial planning databases
		Transform Cameroonian cities into circular economy cities in waste management
Peace	Adopt sustainable development as the	Harmonize urban planning laws with orientation laws for sustainable territorial development

Pillars	Objectives	Recommendations
	foundation for emergence	Adapt the urban policy to local realities by integrating ancestral urban institutions into governance
		Establish participatory tools for public involvement in decision-making processes
Partnership	Use decentralized cooperation as a tool for acquiring skills, including mobilizing the diaspora	Be resilient and respond to disaster prevention and management, health crises, and displaced persons due to conflicts

Table 2: The Pillars of the National Urban Policy Source: Authors, 2026

Guiding Principles	Global Objective	Specific Objectives
Geographic principle of territorial equity	Encourage solidarity between rural and urban areas and fight against poverty	Implement concrete actions to combat social inequalities, fostering solidarity towards the most disadvantaged
Principle of ecosystem preservation	Adopt healthy lifestyles	Promote sustainable consumption and production patterns
	Reinforce urban resilience	Reduce disaster risks
	Mitigate and adapt to climate change	
Principle of social equity	Adopt social diversity manifested by harmonious and peaceful cohabitation of different social strata	Combat urban social segregation
Principle of economic foresight	Be economically dynamic, inclusive, and non-polluting	Play the role of a driver of local development
	Produce to reduce various forms of inequality	
Political principle of territorial autonomy	Grant certain financial autonomy to municipalities	
Principle of sustainable management of satellite cities, new cities, border cities, and port cities	Identify satellite cities	Design a special program for the construction of new cities, implementing appropriate governance approaches for large cities associated with satellite cities
	Establish an appropriate governance approach for border cities	Pay particular attention to port cities

Table 3: Guiding Principles of the National Urban Policy Source: Authors, 2026

III.1.2. Logical Framework of SDG 11

Targets	Dimensions of Targets
11.1	Access to adequate and affordable housing
	Access to basic services that are adequate and affordable
	Sanitation
11.2	Access to safe and affordable transport systems
	Improve road safety
	Development of public transport
11.3	Take vulnerable groups into account
	Strengthen sustainable urbanization
	Enhance capacities for participatory, integrated, and sustainable planning and management of human settlements
11.4	Strengthen efforts to protect and preserve world cultural and natural heritage
11.5	Reduce the number of people killed and the number affected by disasters
	Decrease economic losses
	Protect the poor and vulnerable from disasters
11.6	Reduce the per capita environmental impact of cities
11.7	Ensure access for all, especially for women and children, the elderly, and persons with disabilities, to safe green and public spaces
11.a	Promote positive economic, social, and environmental links between urban and peri-urban areas
	Enhance national and regional development planning
11.b	Increase the number of cities and human settlements adopting and implementing integrated policies and action plans aimed at inclusion, resource efficiency, climate change adaptation and mitigation, and disaster resilience

Targets	Dimensions of Targets
	Develop and implement, in accordance with the Sendai Framework for Disaster Risk Reduction (2015-2030), comprehensive disaster risk management at all levels

This is one of the Sustainable Development Goals included in the 2030 Agenda adopted by the United Nations at the end of 2015 and effective from 2016. This objective 11 is dedicated to cities and human settlements, which must be inclusive, safe, resilient, and sustainable by 2030. It consists of 10 targets to be achieved. For this analysis, the last target (11.c), which aims to help least developed countries to be resilient, has not been considered (see Table 4).*Source: Authors, 2026*

III.1.3. Logical Framework of the 2036 Agenda

The third United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in 2016 in Ecuador resulted in the Quito Declaration. This Declaration provides a set of guidelines for global urban development aimed at 2036. The analysis of the objective to fulfill territorial functions beyond administrative boundaries is only considered for the analysis of urban development plans (see Table 5).

Objectives	Specific Objectives
Fulfill their social function	Ensure the right to adequate housing
	Ensure access for all to quality public goods and services
	Ensure access for all to affordable drinking water and safe sanitation facilities
Ensure the inclusion of all	Promote civic participation
	Give a high priority to the presence of quality safe green spaces and public areas that are open and accessible
	Foster intergenerational exchanges
	Promote cultural expressions and political participation
	Promote social cohesion
	Pay special attention to the needs of vulnerable groups
Ensure gender equality and empower all women and girls	Ensure the full and effective participation of women and girls and equal rights in all areas
	Ensure decent work and equal pay for equal work for all women
	Prevent and eliminate all forms of discrimination, violence, and harassment against women and girls in public and private spaces
Meet the challenges and opportunities associated with sustainable, inclusive, and viable economic growth	Promote structural transformations and a high level of productivity through urbanization
	Promote energy efficiency
	Support the viable transition of informal economies to formal economies
Fulfill territorial functions beyond administrative boundaries	Fulfill territorial functions beyond administrative boundaries
Promote planning and investments that take age and gender equality into account	Provide all with viable, safe, and accessible urban mobility means
	Establish resource-efficient passenger and freight transport systems

Objectives	Specific Objectives
	Effectively connect people, places, goods, services, and economic opportunities
Adopt and implement disaster risk reduction and management measures	Reduce vulnerability
	Strengthen resilience and adaptation capacities to disasters
	Foster climate change adaptation and mitigation
Protect, preserve, restore, and promote ecosystems, water resources, natural habitats, and biodiversity	Transition to sustainable production and consumption patterns
	Reduce environmental impacts

Table 5: Objectives of the 2036 Agenda*Source: Authors, 2026*

III.1.4. Logical Framework of SDG 13

The issue of climate change is addressed in the 2030 Agenda through SDG 13, which aims to urgently take measures to combat climate change and its impacts. This is accomplished through four targets (see Table 6).

Targets	Dimensions of the Targets
13.1	Strengthen resilience to climate-related hazards in all countries
	Enhance adaptive capacities to climate-related risks and natural disasters
13.2	Integrate climate change measures into national policies, strategies, and planning
13.3	Improve education, awareness, and individual and institutional capacities regarding climate change adaptation, mitigation, and impacts, as well as early warning systems

Table 6: Dimensions of SDG 13*Source: Authors, 2025*

III.2. Evaluation of the National Urban Policy in line with International Urban Governance Instruments

The implementation of urban policy in Cameroon reveals the immense challenges that still need to be addressed in connection with the SDGs.

III.2.1. National Urban Policy in Relation to SDG 11

The evaluation of the extent to which SDG 11 is considered in the national urban policy yields a score of 0.62, corresponding to a medium level of consideration according to the evaluation framework established (see Table 7). The national

urban policy should have included a set of additional objectives for better incorporation of SDG 11. For example, it could have included a target aimed at facilitating access to urban basic services and facilities, which is extremely important for the thriving of urban populations. Additionally, it should have planned measures to ensure easy access, particularly for women, children, and persons with reduced mobility, to green spaces and other safe, inclusive leisure areas. Furthermore, this access should extend to all public services. The national urban policy should have also anticipated measures to promote interculturality and the preservation of the cultural heritage of peoples, especially given that Cameroon is a country with a great cultural diversity that deserves to be framed, preserved, and considered a tourist asset, as well as a guarantee of stability and economic growth. The work of Esoh Elamé (2016) on intercultural cities would be a major asset for a better consideration of interculturality in urban areas. Finally, it should aim to establish positive links between urban and sub-urban areas and plan for a disaster management strategy in accordance with the Sendai Framework.

Targets	Dimensions of the Targets	Total Coefficient Assignable	Assigned Coefficient
11.1	Access to secure and affordable housing	1	0.66
	Access to affordable basic services		
	Sanitation		
11.2	Access to safe and affordable transport systems	1	1
	Improve road safety		
	Development of public transport		
	Consider vulnerable groups		
11.3	Strengthen sustainable urbanization	1	1
	Enhance participatory, integrated, and sustainable planning and management capacities of human settlements		
11.4	Strengthen efforts to protect and preserve world cultural and natural heritage	1	0
11.5	Reduce the number of deaths and affected individuals from disasters	1	1
	Reduce economic losses		
	Protect the poor and vulnerable from disasters		
11.6	Reduce the negative environmental impact of cities per capita	1	1
11.7	Ensure access for all, particularly for women and children, the elderly, and persons with disabilities, to safe green and public spaces	1	0
11.a	Promote positive economic, social, and environmental links	1	0.5

Targets	Dimensions of the Targets	Total Coefficient Assignable	Assigned Coefficient
	between urban and sub-urban areas		
	Strengthen national and regional development planning		
11.b	Increase the number of cities and human settlements adopting inclusive actions	1	0.5
	Increase the number of cities working towards rational resource use		
	Increase the number of cities working on adaptation to climate change impacts		
	Develop and implement disaster risk management in accordance with the Sendai Framework at all levels		
Score		**0.62**	

Table 7: Diagnosis of the National Urban Policy Relative to SDG 11*Source: Authors, 2025*

The Sendai Framework is a global agreement adopted at the third World Conference on Disaster Risk Reduction. This conference took place in 2015 in Sendai, Japan. The Sendai Framework aims to significantly reduce loss of life, economic damage, and social disruptions caused by natural disasters through 13 principles and seven global objectives.

III.2.2. National Urban Policy in Relation to the 2036 Agenda

In relation to the 2036 Agenda or NPV, Cameroon's national urban policy scores 0.54, corresponding to a medium level of consideration of this international instrument supposed to channel urban development worldwide (see Table 8).

Objectives	Specific Objectives	Total Coefficient Assignable	Assigned Coefficient
O1	Ensure the right to adequate housing	1	0.33
	Ensure access for all to quality public goods and services		
	Ensure access for all, at an affordable price, to safe drinking water and sanitation facilities		
O2	Promote civic participation	1	0.5
	Prioritize the presence of quality safe green spaces and accessible public areas for all		
	Foster intergenerational exchange		
	Promote cultural expressions and political participation		
	Promote social cohesion		
	Pay special attention to the needs of vulnerable groups		
O3	Guarantee the full and effective participation of women and girls and equality of rights in all areas	1	0
	Ensure decent work and equal pay for equal work for all women		
	Prevent and eliminate all forms of discrimination, violence, and harassment against women and girls in public and private spaces		
O4	Promote structural transformations and high productivity levels through urbanization	1	0.33
	Promote energy efficiency		
	Support viable transitions of informal economies to formal economies		
O5	Provide viable, safe, and accessible urban mobility options for all	1	0.66
	Establish resource-efficient passenger and freight transport systems		

Objectives	Specific Objectives	Total Coefficient Assignable	Assigned Coefficient
	Effectively connect people, places, goods, services, and economic opportunities		
O6	Reduce vulnerability	1	1
	Strengthen resilience and adaptation capacities to disasters		
	Promote climate change adaptation and mitigation		
O7	Transition to sustainable production and consumption methods	1	1
	Reduce environmental impacts		
Score		**0.54**	

Table 8: Evaluation of the National Urban Policy in Relation to the NPV*Source: Authors, 2026*

The Cameroonian policy could have included several other objectives to achieve a better score. This would involve ensuring everyone has access to basic urban services and facilities, prioritizing the creation of quality safe green spaces and other public areas that are open and accessible to all. It would also involve effectively connecting people, places, goods, services, and economic opportunities and promoting intergenerational exchanges. Additionally, it must guarantee the full and effective participation of women and girls and equality of rights in all areas, ensuring them decent work and equal pay for equal work. Finally, this policy would benefit from instruments to prevent and eliminate all forms of discrimination, violence, and harassment against them in public and private spaces.

III.2.3. National Urban Policy Evaluated in Relation to SDG 13

Finally, assessed against the challenges of climate change and specifically SDG 13, the national urban policy scores 0.66, which corresponds to a medium level of consideration for this tool (see Table 9). Indeed, the urban policy falls short due to the lack of a forecast regarding the improvement of education, awareness, and individual and institutional capacities concerning climate change adaptation, mitigation of its effects, and impact reduction, as well as early warning systems.

This deficiency limits the policy's effectiveness in addressing the urgent need for comprehensive climate strategies. Incorporating specific objectives focused on enhancing education and training related to climate issues would empower both individuals and institutions, fostering a more resilient urban environment capable of adapting to the impacts of climate change.

Targets	**Dimensions of the Targets**	**Total Coefficient Assignable**	**Assigned Coefficient**
13.1	Strengthen resilience to climate-related hazards	1	1
	Enhance adaptive capacities to climate-related risks and natural disasters		
13.2	Integrate climate change measures into national policies, strategies, and planning	1	1
13.3	Improve education, awareness, and individual capacities regarding climate change	1	0
	Improve institutional capacities regarding climate change		
Score		0.66	

Table 9: Analysis of the National Urban Policy in Relation to SDG 13 Source : Authors, 2026

IV. DISCUSSION

Through its rational goals, there is a close relationship between governance and sustainable urban development. This has become a "diplomatic and political credo" (Baudin, 2009: 61) in the XXIst century. It is brandished, like a scarecrow, at the poor performers in the international arena, struggling to domesticate the reformed model of social progress. From the outset, the governance of sustainable development is inspired by the necessity for a rationally marked cohesion among the components of sustainable development. Sustainable development embodies a variety of principles that underscore its centrality in the governance process (Baudin, 2009: 19). These include the precautionary principle, which works against the risks of irreversibility; the principle of prevention, which mobilizes

strategies aimed at avoiding problems rather than addressing them post facto; the principle of good governance, advocating for wisdom and reason in management; the principle of participation, which suggests the mobilization of stakeholders without exclusion to their full capabilities; the principle of solidarity; the principle of transparency; and the principle of viability.

According to Le Galès (2004), the paradigm of local governance is contingent, uncertain, non-standardized, and admits "a diversity of institutional solutions regarding collective action, social and political order, or economic regulation. This paradigm thus suggests the relativity of the nature and level of governance specific to each political unit. According to Lazzeri (2008), there is a tendency for its indicators and various instruments to be juxtaposed rather than truly integrating in a perfect osmosis. This disintegration inevitably leads to unsustainable trajectories of urban development.

It should however be observed that there exists a national urban policy in Cameroun. It is a document that was drafted based on an anticipated rigorous diagnosis of the urban issues facing Cameroonian cities. It is structured around a vision with two main objectives and several specific objectives. To address the problems highlighted by the preliminary diagnosis and to achieve the set vision and objectives, the Cameroonian urban policy has defined several pillars, guiding principles, and strategic axes, all broken down into measures, actions, and activities. The commitment to align the policy with international instruments like the United Nations 2030 Agenda, the African Union Agenda 2063, and the Quito Agenda 2036 reflects the Cameroonian government's intent to adapt the national urban policy to existing recommendations on the international stage.

However, the evaluation conducted in this study reveals a medium level of alignment of this policy with international urban governance instruments, specifically SDG 11, the 2036 Agenda, and SDG 13. Therefore, it is necessary to consider the additional objectives highlighted for better alignment of the studied national policy with the international instruments used as analytical references. This finding underscores the necessity for a deeper integration of the specific objectives articulated in the considered policy.

Also, it is realistic to observe that the country permanently bows to the urgency of the immediacy; a timeline that does not align with the ideal of sustainability. It is therefore necessary to work on a timeline for achieving these objectives that is clear and realistic. Working on the congruence of national calendar and

international deadlines will facilitate accountability and encourage various stakeholders to engage with keenness with urban development initiatives and policies. Monitoring and taking corrective measures is also expected to contribute to a better destiny of urban policy in Cameroon. Reinforcing educational initiatives on the challenges and needs of citizens and countries will help strengthening urban policies and make them more efficient. The presence of gaps indicates that while the policy aspires to align with these international standards, practical implementation may fall short.

Conclusion

The analysis of the compliance of the national urban policy with international urban governance instruments has been the focal point of this evaluative reflection. The methodological framework specifically facilitated the design of the compliance index used to assess the adequacy of the national urban policy concerning international governance instruments. Notably, the national urban policy presents an index of 0.62 concerning SDG 11, an index of 0.54 concerning the 2036 Agenda, and an index of 0.66 concerning SDG 13. These indices correspond to a medium level of alignment of the national urban policy with international urban governance instruments. For each of these instruments, a set of additional objectives that the national urban policy could have considered for better alignment has been formulated. Overall, the desired and necessary alignment of the Cameroonian national urban policy with the identified international instruments would be an effective means to achieve the de-slumification of Cameroonian cities at the local level and contribute to the attainment of the objectives of these international agendas by their deadlines.

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Chapter 54: Trauma, Eco-casteism and the Dalit Self: Mapping the Poetics of Resistance in Dalit Personal Narratives

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Abstract

A Dalit autobiography shines like a beacon of hope and protest. It acts as a full-fledged theory of the Dalit self that challenges the undemocratic forces of caste and politics. It is a polemic against the casteist permutation of the Indian society. Every Dalit narrative habours immense pain and unfathomable trauma caused by centuries of oppression. It chronicles the development of the Dalit consciousness that articulates the impact of caste on identity and occupation. In modern India, we witness the perpetual struggle of the Dalit community with the hegemonic forces of The Hindu social order. There are various factors like endogamy, spatial dominance and religion that are used in a systematic manner to dehumanize the lower castes and keep them at the edge of the civil sphere. Both independence and modern politics have failed to combat the curse of casteism and a Dalit narrative is an exemplification of this fact. Hence in this era of globalization, Dalits continue with their ideology that questions the stigmatized status of the community. Thus, a Dalit is not just an individual but an epoch that rings like a thunderous bell to mark the beginning of a new social order based on equality, fraternity and recovery of the dalit pride.

Keywords: Dali Self, Permutation, Trauma, Dehumaize, Equality, Dalit Pride.

Introduction

Trauma is caused by grave injuries which are psychological in nature because they wound the soul. Theoretically, trauma gets expressed through words that describe how these injuries were caused and who felt them. In India, we witness a peculiar civil sphere that gets distorted by the members of the upper caste whose ideology dominates and shapes every inch of this civil society. Caste conventions which form an integral part of this ideology are used in a strategic manner to

create rigid social hierarchies within the society where a Dalit occupies the lowest position. The word Dalit is of Marathi origin. It was coined by B.R. Ambedkar and it means broken or oppressed. As a community, Dalits face both physical and verbal abuse and suffer with a fractured identity. They also serve as a symbolic representation of trauma caused by social sufferings which are engineered by the Hindu social order that has the power to control the dynamics of the society. This Hindu social order strictly forbids the lower castes to dine or tie the nuptial knot with members of the upper caste. It also enforces laws that socially segregate our society by giving spatial dominance to the Brahmins who violently push the lower castes to the fringes of our civil shere. A Dalit autobiography tries to conceptualize these indescribable pain, injustice and compromises made by the Dalits in the form of a narrative that records their response as carrier groups who try to articulate their status as untouchables under .the shadow of the caste system.

Dalits as Carrier Groups: The term "Carrier groups" was popularized by the famous sociologist, Jeffrey C. Alexander. She develoed it as a concept within the purview of trauma theory. Technically speaking, trauma theory is an interdisciplinary area that explores responses and rehabilitation of victims with violent histories. It has two versions that have different implications in the academic circle. First, we have the psychoanalytical version where victims perceive traumatic experiences in an unconscious manner. In other words, truth gets repressed by various social fears that manifest in the form of shame and guilt. Next comes the enlightenment version where victims become carrier groups and respond in a clear and lucid way. They know that "trauma will be resolved not only by setting things right in the world, but also by setting things right in the self" which means healing. This healing starts through the "creation of literature" (Alexander 10,11) which appears in the form of testimonies, memoirs and autobiographies. In the case of Dalits, literature becomes a major tool as it enables them to write about their personal experiences in the form of an autobiography. It has been observed that in a Dalit autobiography, "what strikes the reader" is "the author's ability to narrate his story without sentimentality or hatred towards his tormentors" (Puri xv).

In the midst of social ostracization and existential threats, Dalit autobiographies continue to thrive and express "what this suffering is exactly, who delivered it, and who was on the receiving end-the answers to these question are not objectively known but established through a trauma process" (Alexander 1) where perpetrators are identified and victims are compensated. In these narratives we see a slow but steady emergence of voices that challenge the "strategic calculations" (Alexander 2) of the Hindu social order to exclude and

humiliate Dalits on the basis of caste that determines the contours of their population. A meticulous analysis of the existing social fabric of our civil society would make us realize that even in this era of globalization, Dalits continue to suffer discrimination that is heinous and generational in nature. Caste and politics go hand in hand to give rise to an "irreprisible caste system" (Kumar 115) that divides the Indian society into higher and lower castes. Such a division is highly unscientific as it completely subordinates the Dalits who struggle as outcastes with no protection and respect. This also means that they remain outside the social contract theory where an authority is always there to protect the rights of individuals.

Methodology: The current chapter attempts a close reading of Dalit autobiographies as a genre that aims to establish the Dalit self as a symbol of resilience whose identity continues to evolve in this age of digitalization. Many critics feel that such an aim makes them look like "accusatory narratives" (Alexander 2). Therefore, they get systematically neglected for their nonconformist approach towards life and society. According to Raj Kumar "one possible reason for this neglect could be the fact that these voices challenge the hegemony of the upper caste and make way for the assertion of the marginal self" (1). However, a growing interest among sensitive readers to explore this genre is seen as a positive sign as it assures significant social raparations for the Dalit self that has been marginalized and cast in a world whose meaning "is read in the alphabet of hunger and want" (Devi xxiv).The caste system that favours the interests of the upper caste Hindus in an explicit manner has always been a brutal agent because it percsecutes individuals on the basis of gender and caste. Stuffed with old values. it rages like a tsunami and attacks our social fabric by dividing it into layers with specific caste identities. This is something very alarming as it complicates the Indian society where everything is determined by sanctions of ancient scriptures whose "original metaphysical content" (Devy xiv) gets totally ignored by those who control the social sphere. Most Dalit autobiographies are a delineation of this particular assumption.

Discussion: Within the context of the Indian subcontinent, Dalits occupy the lowest position and their narratives are a subjective projection of shared experiences that reflect personal and collective trauma triggered by social exclusion and deprivation. With a nomenclature that includes various titles like ati-shudras, chandalas, harijans and the Scheduled Castes, Dalits continue to shuffle between the notions of purity and pollution. After independence, India emerged as a nation-state but this could hardly improve the existing status of the

Dalit community. This situation has been aptly described by Ramadev who observes:

> *Freedom came in 1947. A new constitution was adopted for the country. All Indians were assured of their fundamental rights. But let us ask our consciences if untouchability has been banished from the land. Does the faith that the diving spirit [Divine Spirit] resides in every human being guide us? Do we give every individual the respect that is due to all human beings? We will have to pay the price for our failure to achieve even this modicum of humaneness even after having become the citizens of a free country. (Choudhuri 150)*

It is this failure that prompts writers like Kamble, Pawar, Valmiki and Nimgade to strongly critique India's social eco-system where "emotional violence" that gets unleashed through "social exclusion and insult" is always "reserverd for Dalits" (Puri xv). These writers graphically mourn and document their violent histories through the help of memory. The caste system lingers on like a permanent feature of the Indian society that murders souls and "generate psychic deformations" that pass on "from generation to generation"(Schwab 3). Baby Kamble's *The Prisons We Broke* (2008) and Urmila Pawar's *The Weave of My Life* (2015) are two such memoirs where we encounter numerous episodes of the Mahar community that is "eternally stricken by poverty"(*Prisons We Broke* 7).

Kamble's narrative begins in a locality where tiny mud houses stood with walls that "were nothing but stones arranged vertically with some mud coating (*Prisons We Broke* 7). The dalits lived there like animals. Their day began with a cock's crow and the sound of a grinding stone that resonated like a machine in each house of the Mahar community. It was a society where women went out to work and children were left in open spaces where they played. There was nobody to look after them. Their weary mothers returned in the afternoon with their bodies soaked in sweat and throats that were parched and dry. Food was something that was always scarce in the Mahar household. There was no security and their place "was in the garbage pits outside the village, where everyone threw away their waste." That was where the entire community found solace in "poor huts, amidst all the filth!" (*Prisons We Broke* 7, 49). When it comes to Pawar, we find a similar kind of setting where "the Mahars could be summoned anytime by the upper castes, or could be attacked from all sides if anything went wrong. Their community could help in the preparations of festivals but were strictly forbidden to participate in them. They were also "made to dispose off dead animals" and eat

leftovers of food even on festive occasions" (*Weave of My Life* xvi-xvii). This situation has not changed much even after the abolition of untouchabilty because the caste system continues to perpetrate violence against the Dalit community in various ways. Thus, as Ghatak points out, Dalits remain permanently trapped in the web of "untouchability, community-based occupation" and "ghettoization." They have been "disempowered, stigmatized and isolated (with only some assigned roles of maintaining the excretory and cleaning the waste, filth, dirt, leftovers, stinks) in a degraded space (78-79) which is known as eco-casteism, a term that was coined by Mukul Sharma.

There are other Dalit writers like Om Prakash Valmiki and Namdeo Nimgade whose memoirs present similar experiences of trauma associated with "spatial marginality" (Mehretu et al). Nimgade's "earliest memory" in *In The Tiger's Shadow* (2010) takes us into the remote world of Satgaon, a village in the state of Maharashtra that was "500-and a universe away" from Mumbai. It was "surrounded by dense jungle with wild and dangerous animals." Around his community "were also life-giving rivers, but they often dried up in the tropical summers." To make matters worse, this bleak landscape "could change dramatically, from a rich green during monsoons, to dusty parched land during droughts that deprived" them "of food and water." There were no post office, hospitals or paved roads which made that locality "a primitive patch of land" (2,3). Then we also have the cast-ridden terrains in Valmiki's *Joothan* (2014) where Dalits gather like flies that are periodically crushed by the Brahmins. We find his childhood in a dingy locality of the chuhra basti where:

> *All the quarrels of the village locality would be discussed in the shape of a Round Table Conference…There was muck strewn everywhere. The stench was so overpowering that one would choke within a minute. The pigs wandering in narrow lanes, naked children, dogs, daily fights, this was the environment…If the people who call the caste system an ideal social arrangement had to live in this environment for a day or two, they would change their mind…(Joothan 1)*

Such heart-wrenching descriptions clearly show the dominance of caste as a phenomenon that constantly guards the interests of the upper caste Hindus. They exclude Dalits by locating them at the periphery where they are given a fixed status that socially immobilizes them. The Dalits live and work in a filthy environment and are compelled to scavenge and clean the localities owned by the upper caste Hindus. This eventually becomes their profession. They are considered as animals who spread pollution and are therefore considered as

untouchables. This practice of untouchability, as Mukherjee suggests, was also prevalent in the Aryan society. The Aryans labeled rebellious groups as chandalas. The Aryans punished these hostile groups by pushing them out of their villages and "for touching an Aryan woman a chandala was fined one hundred panas, and for adultery with her a shavapaca [untouchable] was sentenced to death." One was also forbidden to "touch, talk with or even to look at a chandala (41). A person who failed to observe this had to undrgo penance. But who were these Chandalas and why were they hostile.? The answer to this question is debatable because many scholars believe that these untouchables were the original inhabitants of the Indian subcontinent. They were defeated by the Aryans. This invasion also marks the beginning of the Vedic period. During this period, the society got divided into varnas –Brahmana, Kshatriya, Vaishya, Shudra and the ati-shudra. Each varna was given a specific duty which created a unique "cultural system" that placed the varnas in a hierarchical manner. This arrangement, as pointed out by Gould, was based "on the division of labour" and by "ranking all occupational behavior on a pollution scale" it provided 'the basis for the virtually unlimited permutation of Indian society into hereditary compartments" that performed "separate but interdependent religious and economic functions." thereby creating the caste system (68).

However, Gould's theory which involves religious and economic reasons behind the evolution of the caste system gets rejected by Dalit writers like Jagjivan Ram who feels that there were "political motives" (Kumar 120) responsible for the emergence of the caste system. Religious sanctions were there to legitimize them and so nothing could stop the Aryans from doing what they wanted to do. The observation made by him adds one more dimension to the existing debate on the evolution of the caste system and untouchabiity:

> *Colour-concious Aryan, who regarded themselves as culturally superior, were anxious to maintain the purity of their blood. Under the impact of these forces the trivarnic society became chaturvarnic, and the later split into a large number of castes and sub-castes within the framework of their fourfold systemof society. (10)*

This chaturvarnic society involved various caste laws that empowered the "so-called dwija society" (Kumar 121) or the first three varnas to impose restrictions on the shudras. This unjust practice has continued for centuries and still remains as one of the biggest challenges faced by the Indian society where power remains in the hands of the Savarnas. For Foucault, this power plays a decisive role in our society as it "forms knowledge" and produces a "discourse"

that legitimizes the disciplining of subjects who are deviants and lack knowledge(119). The caste system is a quintessential example of this principle as it gives power to the Savarnas to generate and process knowledge against the Shudras, the ati-shudras or the untouchables and women who were not allowed to use Sanskrit language. This was done to repress their power and give them a subservient position within the society. Among them, the untouchables or Dalits suffered the most because "only unskilled, unproductive, lowly and menial jobs were assigned to them" (Mukherjee 104). They had neither power nor knowledge and were compelled to internalize their subservient position at the periphery of our civilization.

Dalits became the victims of upper caste aggression. This aggression was conferred "civil legitimacy" by the caste system. So they were completely excluded from the civil society. The discursive construction of Dalits as agents of pollution has suppressed their "cultural capacity for identity reconstruction" (Alexander 136-137) within the civil society leading to individual, collective and transgenerational trauma among them. Dalits texts is an explication of this trauma process where bad memories "come in flashbacks or nightmares" and are put on pages as words for the world to read. Thus, writing helps, but as Schwab observes, "is not enough." It is "but a gentle nudge for those who struggle with the experience of living in today's violent world" which when analysed in the context of India, shows caste as something that remains deeply rooted in her social fabric. Hence, writing becomes a tool as it enables the "the translation of trauma"(6-7) into literature for the world to know, react, repair and punish the agents who caused it. For Schwab, this leads to healing which is one of the main concerns of trauma literature. Of course, there are other ways like Trauma-Focused Psychotherapy through which patients seek validation of their traumatic experiences, but writing remains as one of the favorite tools as it enables the victim to reach a wider audience.

Dalit literature falls within the trajectory of trauma studies. "The event of the development of Dalit literature," as pointed out by Prabhakaran Mande, "is not just a literary event" but something whose "significance will not be grasped…unless…seen from a sociological perspective against the entire background of the changes happening in society." (qtd. in Limbale 99). Under the shadow of the Hindu social order, Dalits continue to struugle with the stigma of caste that continues to evolve and impact our society in various ways. This undeniable loss of identity and pain of the Dalit soul gets projected through Valmiki who writes:

> *Putting these experiences on paper entailed all sorts of dangers. After a long period of procrastination, I started to write. Once again, I had to relive all those miseries, torments, neglects, admonitions. I suffered a deep mental anguish while writing this book. How terribly painful was this unraveling of myself, layer upon layer. Some people find this stuff unbelievable and exaggerated. (Joothan viii)*

This unraveling of the Dalit self is indeed very painful as it involves both physical and mental trauma that fracture the psyche of the Dalit body. This Dalit body is not just a cage of bones but an active playground where traumatic experiences get registered through physical abuse and spatial marginalization. A quick glance over Kamble's narrative makes us aware of a power structure that consolidates the caste system through various practices that expose the brahminical ideology. This ideology forbids a Dalit to touch members of the upper caste. Kamble recalls the words of the shopkeeper who tells his children to keep their distance from the "despicable Mahar woman" as her touch might contaminate them. She was his customer but this does not make any difference as her identity was enough to label her as an agent of pollution. This also involves an element of hypocrisy as the same shopkeeper would not mind touching her money kept on the threshold. Pawar narrates a similar incident of caste cruelty endured by the Mahar boys of her community during the Holi celebrations. The celebrations began with the Mahar boys carrying huge trees to the Shambhu temple where these heavy tree trunks were made to stand by them. It was a herculean task that got accomplished by the Mahar boys with a lot of perfection. They felt happy as they were allowed to touch the tree and perform "the real tough labour…But once the holi rituals" started, the same Mahar boys were ignored and kept away from the holy palanquin because of caste conventions that saw them as agents causing pollution by touch. Pawar question these double standard practiced by the members of the Maratha, Bhandari and Kulwadi castes through her text that battles against the cruelty of caste and untouchability. Regarding this cruel practice, Valmiki writes: "Untouchability was so rampant that while it was considered alright to touch dogs and cats or cows and buffaloes, if one happened to touch Chuhra, one got contaminated or polluted. The Chuhras were not seen as human. They were simply things for use, Their utility lasted until the work was done. Use them and then throw them away" (*Joothan* 2).

This attitude is symbolic of how a Dalit gets objectified and then abused in the name of caste that becomes responsible for the deplorable condition of a Dalit woman who gets doubly marginalised. This means that "for Dalit women

in India, caste and gender come together to create a specific and often crippling, level of oppression. Dalit women are marginalized by being placed at the bottom of the social scale through their caste status in addition to facing oppression as women in a patriarchial society"(Tariq). This means they not only suffer the wrath of their husbands as housewives, but also face discrimination as dalits at the hands of the dominating class. Pawar's memoir clearly portrays this picture as a "trauma discourse" (Degloma) where for every Dalit woman:

> *The day began very early…at four o'clock in the morning…[they] had to fetch water from the well for everybody in the house to bathe in, drink…then they cleaned the pots and plates used the previous night and cooked for the whole house. They breakfasted with the men folk and went with them to work in the field. They planted paddy till their backs broke…they returned home just half an hour earlier than their men. They lit the stove under an earthern pot which they had filled up in the morning to keep the hot bath water ready for their men..they began preparations for the evening meals…the men arrived, bathed and sat smoking…some of them drinking liquor. Women would again go to the well to fetch water, wash the muddied clothes…light the lamps and serve food to the men first…After the children went to sleep, they sat down and messaged the heads and feet of their husbands…By the time they lay down in bed, their beds will be bent like a bow…This was not an isolated picture…In addition, the woman had to behave as if she were a deaf and dumb creature. (Weave of My Life 246-47)*

This was their daily routine, and according to kancha Ilaish, was completely different from that of a Hindu upper caste woman who always had plenty of things and whose cooking took place "primarily in the name of God" (26). A Dalit woman was compelled to accept such arrangements and she had no power to complain. Hence "haunting, trauma, and mourning" become the cornerstones that shape her social framework within which her identity gets "constituted, destroyed and reconstructed" (Schwab 11) by the forces of brahminical hegemony and Dalit patriarchy. We see her constantly struggling with a mind that somehow keeps "on hoping against hope-that" she "too would be able to live like the upper castes"(*Prisons We Broke* 18). Unfortunately, this does not happen and she is left with a legacy of discriminationthat which is so traumatic and suffocating. Equally harrowing are the memories of Kamble who

takes us into the Maharwada where we witness the violation and torture of Dalit women:

> *In those days, at least one woman in a hundred would have her nose chopped off. You may well ask why' It's because of the sasu, who would poison her son's mind. These sasus ruined the lives of innocent women forever. Every day the Maharwada would resound with cries of hapless women in some house or the other. Husbands, flogging their wives as if they were beasts, would do so until the sticks broke with the effort. The heads of these women would break open, their backbones would be crushed, and some would collapse unconscious.(Prisons We Broke 98)*

This miserable existence also forms the traumatic core of Bama"s *Karukku* (2000) which is the first Dalit autobiography written in Tamil showcasing the double marginalization of Dalit women. Her narrative is a defiant attempt where we see a conscious use of "spoken Dalit Tamil" (Pandian132-133) that does not follow the standard rules of grammar prescribed by mainstream Tamil literature. Her writing also involves a certain amount of anonymity inorder to provide a larger picture of "various caste discriminations" (Kumar 233) in the Indian society. She mentions a nameless village where she lives with her family members whose names she does not mention. The members of the upper caste who torment her community are also pushed into the shadow of anonymity. This, according to Pandian, is a wonderful narrative strategy because it enables Bama to deliver a strong statement on caste discrimination which is universal in nature as it affects every inch of our society. She also evokes collective trauma by stating that the trauma experienced by her at the personal level gets meaning only when expressed through the shared experiences of her community.

Conclusion: Finally, we may focus on Dalit aesthetics where there is no place for sophistication. Through a close examination of Valmiki's *Joothan* (2003), we realize that the text is a linguistic terrain where there is free play of words and phrases used in the daily conversations of the Dalit community. They come in the form of abuses and curses arising out of the caste conventions that inflict silent psychological trauma and pain on the Dalit psyche: "They did not call us by our names. If a person were older, then he would be called 'Oe Chuhre.' If a person were younger or of the same age, then 'Abey Chuchre' was used." The children of the Tyagis would tease Valmiki and the boys of his community by calling them 'Chuchre ka…"(*Joothan*2-3). Sharankumar Limbale's classroom experience in *The Outcaste* (2003) shows how a Dalit's childhood gets shaped or rather fractured by words of humiliation and shame: "I remembered the hands of

high caste boys and girls offering us their leftovers, the withered tree in whose shade we sat, the bundle of leftovers, the questions my mother had asked, and the teacher calling me a son of a bitch and a beef eater…(4).These are not just words but wounds gleaned from the traumatic memories of a boy whose text is a "creative reworking and translation of (Schwab 4) casteist experiences and they hold the "agony" and trauma inflicted by his exploiters. The words used by him are harsh because they express his experiences, and transformation of his self. The life-story of Viramma, as pointed out by Kumar, is one more example where we see a deliberate attempt made by her to challenge the mainstream "Tamil usuage" of words that was popularized by the upper caste writers where slangs and swear words have no place. Her narrative that moves with the force of a whirlwind speaks about the commodification of the Dalit community whom she represents. As a writer:

> *She exercises her freedom, at times without any restraint. She frequently uses swear words, slangs and explicit language. She tries to justify the use of her language by saying that the meaning of a word depends on the context in which it has been used. There is yet another dimension why she uses such language. Subjected to all forms of oppression such as, caste, class and gender, Viramma, like other Dalit women in the country has been forced to remain silent for all these years. So when she gets a chance to speak, she speaks to her heart's content. Speaking in a particular way, perhaps, gives her pleasure; it is also her self-assertion. (Kumar 245)*

Significantly, it is this self-assertion that labels Dalit personal narratives as a project where we see the awakening of Dalit cuture. They strongly critique caste conventions that contruct identity and create compartments to traumatize Dalits. What makes these narratives so transitional is their unique "caste language" (Ilaiah 5) that challenges the mainstream literature in myriad ways. In them, we come across "subaltern intellectuals" who through theit trauma work demand " for civil repais in postcolonial societies" (Alexander 146). The spectrum of a Dalit autobiography is broad within which, as Arjun Dangle suggests, we realize that "Dalit is not a caste but realization and is related to the experiences, joys and sorrows , and struggles of those in the lowest stratum of society." (264-65). These are not just trauma narratives but an expression of Dalit ideology that is defiant and dedicated to the upliftment of the Dalit community where trauma remains as something that is shared by all. The victim remains intimately connected to the community and this becomes clear from the words of

Kamble who writes: “Well, I wrote about my community experience. The suffering of my people became my own suffering. Their experiences became mine. So I really find it very difficult to think of myself outside of my community(*Prisons We Broke* 136). Hence, we see the formation of a deep emotional bond amd it is through this bond that every Dalit protagonist codes, weights, amd narrates (Alexnder 35)trauma as an event that “one cannot simply leave behind” (Caruth 2)

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Chapter 55: Neuro-Urban Sovereignty: Bridging Indigenous Spatial Knowledge and AI Climate Systems in Marginalized Urban Settlements

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Abstract

This study investigates whether Indigenous cognitive mapping traditions can enhance climate prediction systems used in informal settlements in the Global South while challenging existing smart city approaches that rely on centralized control. The viewpoint integrates insights from neuroscience research on spatial cognition, documentation of Indigenous knowledge systems, climate adaptation case studies, and urban technology analysis, with particular attention to African and Asian settlements where traditional environmental knowledge continues to function despite increasing technological pressures. The analysis suggests that Indigenous communities process spatial and environmental information through relational, multi-generational frameworks that conventional algorithms often overlook. When community-owned digital tools translate these cognitive patterns into climate warning systems, prediction accuracy may improve because they incorporate long-term weather observations along with culturally embedded environmental signals. The study contributes originality by establishing a novel connection between neurocognitive research, Indigenous epistemology, and smart urban climate technologies. However, the proposed approach requires real-world testing and careful governance to ensure that Indigenous communities maintain full control over data and knowledge systems to safeguard their traditional practices. Practically, the framework offers city planners context-sensitive alternatives to universal technological models and helps technology designers understand how cultural context shapes the effectiveness of climate resilience systems. Socially, the approach supports technological sovereignty for marginalized communities while strengthening their capacity to adapt to climate risks.

Keywords: Indigenous spatial cognition, climate adaptation technologies, community data sovereignty, informal settlement resilience, cognitive urbanism

1. Introduction

Climate adaptation discussions worldwide have started to depend on technological solutionism which claims that sensor networks and predictive algorithms together with centralized data platforms will strengthen vulnerable populations' ability to cope with environmental disruptions. The belief is based on an epistemic contradiction because communities most vulnerable to climate change effects face1the most common exclusion from protection knowledge systems. In the extensive slums of Nairobi Dhaka Lagos and Manila millions experience daily flooding dangers without access to formal infrastructure because residents developed complex spatial knowledge that urban planners and AI developers do not recognize.

The default-mode assumption of the climate adaptation process for marginalized urban communities needs assessment because this review article studies this assumption. The communities in question possess advanced environmental monitoring and prediction skills which they have developed through their neurological capabilities and social distribution and empirical evidence. The core issue, in essence, is not the integration of 'smart' technologies into these spaces but rather the identification and articulation and incorporation of the cognitive technologies which already exist there.

The Neuro-Urban Sovereignty concept serves as a framework to examine the various intersections present in this situation. The framework establishes its foundation through three main assertions which state that 1. Indigenous and community-based knowledge systems of space and place function as complex environmental knowledge systems that exhibit different environmental understanding patterns 2. The current AI climatology models which fail to deliver accurate results because they lack essential components of human spatial reasoning that stems from local knowledge systems 3. The technological sovereignty of a community requires its members to control all aspects of their data and algorithm systems since this requirement functions as an essential condition for developing effective climate adaptation systems.

Research indicates that by 2050, more than 1.6 billion people will live in informal urban areas with most people located in climate-sensitive regions across Africa and Asia (Anwana & Owojori, 2023). The existing smart city development methods which already operate in established urban areas with maintained infrastructure have failed to implement their systems within these environments.

The cognitive tools that communities use for daily operations remain invisible to both the sensors and satellites that attempt to monitor urban danger signals.

1.1 Neurocognitive Foundations of Spatial Mapping

The dismissal of community-based environmental knowledge as "anecdotal" or "subjective" rests on a fundamental misunderstanding of how human spatial cognition operates. The human brain executes its most complex computational tasks through spatial mapping which enables people to navigate their environment while predicting and responding to its changing patterns. The discovery of place cells and grid cells and boundary cells in the hippocampal-entorhinal system demonstrated that the brain constructs detailed cognitive maps through continuous integration of sensory inputs and movement patterns and contextual cues.

The neural mapping systems function as active prediction systems because they do not operate as recording instruments that passively track information. The brain creates probabilistic models which describe how the environment will behave through all the experiences it has stored. A resident of an informal settlement observes water accumulation in a low area during heavy rain and uses animal behavior patterns to predict upcoming floods. The difference shows itself through two different levels of cognitive capacity because people face more complex environmental situations which have higher importance.

The study of expert spatial cognition demonstrates that repeated visits to the same location lead to precise development of neural pathways in the human brain. The residents of flood-prone informal settlements, who navigate micro-topographies, monitor drainage patterns, and track seasonal water behavior across years or generations, are engaging in precisely this form of expert spatial cognition (Anwana & Owojori, 2023).

The cognitive skills required for this task need to be distributed throughout all social networks. The concept of "distributed cognition" recognizes that intelligence exists in systems which combine human minds with their physical environment and operational activities. Community members conduct distributed environmental monitoring when they share their observations of rising water levels and discuss past flood areas and share their findings about soil saturation patterns.

The relational nature of this knowledge possesses critical importance. Community-based spatial knowledge combines different environmental signals

to create comprehensive risk assessments which differ from sensor data that only measures single variables at separate times. A resident might simultaneously consider soil permeability, proximity to drainage channels, the behavior of construction materials when wet, seasonal rainfall patterns, and the historical flood memory of the area. The brain's spatial mapping system evolved to perform this multi-modal integration which exists in its current form.

The neurocognitive perspective therefore transforms Indigenous and community-based spatial knowledge from its previous status as "traditional belief" into "embodied environmental computation." Humans use the same neural systems for reading landscape markers and interpreting animal behavior and determining flood patterns which they use for their spatial intelligence. AI climate systems need to determine the methods for formalizing and including advanced cognitive results into their decision-making processes instead of deciding whether to treat this knowledge as a cultural obligation.

1.2 The Failure of Top-Down Smart City Climate Models

As smart city projects spread across the world, cities that face climate change threats start to discuss technological solutions for their environmental challenges. The urban climate risks, which the systems denote as visible and measurable and controllable, get revealed through the combination of sensor networks and satellite imagery and predictive analytics and real-time monitoring dashboards. The operation of these systems in informal settlements has shown multiple instances of failure because their design only functions in specific environments which use entirely different knowledge systems.

The first failure involves the system's ability to maintain accurate spatial measurements. Climate models which smart city systems use as their foundation rely on three data sources: satellite images and municipal sensor data and official infrastructure data. The data sources for informal settlements which lack official street names and unregistered buildings and makeshift drainage systems only provide partial access to essential spatial data. The satellite image shows building density but the image cannot distinguish between buildings which use permeable foundations and buildings which use impermeable foundations and the image fails to identify the informal drainage systems which residents built and the image cannot detect the micro-topographies which control flood pathways.

The upcoming failure will only last for a limited time. Conventional climate models operate on timescales dictated by data collection cycles such as daily satellite passes and hourly sensor readings and seasonal model updates. The

community-based observations proceed according to human experience because they measure three-time intervals which include the instant people notice fast water rise and the current time people check which areas are flooded and the ongoing process of people deciding to move their things or leave their home.

The third failure is relational. Smart city systems typically assess risk through discrete variables such as rainfall intensity, elevation, and proximity to water bodies. However, flood risk in informal settlements is inherently relational: it relies on the interplay between soil composition and construction materials, between formal drainage infrastructures and informal channels, as well as between household locations and community warning networks. Research indicates that when residents are prompted to identify vulnerability indicators, they generate compact, locally relevant sets of metrics that encapsulate these social, material, and landscape relations indicators that formal models systematically exclude (Anwana & Owojori, 2023).

Most basic to the problem, smart city climate models fail because they treat communities as people who receive information instead of active partners in creating knowledge. The system needs data transfer, so sensors collect data, and algorithms analyze that data, and officials send out risk information to the community. The system fails to acknowledge that residents already participate in gathering data while they process the information through their complex thinking abilities and social interactions to make decisions based on their assessments.

Recent studies about climate adaptation technologies have started to identify their existing limitations. The research on Bangladesh's informal settlements demonstrates that community innovation and adaptation solutions through multi-tiered institutional systems provide superior results to simple technology transfer methods (Haque et al., 2024). The research about climate change perceptions in sub-Saharan Africa shows that improved agricultural technology transfer must occur to develop adaptive capacity because local knowledge integration is essential for successful technology implementation (Ayanlade et al., 2022).

The current smart city models which operate through top-down control systems lack effectiveness in addressing the needs of people who live in informal settlements. The situation exists as a fundamental disappearance of established scientific methods because it demonstrates how technological design still upholds colonial knowledge systems.

1.3 Indigenous Epistemology as a Data Source for AI

The process of redefining Indigenous and community-based knowledge systems as legitimate AI training data requires scientists to move beyond basic discussions about public consultation and participation to establish a new standard for training data authenticity. Climate models used in current artificial intelligence systems depend on data that scientists collect through their use of formal scientific equipment including satellite images and weather station data and hydrological systems and municipal infrastructure records. The training data contains knowledge systems which treat facts as objective and measurable while maintaining a position of independence from the observer that exists only within specific cultural contexts.

The Indigenous people view knowledge through their traditional knowledge systems which maintain that knowledge exists in specific contexts and Asian people who observe knowledge must remain present into their Native community. Knowledge systems of Indigenous people possess this feature as their strength because Indigenous knowledge systems demonstrate their ability to capture complex relationships between different contexts which scientific methods struggle to identify. A community member states that "water behaves differently in this area due to the soil type and the manner in which people have constructed their homes" which demonstrates his connection between earth sciences and water systems and social structures that standardized flood assessment methods cannot measure.

The main problem stems from the need to establish formal procedures which enable AI systems to process this knowledge that currently has substantial empirical support. Recent advancements in artificial intelligence and machine learning have commenced investigations into methodologies for embedding qualitative relational and narrative data within algorithmic frameworks. Knowledge graphs, which represent information through networks of interrelated elements instead of separate data points, offer effective methods to formalize Indigenous spatial knowledge systems.

The development of natural language processing and semantic analysis technologies enables AI systems to extract structured data from narrative texts. The historical flood accounts that community members share contain detailed information about the flood routes and their timing and their resulting effects and the methods that effectively addressed the situation. The researchers can analyze

these narratives to identify patterns and obtain geographical data and build forecasting models which will work together with the sensor data.

The creation of training data for AI systems requires Indigenous knowledge because its use creates problems related to data sovereignty and intellectual property rights. Indigenous knowledge should not be regarded as "raw data" awaiting extraction; it is the culmination of generations of observation, experimentation, and cultural transmission. Community ownership and governance should receive recognition in any framework developed for this knowledge integration into AI systems.

Research pertaining to climate adaptation within Indigenous settings has increasingly shown that traditional knowledge systems must be respected while they need to be combined with scientific methods. Investigations into ancestral agricultural practices in the Andes show that traditional techniques hold advanced knowledge about climate variability and soil management which modern agricultural science has yet to discover (Carrasco-Torrontegui et al., 2021). The research about ancient water harvesting technologies in India shows that traditional systems demonstrate better climate resilience and sustainability than modern infrastructure systems do (Jain et al., 2024).

For AI climate systems, this indicates the potential for a hybrid methodology which combines two methods through environmental sensor measurement systems and community observation data collection and through machine learning techniques which detect patterns in both numerical and descriptive data and through user-centered design methods which ensure database results match community risk assessment standards.

2.Case Study Patterns: Africa and Asia

The research study named "The Development of Indigenous Informatics: Case Studies from Chiapas, Mexico and Kenya" examines two representative examples which demonstrate how indigenous knowledge systems connect with educational methods and technological progress. The theoretical models which seek to improve Indigenous spatial understanding through Artificial Intelligence climate systems have received substantial validation from specific research studies which took place in Africa and Asia to study informal settlements that face increased danger from climate impact while their community-based adaptive methods were recorded.

The people who live in the dangerous flood zones of sub-Saharan Africa have developed an environmental monitoring system which uses ecological, hydrological, and sociological data for their environmental assessments. Community members are documented to meticulously monitor fluctuations in water levels within channels and rivers to observe alterations in riverbanks and to utilize low-lying microtopographies as proximate predictors of inundation (Anwana Owojori 2023). The organization gathers data through continuous activities which it uses to distribute information via its standard communication systems.

The indicators of vulnerability which come from soil and building material signals stand out as the most important information. The residents who lack official infrastructure use their flood risk assessment methods to study how precipitation affects different soil types and their ability to handle water and their status when wet. The researchers track how building materials change when they experience moisture-induced stress while using the data to assess how different materials perform in their construction work.

The South Asian region shows the same trends which exist in Bangladesh and India but those trends face added difficulties. Bangladesh residents who live in areas susceptible to flooding use semiotic signs from wildlife and natural environments to create informal early-warning systems which help them predict weather patterns and flooding events by monitoring changes in bird and insect and plant behavior (Haque et al. 2024). The biological indicators provide time-based information which shows upcoming condition changes that work together with the spatial information obtained through landscape analysis.

The process of analysis becomes more complicated when researchers need to identify both seasonal and weather patterns. The research shows that residents use their fixed mental frameworks about seasonal changes and rain patterns and flood periods to assess current information. People enter a state of increased awareness and preparedness when actual conditions deviate from their expected or standard patterns.

The body of knowledge exists beyond personal ownership because it circulates between households and through their social relationships and community organizations. The preservation of multi-generational memory holds great importance. The combination of oral traditions and historical flooding experiences offers contextual information about water accumulation areas and drainage speed and the effectiveness of previous flood control methods. Elders

possess deep environmental knowledge because their memories of past floods include events that happened before written records began.

The distinctions between sensor-based methodologies and these community-centric approaches become evident in these contexts. While the prevailing literature accentuates the notion of complementarity as opposed to disjunction, scholarly investigations reveal that communal knowledge encapsulates socio-material and micro-landscape interactions such as soil type, construction practices, and informal drainage systems that conventional mapping and modeling methodologies frequently overlook (Anwana & Owojori, 2023).

The research conducted on climate adaptation technologies in rural Cameroon provides new evidence which demonstrates the shortcomings of technology-focused methods. The research shows that information and communication technologies enable climate adaptation efforts but their success depends on how well they work with existing local knowledge systems and institutional frameworks (Fudjumdjum & Filho, 2025).

3. Technological Sovereignty and Community Data Ownership

The examination of Indigenous spatial knowledge integration into artificial intelligence climate systems reveals that power, ownership, and governance inquiries extend beyond design. The significance of Indigenous knowledge and spatial anchoring necessitates consideration: Should we? The creation of new knowledge systems should start from Indigenous knowledge and traditional Indigenous ways of life. The research needs to investigate ownership control and data access together with privacy and consent requirements as essential research areas.

The combination of Indigenous knowledge with artificial intelligence-based climate models leads to questions about who controls the knowledge systems that these models represent according to Horn 2020. The technological sovereignty concept establishes a framework to examine these technological governance challenges because it gives communities control over major technologies that shape their daily lives. The concept of technological sovereignty in climate adaptation requires organizations to abandon all their knowledge systems which include data infrastructure and algorithm and decision-making systems.

The extractive data models predominant among smart city initiatives and artificial intelligence climate programs present a potential problem which requires your assessment. External actors, including government entities, non-

governmental organizations, and technology corporations, are gathering community data to use in their private algorithms which produce risk assessments and early warnings and policy recommendations. The technological systems built for communities fail to recognize these communities as partners in their development because they only view them as data sources and service users.

The existing system faces challenges from technological sovereignty which empowers communities to control all aspects of their personal and environmental data. The concept exists beyond ethical boundaries because it functions as an essential need for successful climate adaptation efforts. The technologies which exist to protect communities become problematic when those communities do not possess control over these protective technologies because these systems will primarily reflect the needs and beliefs of their developers instead of meeting the requirements of their actual users.

The fundamental element of technological sovereignty depends on data ownership as its essential component. Our ability to own our spatial knowledge must be the starting point for understanding Neuro-Urban Sovereignty because it includes our right to share this knowledge and our right to observe our surroundings and evaluate potential dangers while maintaining our right to claim these observations and evaluations as intellectual property. Organizations must establish specific agreements to govern artificial intelligence platforms that use this knowledge which must describe data usage rights and access permissions as well as methods for distributing gained advantages.

Technological sovereignty represents more than ownership rights together with the community's power to run and control the algorithm. The Artificial Intelligence climate systems make critical choices about how to distribute resources which areas need to receive priority for intervention and which risks need to be addressed. The elite class has taken advantage of our economic resources and communal assets for more than forty years.

An increasing body of research focusing on climate change adaptation within Indigenous contexts demonstrates that Indigenous communities need to control their adaptation technologies. Passorted (2025) demonstrates that communal decision-making systems function most effectively when they create adaptation methods for research on Iranian pastoralist communities. The research Yu et al. (2024) conducted about agricultural adaptation in China showed that successful technology implementation needs to prioritize farmers' requirements.

Data cooperatives serve as one method through which technological sovereignty can be achieved. The data cooperative model enables community members to own and operate data infrastructure while using democratic processes to decide their data collection methods and data usage practices and data distribution methods. A local data cooperative would handle environmental observation data while establishing partnerships with AI developers to develop algorithms that meet community needs.

Another paradigm is the Indigenous data sovereignty movement, which has established protocols that govern Indigenous control over data collection methods and data ownership rights and data usage practices. The CARE Principles for Indigenous Data Governance Collective benefit, Authority to control, Responsibility, and Ethics provide a framework that applies to informal urban settlements.

4. Proposed Framework for Neuro-Urban Sovereignty

The theoretical foundations together with the empirical evidence which we have presented form the basis for our complete demonstration of Neuro-Urban Sovereignty which unites Indigenous spatial knowledge with AI climate systems through community ownership protection and adaptive capacity building and colonial knowledge system opposition. The framework functions through four connected dimensions which include epistemological methods and technical systems and institutional structures and political systems.

4.1 Epistemological Dimension: Recognizing Multiple Forms of Environmental Intelligence

The epistemological foundation of Neuro-Urban Sovereignty is the recognition that community-based spatial knowledge and formal scientific knowledge are different but co-equal forms of environmental intelligence. The system needs to remove its current structure which treats scientific knowledge as unbiased and universal while it considers Indigenous knowledge as limited and specific to regions. The framework shows that knowledge exists in specific contexts which people create through their distinct viewpoints and research techniques whereas different knowledge systems provide added understanding about intricate environmental systems.

4.2 Technical Dimension: Hybrid AI Architectures

The technical implementation of Neuro-Urban Sovereignty requires the creation of hybrid artificial intelligence systems which combine multiple data sources and multiple analytical methods. We propose the subsequent tri-layered architecture:

Community Observation Layer: The environmental monitoring network operates as a decentralized system which enables its members to conduct systematic observations through their mobile applications and participatory mapping and narrative documentation methods. This layer captures the relational and context-sensitive characteristics of space that sensors cannot, including soil behavior, material responses, patterns of animal usage, micro-topographies, and indicators of social vulnerability.

Sensor and Satellite Layer: The system uses traditional remote sensing methods together with on-site sensor networks which collect precise environmental data including rainfall measurements and temperature readings and water level data and information about land cover. The layer offers broad spatial coverage together with continuous time-based data but it fails to provide the detailed context which comes from community observation.

Integration and Learning Layer: The system uses machine learning to analyze combined data from community-generated sources and data obtained from sensors to find hidden patterns. The systems use knowledge graphs to show relationships between different entities while natural language processing enables them to extract structured information from written texts and their ensemble methods combine predictions from several models. The system operates through continuous feedback loops which include three main processes. The community observations help to improve the accuracy of algorithm predictions. The system tests algorithm outputs against actual community experiences. The process requires investigation when discrepancies occur because they require updating the model.

5. Institutional Dimension: Community Data Governance

The institutional framework for Neuro-Urban Sovereignty depends on community data governance structures which enable local communities to control their data collection processes and data usage rights and data benefit distribution methods. The proposed Community Climate Data Cooperatives will function as democratically governed organizations which operate as data owners to manage environmental data produced by their respective communities while establishing

agreements with outside parties and distributing data according to community needs and requirements.

5.1 Political Dimension: Challenging Knowledge Hierarchies

The political aspect of Neuro-Urban Sovereignty proves that technical and institutional changes fail to address the complete needs of community knowledge systems which face power distribution challenges. The solution needs three elements which include legal acknowledgment of community data rights and community capacity development for technical decision-making and informal settlement communities to work with data justice movements and climate adaptation policy changes which need to show actual community co-governance.

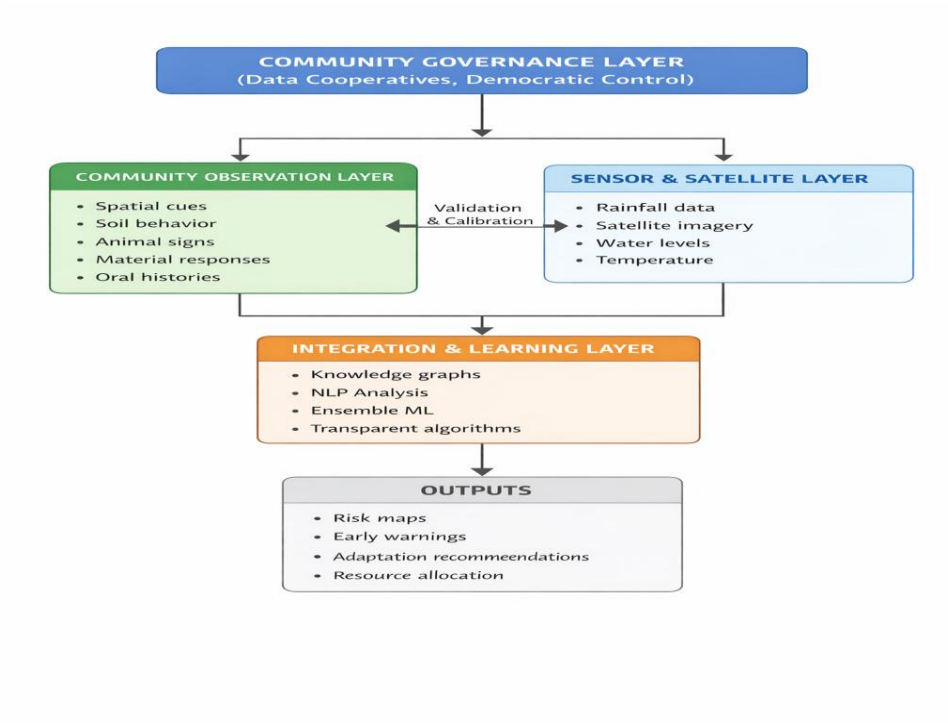


Figure 1: Neuro-Urban Sovereignty Framework Architecture

Source: Authors Creation

Figure 1: *The diagram displays the Neuro-Urban Sovereignty framework which consists of multiple architectural layers. Community governance structures (data cooperatives) at the top control the entire system through democratic decision-making. The middle layers display two active data sources which include*

community observations and traditional sensors that work together to verify their accuracy through continuous testing. The integration layer uses advanced AI techniques to synthesize these diverse data sources while maintaining transparency. The system produces outputs which directly reflect the priorities established by the community. The system operates through a non-hierarchical architecture which gives equal value to community knowledge and sensor data while community governance exercises control over the entire system.

6. Practical and Policy Implications

The implementation of Neuro-Urban Sovereignty creates major effects which extend to climate adaptation practices and urban planning activities and technological advancements and policy development at different levels of government.

6.1 For Urban Planning and Climate Adaptation Practice

Urban planners and climate scientists need to restructure their approaches to study informal settlements. Planners should recognize these communities as valuable environmental knowledge bases that possess advanced understanding and should not be seen as deficient in expertise and infrastructure. The process requires community members to take part in environmental risk assessment with local spatial knowledge and technical evaluation of hybrid infrastructure that supports existing community methods and technical capacity development which enables active participation in adaptation planning (Ricciardi et al., 2025).

6.2 For Technology Developers and AI Researchers

Artificial intelligence developers must move beyond data extraction methods because the Neuro-Urban Sovereignty framework requires them to develop systems which demonstrate multiple ways of knowing. The research requires researchers to develop new AI methods which enable machines to analyze both quantitative sensor information and qualitative relational narrative content. The research needs community members to take part in the design process from the beginning while designers should work with them as partners. The research requires system transparency through interpretable algorithms which allow auditing and community control through open-source development.

6.3 For Policy and Governance

The widespread application of Neuro-Urban Sovereignty requires policy changes that need to be established in three different government levels which exist at

local and national and international levels. The first requirement establishes legal recognition of community data rights through frameworks which support the principle of shared data ownership. The second requirement establishes new funding systems through which communities will control technological development to create dedicated resources for data cooperatives and their development. The third requirement establishes mandatory design processes that demand true community involvement for active design processes. The fourth requirement requires organizations to follow climate finance systems which support projects led by local communities (Haque et al., 2024).

Dimension	Top-Down Smart City Model	Neuro-Urban Sovereignty Model
Epistemology	Scientific knowledge as objective and universal; local knowledge as anecdotal	Multiple knowledge systems as co-equal; all knowledge as situated
Data Sources	Sensors, satellites, formal infrastructure data	Hybrid: sensors + community observations + oral histories + participatory mapping
Data Ownership	Government or corporate ownership; extractive model	Community ownership through data cooperatives; benefit-sharing agreements
Algorithmic Governance	Proprietary algorithms; opaque decision-making	Transparent, interpretable algorithms; community participation in design and oversight
Spatial Resolution	Macro-scale (satellite, municipal sensors)	Multi-scale: macro (satellite) + micro (community observation of soil, materials, topography)
Temporal Resolution	Periodic updates (daily, seasonal)	Continuous real-time observation + multi-generational memory
Risk Assessment	Discrete variables (elevation, rainfall, distance to water)	Relational integration (soil + materials + social networks + historical patterns)
Community Role	Passive recipients of information and services	Active knowledge producers and system co-governors
Validation	Technical accuracy against formal models	Effectiveness in community risk reduction; alignment with lived experience

Power Structure	Centralized (government/corporate control)	Distributed (community governance with external partnerships)

Table 1: Comparative Analysis of Climate Adaptation Paradigms

Table 1: This table demonstrates how the existing top-down smart city model for climate change solutions differs from the recommended Neuro-Urban Sovereignty framework through its assessment of fundamental aspects. The comparison reveals that the differences are not merely technical but epistemological and political. The smart city model treats communities as passive data sources and service recipients, relies on extractive data practices, and privileges formal scientific knowledge. The Neuro-Urban Sovereignty model establishes community data ownership while recognizing communities as active knowledge producers and system co-governors who treat all knowledge systems as equal. The two models establish different definitions of success because the smart city model focuses on technical performance metrics while Neuro-Urban Sovereignty prioritizes community-defined outcomes which include self-determination and climate justice.

7. Conclusion

This research paper proposes essential changes to how climate adaptation technology should be understood in urban areas which experience social and environmental disadvantages. The main system of smart city technology which uses sensors to operate from a centralized command center fails because it lacks technical capacity to detect the sophisticated environmental knowledge which local communities possess. Our redefinition of Indigenous and community-based spatial knowledge as brain-based knowledge which scientists have demonstrated to be essential for climate adaptation needs to be acknowledged as Neuro-Urban Sovereignty. This new model shows which coordinate knowledge creation with community rights as joint decision makers across operational processes.

The research findings presented in this document demonstrate that people living in informal settlements across Africa and Asia use complex sensory-based methods to predict and reduce flood threats. The practitioners use landscape indicators and soil and material observation and animal movement tracking and intergenerational environmental knowledge to conduct their work. The research demonstrates environmental intelligence which operates across distances and time periods that exceed the detection capabilities of sensor networks.

Neuro-Urban Sovereignty offers both a critical assessment and an innovative solution for urban governance. The contemporary climate systems of artificial intelligence systems maintain colonial epistemological hierarchies because they treat scientific knowledge as universal truth while disregarding Indigenous knowledge as mere anecdotal evidence. The research provides a framework that defines how hybrid artificial intelligence systems should integrate multiple environmental intelligence sources and community-driven data governance systems and political methods which serve to challenge existing power disparities.

The effects of the study extend beyond informal settlements to study how technology and knowledge and power relations interact during the climate emergency. Climate adaptation requires better results from science and policy processes according to the need for multiple knowledge systems to be acknowledged and included in the process. The statement does not mean scientists should stop using scientific methods because it recommends that scientists treat these methods as one kind of knowledge that has unique advantages and disadvantages.

Climate projections forecast that by the mid-21st century, billions of individuals will reside in informal urban settlements situated in climate-vulnerable regions. Current adaptation techniques do not provide complete solutions for this urgent requirement. The practice of funding centralized technological solutions which exclude local community expertise has proven to be both ineffective and unjust because it increases the marginalization of communities that suffer most from climate change while extracting their knowledge for outside purposes.

Neuro-Urban Sovereignty functions as a practical requirement that exists outside its depiction as an ideal society. The system combines established community methods with proven artificial intelligence technology while developing solutions that support both data justice and Indigenous rights movements. The system establishes two core functions which develop better climate adaptation methods that create fairer systems which empower communities instead of diminishing their control.

The residents of informal settlements actively work to solve their problems with climate risks through their use of advanced environmental intelligence tools. The main issue at hand requires institutions which include governmental bodies, research organizations, and technology developers to decide whether they will

recognize community intelligence and work together with communities or continue to impose solutions which derive from their own external priorities and assumptions. Neuro-Urban Sovereignty demands a complete shift in power structures which includes control over knowledge systems and technology to enable communities to govern themselves during the climate crisis.

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Chapter 56: State of Knowledge and Environmental Vulnerability to Malaria in Northern Cameroon

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Abstract

The endemicity of malaria in Northern Cameroon, particularly in the Benoué Division, has been the central issue of this study. It has been examined through the lens of the state of knowledge among the populations, as well as environmental vulnerability concerning this pathology. The objective was to shed light on this knowledge and the natural elements that make the populations vulnerable to malaria. The methodology consisted of an in-depth documentary review and a questionnaire survey among residents. The results obtained show that in Benoué, nearly 100% of the population has a good understanding of malaria, its mode of transmission, and prevention methods. The reflex is to resort to self-medication when fever occurs and to go to the hospital as a last resort when perceived malaria symptoms persist. The malaria risk map created reveals that the combination of several factors such as topography, rainfall, water bodies, and heat are the drivers of malaria endemicity in this geographical area. They should, therefore, be taken into account in the formulation of all strategies to combat malaria in this area.

Keywords: State of knowledge, environmental vulnerability, Northern Cameroon, malaria risk map, self-medication

Introduction

According to the 2025 World Malaria Report published by the WHO (World Health Organization), significant progress was made in 2024. It is estimated that over a million lives were saved in 2024, and the number of countries certified as malaria-free globally has risen to 47 plus one territory. Between 2000 and 2024, the number of countries reporting fewer than 1,000 cases

increased from 13 to 37, while those reporting fewer than 10 rose from four to 24 (WHO, 2025). The certification indicating exemption from malaria cases is awarded when a country or territory successfully proves that for three consecutive years, no cases of malaria have been recorded. These generally satisfactory results lend weight to the various prevention and control measures implemented, notably insecticide-treated nets (ITNs), seasonal malaria chemoprevention (SMC), perennial malaria chemoprevention (PMC), and rapid diagnostic tests (RDTs). However, some interannual disparities are hidden within these data. Indeed, between 2015 and 2024, there was an increase of 52 million malaria cases and 32,000 additional deaths (WHO, 2025). The African continent continues to be the most affected by this vector-borne pathology, with climate change exacerbating its spread.

In 2024, Africa recorded 94% of global malaria cases and 95% of global malaria deaths, with 75% of these deaths occurring among children under five years old. It is, therefore, logical that the 11 countries accounting for two-thirds of malaria cases and deaths are located on the African continent, as well as the five countries representing more than half of the recorded cases worldwide (WHO, 2025). Regarding deaths, the United Republic of Tanzania with 4.3%, Niger with 5.9%, the Democratic Republic of the Congo with 11.3%, and Nigeria with 30.9% accounted for just over half of the global deaths recorded in 2023 (WHO, 2024). It is estimated that in 2018, around 11 million women in Sub-Saharan Africa were at risk of contracting malaria. In Central and West Africa, for instance, there was a prevalence of 35% in each of these regions, and 20% in East Africa as well as in South Africa. Moreover, Nigeria alone concentrated 39% of this prevalence (Munan et al., 2020). Furthermore, each year, at least one million deaths among children under five years are linked to malaria (Mutombo et al., 2018). Thus, pregnant women and children under five years are the most vulnerable groups to malaria. Specifically regarding pregnant women, pregnancy causes changes in organ function, which affects the immune system, making them more susceptible to diseases like malaria (Essiben et al., 2016).

This situation is equally concerning in Cameroon, where malaria was the leading cause of consultations and hospitalizations in 2013 (MINEPAT, 2020). More than a decade later, the situation seems to be worsening as it remains the most prevalent pathology in the country, representing 50% of hospitalizations in health centers, compared to 46% in 2013. This proportion was 41% in 2008 and 38.38% in 2009. Consequently, it is responsible for the morbidity state, absence from work and school of nearly two million people each year (SMO, 2025).

Overall, there was a decline in cases nationwide between 2008 and 2010. Simple malaria cases had a proportion of 67.9% in 2008, 67.3% in 2009, and 66.25% in 2010. Among children aged five and older, the prevalence decreased from 33% in 2008 to 32% in 2009 and 30% in 2010. For children under five, it changed from 56% in 2008 to 54% in 2009, then remained at 54% in 2010. Finally, the proportions for pregnant women decreased from 49% in 2008 to 44% in 2009 and 38% in 2010 (PNLP, 2011). However, beginning in 2011, there was an increase, specifically to 76.51%, and in 2012, 77.06%. In the target group of children under five, there was a reduction in cases to 46% in 2011 and 40% in 2012. Among pregnant women, the decline was more significant, going from 13% in 2011 to 11% in 2012. In older children, the proportions were 26.64% in 2011 and 24% in 2012 (PNLP, 2013).

In Cameroon, the geo-climatic diversity influences the levels and seasons of malaria transmission across different regions (Vanhecke et al., 2014). Three epidemiological profiles are rightly distinguished: the forest zone where inoculation rates are very high, and transmission occurs continuously throughout the year; the plateau zone where transmission is seasonal (6 to 9 months), particularly during the rainy season; and the Soudano-Sahelian zone where there is short seasonal transmission (between 3 and 4 months) during the rainy season (INS & ICF, 2012). The Soudano-Sahelian zone is the area of interest for this article, specifically the Northern region, where transmission occurs during the rainy season, which lasts between 5 and 6 months. This region consistently remains one of the most endemic areas for malaria in Cameroon. Between 2008 and 2011, it was the only region nationally to exceed 35% of malaria morbidity (PNLP, 2013), illustrating the burden of malaria compared to other pathologies in this region. The aim of this research is to evaluate the state of knowledge of local populations on malaria and to highlight the environmental elements that favor a continuous increase in cases of this pathology. We posit that local populations have a good understanding of malaria and its prevention methods, on one hand, and that the water bodies existing within the Division, more numerous during the rainy season, as well as all climatic elements, are the environmental components that make populations vulnerable through an increase in larval habitats and consequently the rise in malaria cases.

Methodology

I. Localization of the Study Area

Our study is conducted in the Northern region of Cameroon, with the city of Garoua as its capital. It is located at an altitude of 249 meters between the 9°18'

North latitude and the 13°24' East longitude. Specifically, in the Benoué Division, which includes seven health districts (HD), namely Garoua I, Garoua II, Bibémi, Ngong, Pitoa, Gashiga, and Lagdo. It is also composed of 12 sub-divisions. This Division covers an area of 13,614 km², with an estimated population of 851,955 inhabitants. The climate is tropical of the Sudanian type, characterized by a hot and dry climate with a long dry season and a short rainy season. The Benoué River and numerous "Mayo" streams define the hydrography. The vegetation is characterized by savanna and its multiple variations (figure 1).

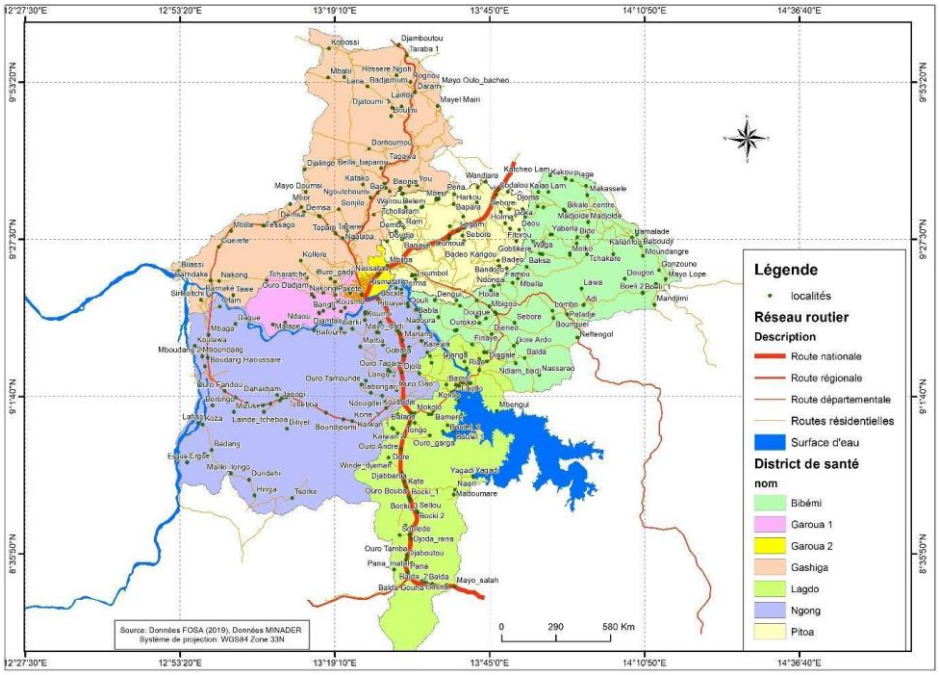


Figure 1 : Localization of the study area

I. Data Sources

The data concerning the natural environment are derived from a documentary analysis. The following climatic elements are considered: temperature, humidity, and precipitation, as these elements are likely to favor the development of anopheles mosquitoes and the parasite responsible for the disease. The socio-demographic data were obtained through a questionnaire survey administered to the population of the Benoué Division in October 2019. The socio-demographic survey consisted of categorizing the target population and assessing their habits for treating malaria cases, the quality of health services and care they receive, and the quality of access to this care. To do this, it is

essential to determine the sample size. For sampling, knowing that the total population N is estimated at nearly 851,955 inhabitants according to BUCREP in 2010, the proportion of population elements is $p = 0.5$, with a confidence level $s = 95%$, the coefficient of margin deduced from the confidence level $t = 1.96$, and finally the margin of error $e = 0.05$, all applicable to the following formula:

$$\boldsymbol{n}= \frac{t^2 N}{t^2+(2e)^2(N-1)}$$

Parameters Observed

- **N**: Total population
- **n**: Sample size
- **s**: Confidence level
- **t**: Margin coefficient derived from the confidence level
- **e**: Margin of error
- **p**: Proportion (known or assumed) of population elements

I. Creation of the Malaria Risk Map

The method for extracting areas likely at risk for malaria was based on the multi-criteria analysis (MCA) method through weighting of factors using cartographic software. MCA is a spatial model that relates a set of parameters, factors (slope, land use, hydrography, surface temperature, etc.), and existing constraints based on their influences and relevance in order to understand, analyze, and evaluate a specific phenomenon. Influence scales were used to assign the highest percentage to the physical factor with the most impact on the spread of female anopheles. We fixed these scales from 1 to 5 in increments of 1, meaning we assigned a coefficient of 5 to the factor with a strong influence and 1 to the factor with a weak influence. It is through this procedure that we identify areas likely to be vulnerable.

Results

I. Socio-demographic and Economic Characteristics

I.1. Socio-demographic Traits of the Study Population

In the questionnaire survey administered to a sample of the population in the Division, 166 women and 218 men responded (Table 1). The results of this survey reveal significant heterogeneity in terms of age, education level, and profession across genders. Indeed, consulting Table 23, we find that 73 of the

surveyed women are under 30 years old, 51 are between 30 and 39 years, 24 between 40 and 49 years, 16 between 50 and 59 years, and finally, 2 are 60 years and older. Among men, 57 are under 30 years old, 83 are between 30 and 39 years, 47 between 40 and 49 years, 22 between 50 and 59 years, and finally, 9 are 60 years and older. Overall, there were more male respondents than female respondents.

Table 1: Gender of Respondents According to Their Age Groups

		Age Groups					Total
		Less than 30 Years	30-39 years	40-49 years	50-59 years	60 years and more	
Sex	Female	73	51	24	16	2	166
	Male	57	83	47	22	9	218
Total		130	134	71	38	11	384

Source: Field Survey

Regarding the level of education (Table 2), among women, 19 have never been to school, 55 attended primary school, 81 reached secondary school, and 11 went to higher education. In contrast, among men, 18 have not received any education, 50 attended primary school, 121 reached secondary school, and 29 reached higher education. It is evident that from the secondary level onwards, the number of educated women decreases significantly. This situation can be explained by the phenomenon of early marriages, which are commonly practiced in the region.

Table 2: Gender of Respondents According to Their Levels of Education

		Levels of Education				Total
		No Level	Primary	Secondary	Higher Education	
Sex	Female	19	55	81	11	166

	Male	18	50	121	29	218
Total		37	105	202	40	384

Source: Field Survey

Regarding professions, we noted several categories among the respondents, and the distributions according to gender are as follows: 70 civil servants (12 women and 58 men), 55 farmers (18 women and 37 men), 127 traders (52 women and 81 men), 62 homemakers, 13 tailors (11 women), 4 secretaries (1 man), 10 drivers, 8 mechanics, and 4 electricians (all men), as well as 21 unemployed individuals (4 women) and finally, 4 hairdressers. It is evident that the profession with the highest number of respondents is that of traders (Table 3).

Table 3: Gender of Respondents According to Their Professions

		Sex		Total
		Female	Male	
Profession	Civil Servant	12	58	70
	Farmer	18	37	55
	Trader	52	81	133
	Housekeeper	62	0	62
	Tailor	11	2	13
	Secretary	3	1	4
	Driver	0	10	10
	Mechanic	0	8	8
	Electrician	0	4	4
	No Job	4	17	21
	Hairdresser	4	0	4

Total	166	218	384

Source: Field Survey

Next, regarding marital status, family size, place of residence, religion, and spoken language, it should be noted that 311 respondents are married, 57 are single, 5 are divorced, and 11 are widowed. Additionally, among the 384 responding families, 115 consist of fewer than 5 people, 199 consist of 5 to 9 people, 49 consist of 10 to 14 people, and finally, 21 families consist of 15 or more people. Most of these families live in rural areas, with 117 practicing Islam and 267 practicing Christianity. Finally, 18.50% of these families speak only French, 7% speak the local language, Fufuldé, and 74.50% speak both French and Fufuldé simultaneously.

I.2. Socioeconomic Characteristics

To characterize our surveyed population in this section, one of the variables was the sum of monthly expenditures. Here, it is notable that more than half of the respondents spend between 36,000 and 50,000 FCFA per month, while 27.30% spend between 50,000 and 100,000 FCFA, 12.80% spend between 100,000 and 150,000 FCFA, 4.40% spend between 150,000 and 200,000 FCFA, and finally, only 2.90% of respondents spend 200,000 FCFA or more per month. This situation suggests a very low standard of living for the population in the Division (Table 4)

Table 4: Monthly Expenditure of Respondents

		Frequency	Percentage
Monthly Expenditure	36000-50000	202	52,6
	50000-100000	105	27,3
	100000-150000	49	12,8
	150000-200000	17	4,4
	200000 and more	11	2,9

Source: Field Survey

Regarding monthly income, as could be expected from the information in the previous table, 40.90% of respondents report having an unstable monthly

income, which is nearly half of the surveyed population. Additionally, 29.40% claim to have a somewhat stable income, while 29.70% state that they have a stable monthly income. It can thus be concluded, as previously noted, that the standard of living for the population is low (Table 5).

Table 5: Income Stability of Respondents

		Frequency	Percentage
Stability of Revenues	unstable	157	40,9
	Some how stable	113	29,4
	Stable	114	29,7

Source: Field Survey

Regarding the possession of economically valuable assets, there is a significant diversity of goods within our sample, including cars, motorcycles, televisions, air conditioners, freezers, refrigerators, stoves, and more. However, it was noted that a considerable number of respondents owned no economically valuable assets, specifically 76 respondents. These data on income and the possession of valuable goods suggest the need to examine the condition of housing. In this regard, various construction materials were identified during the survey, namely: houses built with clay bricks, concrete blocks, semi-hard materials, and rammed earth. It can be stated that 52.30% of the houses are made of concrete blocks, 25.30% of clay bricks, 13% of semi-hard materials, and 9.40% of rammed earth. Additionally, 89.60% of these houses have metal roofs, while 10.40% are covered with thatch (Table 6).

Table 6: Type of Construction Material of Houses

Construction Material	Frequency	Percentage
Clay brick	97	25,3
Concrete block	201	52,3
Semi-concrete material	50	13,0
Rammed earth	36	9,4

Source: Field Survey

Additionally, 81% of the respondents' houses are cemented, 18% are made of earth, and 1% are tiled (Table 7). Regarding electrification and water supply, it is noted that 87% of the houses are electrified, while only 39.80% have access to potable water, which may explain why 76.60% of the toilets are external.

Table 7: Type of Flooring Material

Type of Flooring Material	Frequency	Percentage
Soil	69	18,0
Cement	311	81,0
Tiles	4	1,0

Source: Field Survey

II. Knowledge and Analysis of Malaria Risk

II.1. General Knowledge About Malaria

The study of knowledge regarding malaria, its symptoms, mode of transmission, and prevention methods shows that the surveyed populations are well aware of the disease. Nearly 100% demonstrate a good understanding of malaria and are well informed. They possess long-lasting insecticide-treated nets

(LLINs) and use them regularly; indeed, many reported using them the night before the survey. To optimize communication about this endemic and prevent it, increasing awareness campaigns on the ground or through media is essential. A significant 96.10% of our sample believes that the best time of day for broadcasting messages or awareness spots against malaria is in the evening, likely because they are no longer at work and can be more easily engaged.

From this information, it is observed that our population communicates sufficiently about malaria daily, prompting questions about the treatment methods adopted in case of infection. The discussion of treatment and attitudes toward malaria was divided into two parts: the attitude upon the appearance of symptoms and the attitude in the case of confirmed malaria. This attitude was noted for both adults and for children under five years. The surveys indicate several responses: go to the hospital, self-medication, wait a day, and take a rapid diagnostic test (RDT). In cases of symptoms in adults, 64.10% of our sample would resort to self-medication, while only 34.10% would visit a health center. Conversely, for children under five years, more than half of the respondents (77.90%) would go to a health center, with only 21.40% opting for self-medication. When symptoms persist, however, adherence to going to a health center increases significantly for both adults and children. Specifically, 88.50% of adults would go directly to the hospital, and 97.40% of children under five would also be taken to the hospital if the disease seemed imminent. Regarding health center preferences, 78.10% of respondents prefer public health centers.

II.2. Malaria Vulnerability

The natural dynamics of malaria are strongly influenced by the environmental setting of the Benoué Division. The predominantly flat terrain is conducive to the formation of puddles in agricultural areas and the immediate living environment of the populations. These puddles constitute larval habitats for female anopheles mosquitoes, thereby facilitating faster transmission among residents. Another contributing factor is the climate, with a rainy season typically lasting about six months from May to October. These rains lead to an exponential increase in vector habitats, consequently raising malaria cases. The high temperatures recorded have an impact on the life cycle and evolution of the vectors as well as the development of the parasite responsible for the disease within the anopheles. Indeed, higher temperatures shorten the time required for the sporogonic cycle that makes anopheles infectious, thus increasing the likelihood of transmission.

A risk map was created using multi-criteria analysis that took into account land use, altitude, watercourses, and slope. Initially, it is observed that areas with no malaria risk are not extensive. Low-risk areas are more widespread in the health districts of Ngong and Bibémi, which have larger territories. However, Garoua 1 and 2, as well as Pitoa, are rated as high-risk areas. This is explained by the flat terrain characteristic of these territories, the presence of watercourses, and puddles, all combined with agricultural activities and high population density. The areas indicated in blue on the map correspond to zones where the rainy season enhances the multiplication of larval habitats. After the rainy season, various watercourses that persist provide habitats for vectors during the dry season, thereby maintaining continuity in transmission. It can also be inferred that spatial diffusion of anopheles occurs from these high-risk areas.

From another perspective, the risk is heightened in these localities as higher temperatures increase fertility, shorten the maturation time of larvae, and reduce the development time of the parasite. The combination of these factors makes these zones intense transmission hotspots, especially since maintained by precipitation and irrigation practices, larval habitats proliferate. Conversely, areas of medium and low transmission reflect drier regions where water does not stagnate, but transmission is sustained through human mobility and the persistence of mosquitoes. Hence, the map illustrates how the interplay of several factors such as relief, hydrology, rainfall, and temperatures—can generate high malaria endemicity (figure 2).

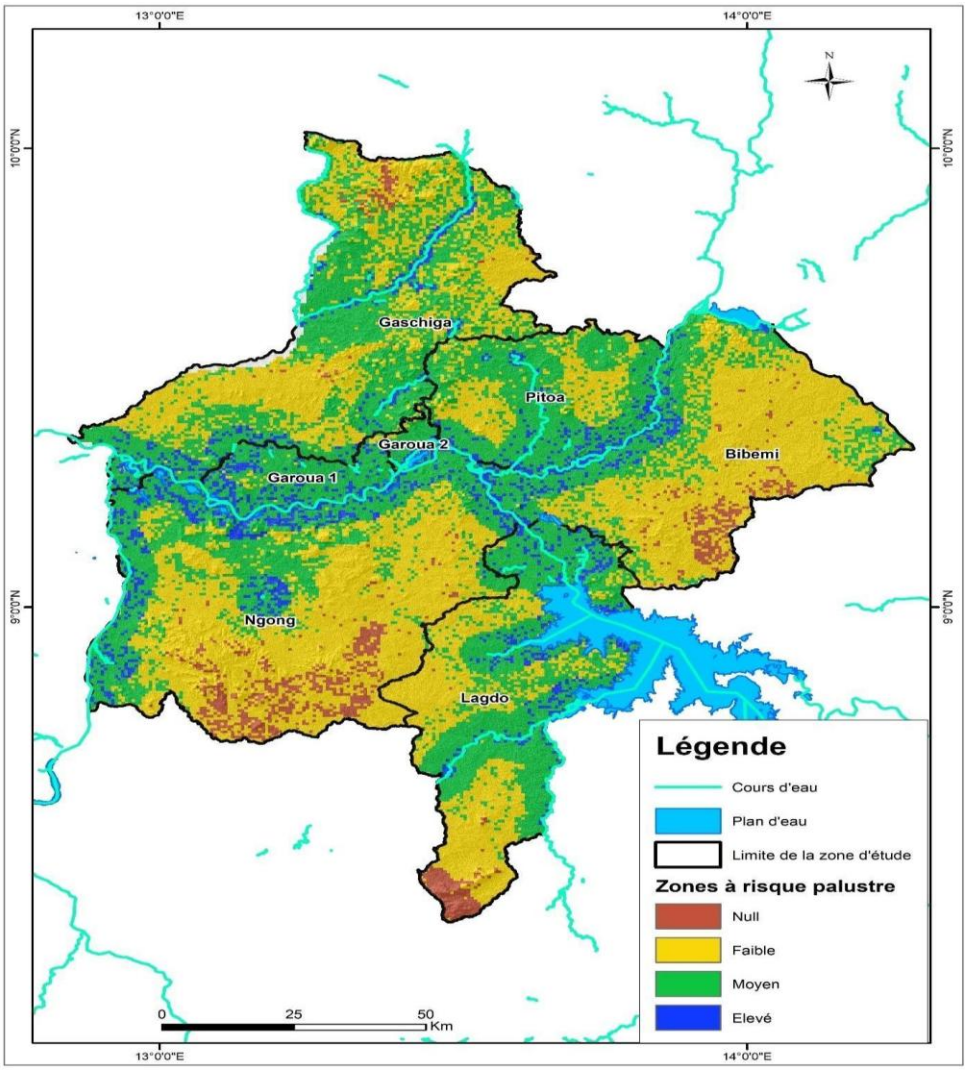


Figure 2 : Malaria risk map

Discussion

On a national level, similar results have been highlighted through various studies published in Cameroon's malaria indicator reports from 2011 and 2022, as well as the Demographic and Health Survey of Cameroon. Specifically, this study notes that the proportion of women with no education is 11%, which is close to the 23% noted in the 2011 malaria indicator report (INS & PNLP, 2012). In 2022, this proportion was estimated at 20%, indicating a decline in the number of uneducated women at the national level (INS et al., 2023). It can thus be

concluded that, overall, these women possess an adequate level of education to understand the health issues related to malaria, as well as the importance of safeguarding their own health and that of their children. A similar situation was observed in Lubumbashi, where a socio-demographic survey on malaria revealed that 83% of women had a good level of education (Mutombo et al., 2014).

The description of the respondents' housing reflects the national situation. Indeed, 52.30% of houses are made of concrete blocks, 25.30% of clay bricks, and 9.40% of rammed earth. Additionally, 89.60% of these houses have metal roofs, while 10.40% are thatched. The flooring in 81% of the houses is cemented, while 18% is earthen. In contrast, in 2011, the proportion of households living in houses with earthen or sandy floors was 48%. A significant percentage of these households (79%) was located in rural areas. However, 44% of the houses had cemented walls, with 68% located in urban areas. Furthermore, 25% of households had walls made from clay bricks, with 42% in rural areas and 9% in urban settings. Among the houses with cemented walls, 47% were situated in urban areas, and 91% of the households living in urban areas had their houses covered with zinc roofs. This proportion was 55% in rural areas and 43% for houses using thatch or palm leaves (INS & PNLP, 2012). In 2022, regarding housing, the floors were covered with various materials, predominantly cement (43%), earth or sand (38%), and tiles (16%). For 81% of households, the roof was made of metal, with disparities between urban (93%) and rural (67%) areas. Conversely, 10% of households live in dwellings covered with thatch, palm fronds, or leaves, representing 12% of all households (INS et al., 2023). Other research indicates that in the North and Far North regions, 52.8% of homes are built with earth, and only 22.5% have cement floors (Breakthrough Action, 2021).

The analysis of the general knowledge about this pathology shows a satisfactory level of understanding within the population, as nearly 100% of respondents know about malaria, its modes of transmission, and prevention methods. Furthermore, they regularly use long-lasting insecticide-treated nets (LLINs). Nationally, according to social perceptions, malaria can be caused by exposure to cold, consumption of fresh foods, eating early mangos, sun exposure, dust, and rain. It is also considered a disease transmitted from mother to child through blood (Nyam, 2020). A study conducted in the Haut-Nkam area found that 93.5% of respondents had a good understanding of malaria, while concerning transmission modes, 78.6% in Bafang and 67% in Bakassa acknowledged that it is transmitted through mosquito bites. To protect themselves from this disease, these populations use mosquito nets, estimated at 69% usage in Bafang and 65.6%

in Bakassa (Enama et al., 2020). Additionally, respondents in a survey on malaria determinants in the Northern (87.1%) and Far North (92.7%) regions recognized fever as a symptom of malaria. Moreover, 90% understood that this disease is transmitted by mosquitoes. However, 44.8% of them prefer not to sleep under mosquito nets when it is hot (Breakthrough Action, 2021).

The malaria indicator surveys mentioned earlier revealed that in 2011, 98% of respondents had heard of malaria, 50% knew that fever is one of its symptoms, and 76% recognized that malaria is caused by mosquitoes. There was also good knowledge of preventive measures, as 93% stated that sleeping under an insecticide-treated net (ITN) is essential, 48% believed in keeping the surroundings clean, and 14% recognized the importance of eliminating stagnant water, which serves as potential breeding sites for mosquitoes (INS & PNLP, 2012).

In 2018, the survey indicated an average level of knowledge. Specifically, 55% of the study population had received a message about malaria through a community health worker, a family member, television, or a healthcare provider. Notably, the Northern region was identified as one of the areas where communication about malaria is sufficiently effective (INS et al., 2023). According to the results of the fifth Demographic and Health Survey of Cameroon (INS, 2019), in 2018, three out of four households owned an insecticide-treated net. Considering that each net is used by at most two people, approximately 59% of households have access. The highest proportions were observed in the Far North (72%), North (63%), and Center (62%) regions. In terms of prevention, 72% of households reported owning at least one insecticide-treated net. This proportion was only 2% in 2004, increased to 36% in 2011, and rose to 73% in 2018. The highest rates of possession were noted in the Far North (97%), North (94%), and Adamaoua (91%) regions. Regarding the effective use of these nets, 54% of household members surveyed slept under a net the night before the survey; this figure was only 1% in 2004, 15% in 2011, and has remained stable since 2018. The highest rates of net use were found in the northern regions, with 91% in the Far North, 86% in the North, and 82% in Adamaoua.

Observations of vulnerable groups, such as pregnant women and children under five, show a clear increase over time. For pregnant women, the use of nets increased from 2% in 2004 to 20% in 2011, then to 61% in 2018, and finally 63% in 2022. For children under five, usage also rose from 1% in 2004 to 21% in 2011, 60% in 2018, and 58% in 2022 (INS et al., 2023).

However, in Lubumbashi, Democratic Republic of the Congo, a study revealed that a significant proportion of mothers (42%) had no knowledge of malaria prevention methods, and only 48.5% of these women confirmed that they use mosquito nets (Mutombo et al., 2014). Similar results were noted in West Africa, particularly in Côte d'Ivoire, where low usage of mosquito nets was reported in the Abidjan health district. Residents mentioned that installing nets made their bedrooms uncomfortable and claimed that they hindered good nighttime breathing. Furthermore, in the Dokui plateau area, heads of households indicated that malaria prevention relies on the use of insecticide-treated nets and insecticides in homes (Moro, 2023). In the Aboisso health district of Côte d'Ivoire, 99% of people surveyed were aware of malaria, and 97% had contracted it at least once. The causes attributed to malaria include mosquitoes, the sun, fatigue, and fatty foods. To protect themselves, they emphasized the need to sleep under a net, eliminate stagnant water around their homes, dispose of waste properly, and clear the surroundings. However, a significant proportion of respondents (42%) reported not sleeping under an ITN for various reasons (Kouame & N'guessan, 2019). Additionally, a survey on malaria determinants in the country revealed that 79.7% of people knew that fever is a symptom of malaria, and 91.4% understood that mosquito bites are responsible for transmitting the disease. Nevertheless, many believed that sun exposure and an unhealthy environment could also cause malaria. For prevention, 84% recognized the need to use an ITN. The survey found that 69.4% of households had at least one ITN for two people, and the night before the survey, 70.7% of respondents had slept under a mosquito net. In case of fever, 58.9% of respondents thought it best to first administer medication to a child under five at home (Breakthrough Action, 2019).

Regarding attitudes towards the disease, the study showed that, in cases of malaria in adults, 64.10% of the sample would resort to self-medication, while only 34.10% would go to a health center. Conversely, for children under five, more than half of the respondents (77.90%) would go to a health center, with only 21.40% opting for self-medication. However, when symptoms persist, the population is more inclined to visit a health center for both adults and children. In this regard, 88.50% of adults would go directly to the hospital, and 97.40% of children under five would also be taken to the hospital if the illness appeared imminent, with 78.10% preferring public health centers. In Haut-Nkam, specifically in Bafang and Bakassa, similar results were found. In cases of malaria, 36.3% of respondents in Bafang and 48.39% in Bakassa go directly to a health center. Overall, 61.5% of respondents in these two localities resort to self-

medication (Enama et al., 2020). Moreover, in the North and Far North regions, respectively 81.9% and 75.7% of surveyed populations believe that in the event of fever in a child under five, they should first resort to self-medication and only seek health services as a last resort (Breakthrough Action, 2020).

The 2022 malaria indicator survey yielded similar results, indicating that among children under five with fever, 56% of households reacted immediately, and 32% sought advice or treatment on the same day or the following day. However, 65% of households first resorted to self-medication by using medications purchased from pharmacies or the street. As children age, households are more inclined to self-medicate. This practice is more common in urban areas (69%) than in rural areas (62%). The reasons for this are justified by 47% citing a lack of money, 44% considering the child's condition not serious, and 4% mentioning the distance to the nearest health center. In contrast, consideration of the residential area helps to differentiate that the lack of money is the main reason cited in rural areas, while in urban areas, the perceived severity of the child's condition takes precedence. Additionally, it was found that 27% of households performed a rapid diagnostic test with a healthcare provider for their children under five with fever (INS et al., 2023).

Regarding the influence of the environment on the development of disease vectors, in this study, 70.10% of respondents reported the presence of stagnant water in their locality. Thus, it is reasonable to say that these populations live in an environment very conducive to the development of malaria vectors. It is also rightly noted that in the localities of Bafang and Bakassa, populations believe it is necessary to sanitize their immediate living environment to protect themselves from malaria (Enama et al., 2020). In Aboisso, Côte d'Ivoire, residents believe that the proximity of stagnant water and waste deposits are factors conducive to contracting malaria (Kouame & N'guessan, 2019). According to the 2022 malaria indicator survey, concerning the immediate living environment, three out of ten households live surrounded by stagnant water, and 70% of them have brushy areas favorable to mosquito development around them. Specifically, 88% of households in rural areas and 67% in urban areas have brushy surroundings. Regarding stagnant water, 35% of households are in urban areas, and 26% in rural locations. For both variables, the highest proportions are observed in the Far North and North regions, with 92% of households in each region.

Conclusion

This research focused its analysis on one of the major public health problems in the world, particularly in Africa and in Cameroon's North, where malaria is seasonal yet endemic. The inquiry centered on the state of knowledge among the populations of the Benoué Division and the environment as a factor of vulnerability for these populations. It was anticipated that local populations have a good understanding of malaria and its prevention methods, while the existing bodies of water, which are more abundant during the rainy season, along with various climatic elements, are environmental components that render populations vulnerable by increasing larval habitats and consequently raising malaria cases.

To verify this, a socio-demographic survey was conducted via questionnaires among residents, and a malaria risk map was created. The findings indicate that the populations in Benoué have a good understanding of malaria, including the vector responsible for its transmission, prevention measures, and treatment options. Specifically concerning treatment, the trend favors self-medication when facing fever, and health centers are visited only as a last resort. The malaria risk map successfully highlighted all the natural elements that, when combined, turn certain areas into intense production hotspots for vectors and, therefore, for disease transmission.

Furthermore, it became clear that the spatial diffusion of vectors and the mobility of individuals contribute to the spread of this disease in areas with medium or low risk. All these elements should be taken into account when developing future control strategies in these geographical spaces.

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Chapter 57: Psychological Resilience and Mental Well-Being among Marginalized Communities in the Global South

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Abstract

Marginalized communities across the Global South often experience structural inequalities, poverty, social exclusion, and limited access to health services, which significantly affect their psychological well-being. These populations are exposed to multiple stressors including discrimination, unemployment, environmental insecurity, and social stigma. Despite these challenges, many individuals within marginalized communities demonstrate remarkable psychological resilience and adaptive coping strategies. The present study aims to explore the relationship between socio-economic marginalization, psychological distress, and resilience among individuals belonging to marginalized groups. A quantitative research design was adopted to assess levels of mental well-being and resilience among participants from economically disadvantaged communities. Data were collected through standardized psychological scales measuring psychological distress, resilience, and perceived social support. Findings indicate that higher levels of social support and community cohesion significantly contribute to psychological resilience, which in turn reduces the negative effects of stress and marginalization. Previous research highlights that marginalized populations often face elevated levels of depression, anxiety, and stigma due to social inequalities and limited mental health resources. Studies also show that intersectional factors such as gender, ethnicity, and economic status further shape mental health outcomes in these

communities. The study contributes to the growing body of literature on community psychology and sustainable development by highlighting the importance of culturally sensitive psychological interventions and social empowerment programs. Promoting resilience and strengthening community support systems can enhance mental health outcomes and support sustainable futures for marginalized populations in the Global South.

Keywords Psychological Resilience, Marginalized Communities, Mental Health, Social Inequality, Global South.

Introduction

Marginalization refers to the process through which certain individuals or groups are pushed to the edges of society and are denied equal access to resources, opportunities, and social participation. Marginalized communities often face persistent poverty, discrimination, limited access to education, and inadequate health services. These social inequalities have profound psychological consequences, influencing individuals' mental health and overall well-being. Scholars in psychology and social sciences have increasingly recognized the importance of examining how marginalization affects psychological functioning and how resilience mechanisms enable individuals to cope with adversity.

Mental health disparities among marginalized populations have been widely documented in psychological literature. Research by World Health Organization (2014) indicates that individuals living in poverty and social exclusion experience higher levels of psychological distress and mental health disorders. Economic deprivation, unemployment, and lack of social support often contribute to chronic stress, anxiety, and depression. Similarly, Patel et al. (2018) emphasized that marginalized populations in developing countries face significant barriers in accessing mental health services, which further worsens psychological outcomes.

Marginalization often intersects with factors such as gender, ethnicity, caste, and socio-economic status. According to Crenshaw (1989), the concept of intersectionality explains how overlapping social identities create multiple forms of discrimination and vulnerability. These intersecting forms of marginalization increase psychological stress and contribute to feelings of social isolation. Supporting this view, Williams and Mohammed (2013) found that experiences of discrimination significantly increase psychological distress and negatively affect mental health among marginalized groups.

Psychological resilience has been identified as a key protective factor that helps individuals cope with adversity and maintain mental well-being. Masten (2001) described resilience as the ability of individuals to adapt successfully despite facing significant challenges or risks. Similarly, Luthar, Cicchetti, and Becker (2000) highlighted that resilience is not simply an individual trait but is influenced by social relationships, community support, and environmental resources.

Research has shown that marginalized communities often demonstrate remarkable resilience despite experiencing structural inequalities. Ungar (2011) emphasized that resilience should be understood within a socio-ecological framework, where cultural values, family support, and community networks play an important role in helping individuals overcome adversity. Similarly, Southwick et al. (2014) argued that social support systems significantly enhance resilience and reduce the negative effects of stress and trauma.

Several empirical studies have examined the relationship between marginalization and mental health outcomes. Marmot (2005) found that social inequality and economic disadvantage are strongly associated with poor mental health outcomes. Individuals living in marginalized conditions often experience higher levels of depression, anxiety, and psychological distress. Likewise, Wilkinson and Pickett (2010) demonstrated that societies with greater income inequality tend to have higher rates of mental health problems.

Studies focusing on marginalized youth have also revealed significant psychological challenges. Evans and Kim (2013) reported that children and adolescents growing up in poverty experience chronic stress due to environmental instability, which negatively affects their cognitive and emotional development. Similarly, Reiss (2013) found that socio-economic disadvantage is associated with higher levels of emotional and behavioral problems among adolescents.

Gender is another important dimension of marginalization that influences psychological well-being. Kabeer (2005) emphasized that women in marginalized communities often face limited opportunities for education and employment, which affects their psychological autonomy and self-esteem. Supporting this view, Nolen-Hoeksema (2012) noted that women are more vulnerable to depression and anxiety due to social inequality and gender-based discrimination.

In addition to structural challenges, stigma and social exclusion also play a critical role in shaping mental health outcomes. Link and Phelan (2001) argued that stigma leads to social rejection and reduced access to opportunities, which

can negatively affect psychological well-being. Individuals belonging to marginalized groups often internalize stigma, leading to feelings of inferiority, low self-worth, and psychological distress.

Despite these challenges, research has highlighted the role of community support and collective identity in promoting psychological resilience. Putnam (2000) emphasized the importance of social capital, suggesting that strong community networks and social trust can significantly enhance psychological well-being. Similarly, Bandura (1997) highlighted the concept of collective efficacy, which refers to the shared belief of a community in its ability to overcome challenges and achieve common goals.

Community-based interventions have been found to be effective in improving mental health outcomes among marginalized populations. Wallerstein (2006) argued that empowerment-based approaches can strengthen community participation and enhance psychological well-being. Such interventions focus on building social support networks, improving access to resources, and promoting psychological empowerment.

Furthermore, cultural identity has been recognized as an important factor in fostering resilience among marginalized communities. Phinney (1990) found that a strong sense of cultural identity contributes to higher self-esteem and psychological well-being among minority groups. Cultural traditions, shared values, and collective practices often provide emotional support and strengthen coping mechanisms.

Recent studies have also highlighted the importance of integrating psychological perspectives into sustainable development policies. Sen (1999) emphasized that development should focus not only on economic growth but also on enhancing human capabilities and well-being. Addressing mental health disparities among marginalized communities is therefore essential for achieving sustainable and inclusive development.

In conclusion, existing literature clearly indicates that marginalization significantly affects psychological well-being. However, resilience, social support, and community empowerment serve as important protective factors that help individuals cope with adversity. Understanding these psychological processes is crucial for developing effective interventions aimed at promoting mental health and social inclusion among marginalized communities in the Global South.

Methodology

Research Design

The present study employed a quantitative descriptive research design to examine the relationship between marginalization, psychological resilience, and mental well-being among individuals belonging to marginalized communities in the Global South. Quantitative research was considered appropriate for this study because it allows for the systematic collection and statistical analysis of numerical data to identify patterns, relationships, and differences among variables. The study aimed to measure levels of psychological distress, resilience, and perceived social support using standardized psychological scales.

Research Objectives

The major objectives of the study were:

1. To examine the level of psychological resilience among individuals belonging to marginalized communities.
2. To assess the level of psychological distress among marginalized populations.
3. To analyze the relationship between social support and psychological resilience.
4. To explore the impact of socio-economic marginalization on mental well-being.

Sample

The study included a sample of 200 participants belonging to marginalized communities residing in urban and semi-urban areas of India, representing socio-economically disadvantaged populations in the Global South. Participants were selected using a purposive sampling technique, which allowed the researcher to focus specifically on individuals from economically and socially marginalized backgrounds. The sample consisted of participants aged between 18 and 45 years, including both male and female respondents. Individuals from low-income households, socially disadvantaged social groups, and communities experiencing limited access to education and healthcare services were included in the study. Participants were primarily recruited from urban slum settlements and semi-urban localities, where socio-economic challenges such as unemployment, financial insecurity, and restricted access to mental health resources are commonly observed.

Data Collection Tools

The following standardized psychological instruments were used for data collection:

1. Psychological Resilience Scale- The Psychological Resilience Scale was used to measure the ability of individuals to cope with adversity and adapt positively to stressful situations. The scale consists of multiple items rated on a Likert-type scale ranging from strongly disagree to strongly agree. Higher scores indicate greater levels of resilience.

2. Depression Anxiety Stress Scale (DASS-21)-The Depression Anxiety Stress Scale was used to assess psychological distress among participants. The scale measures three major components of mental health: depression, anxiety, and stress. Participants rated their experiences over the past week on a four-point Likert scale.

3. Multidimensional Scale of Perceived Social Support (MSPSS)- The MSPSS was used to measure perceived social support from family, friends, and significant others. Social support is considered an important protective factor that enhances resilience and psychological well-being.

Data Collection Procedure

Data were collected through structured questionnaires administered to participants in community settings. The researcher explained the purpose of the study and obtained informed consent from all participants before collecting data. Participants were assured that their responses would remain confidential and would be used only for academic purposes. The questionnaires were administered both through face-to-face interactions and self-reported survey forms. Participants were given sufficient time to read and respond to the items carefully. The entire data collection process was conducted in accordance with ethical research guidelines.

Ethical Considerations

Ethical principles were strictly followed during the research process. Participants were informed about the purpose of the study and their voluntary participation. They were also informed that they could withdraw from the study at any time without any consequences. Confidentiality and anonymity of participants were maintained throughout the research process.

Statistical Analysis

The collected data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) software. Several statistical techniques were applied to examine the relationships among the study variables. Descriptive statistics, including mean and standard deviation, were calculated to describe the levels of psychological resilience and psychological distress among the participants. In order to examine the relationship between psychological resilience, social support, and mental health variables, Pearson correlation analysis was conducted. Furthermore, regression analysis was used to determine the predictive role of socio-economic marginalization and social support on mental health outcomes. An independent sample t-test was also performed to examine differences in psychological variables based on demographic characteristics such as gender and age group. These statistical methods enabled the researcher to identify significant relationships among the variables and provided empirical evidence regarding the psychological experiences of individuals belonging to marginalized communities.

Results

The present study aimed to examine the relationship between psychological resilience, social support, and psychological distress among individuals belonging to marginalized communities in the Global South. A total of 200 participants were included in the study. Data were analyzed using descriptive statistics, correlation analysis, and regression analysis to understand the patterns of psychological well-being among the participants.

Demographic Characteristics of Participants

The demographic distribution of participants was analyzed to understand the socio-economic background of individuals included in the study. Out of the 200 participants, 108 (54%) were female and 92 (46%) were male. The age of participants ranged between 18 and 45 years, with the majority of respondents belonging to the 21–30 age group (42%), followed by the 31–40 age group (33%), and the 18–20 age group (25%). In terms of educational background, 38% of participants had completed secondary education, 34% had higher secondary education, and 28% had undergraduate education or above. Most participants belonged to low-income households, with approximately 61% reporting monthly family incomes below the national average income level. These demographic characteristics confirm that the participants represented marginalized socio-economic groups.

Understanding demographic variables was important because socio-economic disadvantage often interacts with psychological variables such as stress, coping ability, and access to social support.

Descriptive Statistics

Descriptive statistics were calculated to understand the overall levels of psychological resilience, psychological distress, and perceived social support among participants (Table 1).

Table 1: Descriptive Statistics of Major Variables

Variable	Mean	Standard Deviation
Psychological Resilience	3.52	0.68
Depression	3.21	0.74
Anxiety	3.35	0.79
Stress	3.12	0.71
Social Support	3.66	0.64

The results indicate that participants reported moderate to high levels of psychological resilience (M = 3.52) despite experiencing socio-economic disadvantages. However, psychological distress levels were also relatively high, particularly in terms of anxiety and depression. The mean score for social support (M = 3.66) suggests that participants perceived moderate levels of support from family members, friends, and community networks. This finding highlights the potential role of social relationships in supporting mental well-being among marginalized populations. The descriptive statistics also show that anxiety levels were slightly higher than depression and stress among the participants. This may be attributed to economic uncertainty, employment instability, and social discrimination often experienced by marginalized communities.

Psychological Distress among Marginalized Communities

The results reveal that a significant proportion of participants reported experiencing symptoms of psychological distress. Specifically, 46% of participants reported moderate levels of depression, while 29% reported high levels of depressive symptoms. Similarly, 41% of participants reported moderate anxiety, and 34% reported high anxiety levels. These findings support the hypothesis that individuals belonging to marginalized communities experience considerable psychological distress due to social and economic challenges. Financial insecurity, limited access to healthcare services, and social

discrimination often create chronic stress conditions that negatively affect mental health. Participants frequently reported concerns related to job insecurity, financial responsibilities, and family expectations. Such stressors may contribute to increased anxiety levels among individuals in marginalized communities. The results also suggest that younger participants reported slightly higher anxiety levels compared to older participants. This may reflect the uncertainty faced by younger individuals regarding education, employment opportunities, and future prospects.

Relationship between Social Support and Psychological Resilience

To examine the relationship between social support and psychological resilience, Pearson correlation analysis was conducted (Table 2).

Table 2: Correlation between Social Support, Resilience, and Psychological Distress

Variable	Resilience	Depression	Anxiety	Stress
Social Support	.58**	-.41**	-.37**	-.39**
Resilience	—	-.49**	-.46**	-.44**

p < 0.01

The correlation analysis revea led several significant relationships between the study variables. First, social support was positively correlated with psychological resilience (r = .58)**.** This indicates that individuals who perceived greater support from family and community networks were more likely to demonstrate stronger resilience when facing adversity. Second, social support showed negative correlations with depression (r = -.41), anxiety (r = -.37), and stress (r = -.39)**.** This suggests that individuals with higher levels of perceived social support experienced lower levels of psychological distress. Similarly, psychological resilience showed significant negative correlations with depression (r = -.49), anxiety (r = -.46), and stress (r = -.44)**.** These findings suggest that resilience acts as a protective factor that reduces the impact of stressful life circumstances. Overall, these results support the idea that social relationships and emotional support systems play a crucial role in promoting psychological well-being among marginalized populations.

Regression Analysis

A regression analysis was conducted to examine whether social support and resilience significantly predict mental health outcomes among participants (Table 3).

Table 3: Regression Analysis Predicting Psychological Distress

Predictor	Beta	Significance
Social Support	-0.36	$p < 0.01$
Psychological Resilience	-0.41	$p < 0.01$

The regression results indicate that both social support and psychological resilience significantly predicted psychological distress. Psychological resilience emerged as the strongest predictor, suggesting that individuals with higher resilience levels were less likely to experience severe psychological distress. Social support also showed a significant negative effect on psychological distress, indicating that strong interpersonal relationships can reduce the impact of stress and adversity. These findings highlight the importance of community-based support systems and psychological empowerment programs in improving mental health outcomes among marginalized populations.

Gender Differences in Psychological Variables

An independent sample t-test was conducted to examine gender differences in psychological resilience and psychological distress(Table 4).

Table 4: Gender Differences in Psychological Variables

Variable	Male Mean	Female Mean	t-value
Resilience	3.48	3.55	1.12
Depression	3.05	3.32	2.18*
Anxiety	3.21	3.47	2.31*

$p < 0.05$

The results show that female participants reported slightly higher levels of depression and anxiety compared to male participants. However, there was no significant difference in psychological resilience between male and female respondents. These findings may reflect the additional social and economic pressures faced by women in marginalized communities, including household responsibilities, gender discrimination, and limited employment opportunities.

Role of Community Support in Enhancing Resilience

The results of the study highlight the significant role of community networks in strengthening resilience among marginalized populations. Participants who reported strong relationships with family members, neighbors, and community organizations demonstrated higher levels of psychological resilience. Community support often provides emotional encouragement, practical assistance, and a sense of belonging, which can help individuals cope with difficult circumstances. Participants frequently reported relying on family members and close friends during times of stress or financial difficulty. These findings are consistent with community psychology theories that emphasize the importance of collective coping mechanisms and social solidarity in promoting mental health.

Age Differences in Psychological Distress

Age differences were also examined to determine whether psychological distress varied across age groups. The analysis revealed that participants aged 18–25 reported higher levels of anxiety and stress, while individuals aged 31–45 reported slightly higher resilience scores. This pattern suggests that life experience and exposure to different coping strategies may enhance resilience over time. Older participants often reported greater confidence in managing financial difficulties and social challenges.

The findings of the present study provide important insights into the psychological experiences of marginalized communities. Despite experiencing high levels of socio-economic disadvantage, many participants demonstrated moderate levels of psychological resilience. The results confirm that psychological distress is relatively common among marginalized populations, particularly in the form of anxiety and depression. Economic instability, unemployment, and social discrimination appear to be major contributing factors to these mental health challenges. However, the study also highlights the crucial role of social support and resilience in protecting individuals from the negative psychological effects of marginalization. Participants who reported strong social networks and higher resilience levels were significantly less likely to experience severe psychological distress. These findings suggest that mental health interventions aimed at marginalized communities should focus not only on treating psychological symptoms but also on strengthening community support systems and promoting resilience-building strategies. Programs that encourage social participation, community engagement, and psychological empowerment

may help individuals develop effective coping mechanisms and improve overall well-being.

Discussion

The present study aimed to examine the relationship between psychological resilience, social support, and psychological distress among individuals belonging to marginalized communities in the Global South. The findings of the study provide important insights into the psychological experiences of individuals living under socio-economic disadvantage. The results indicate that marginalized populations experience considerable psychological distress; however, resilience and social support act as important protective factors that help individuals cope with adversity.

One of the major findings of the study was that participants reported moderate to high levels of psychological distress, particularly in the form of anxiety and depression. These results are consistent with earlier research suggesting that socio-economic marginalization significantly increases vulnerability to mental health problems. Marmot (2005) argued that social inequalities in income, employment, and education contribute directly to poor mental health outcomes. Individuals living in marginalized conditions often experience chronic stress due to financial insecurity, lack of resources, and limited access to healthcare services. Similarly, Patel et al. (2018) emphasized that mental health disorders are more prevalent among populations facing poverty and social exclusion, especially in developing countries.

The findings also support the argument that economic insecurity and unemployment are major stressors affecting mental health. Participants in the study frequently reported concerns about financial stability and employment opportunities. Such stressors can create long-term psychological strain and increase the risk of anxiety and depression. Previous research by Evans and Kim (2013) demonstrated that individuals exposed to chronic poverty often experience persistent stress, which negatively affects emotional regulation and psychological well-being.

Another important finding of the study is that psychological resilience plays a significant role in reducing psychological distress among marginalized individuals. Participants who reported higher resilience levels were less likely to experience severe depression, anxiety, and stress. This finding aligns with the work of Masten (2001), who described resilience as the capacity of individuals to

maintain positive adaptation despite adversity. Resilience enables individuals to develop coping strategies, maintain optimism, and effectively manage stressful life circumstances.

Similarly, Luthar, Cicchetti, and Becker (2000) emphasized that resilience is not merely an individual personality trait but a dynamic process influenced by environmental and social factors. Individuals who have access to supportive relationships and community resources are more likely to develop resilience and adapt successfully to difficult situations. The findings of the present study support this perspective by highlighting the role of social support networks in enhancing resilience.

The study also revealed a strong positive relationship between social support and psychological resilience. Participants who reported higher levels of perceived social support demonstrated greater resilience and lower levels of psychological distress. This finding is consistent with the social support theory proposed by Cohen and Wills (1985), which suggests that supportive relationships can buffer individuals from the negative effects of stress. Emotional support from family members, friends, and community networks provides individuals with a sense of belonging and security, which enhances their ability to cope with challenges.

The importance of social capital in promoting psychological well-being has also been highlighted by Putnam (2000). According to Putnam, communities with strong social networks and trust are better able to support their members during times of crisis. In marginalized communities, informal social networks often serve as an important source of emotional and practical assistance, particularly in situations where formal institutional support is limited.

Gender differences observed in the present study also provide important insights into the psychological experiences of marginalized populations. Female participants reported slightly higher levels of depression and anxiety compared to male participants. This finding is consistent with earlier research suggesting that women are more vulnerable to mental health problems due to gender-based discrimination and social inequalities. Nolen-Hoeksema (2012) argued that women often experience greater emotional stress because of social expectations, caregiving responsibilities, and limited economic opportunities.

In many marginalized communities, women face additional challenges such as limited access to education, employment opportunities, and decision-making power within households. These structural inequalities may contribute to higher levels of psychological distress among women. Kabeer (2005) highlighted that

empowering women through education and economic opportunities can significantly improve their psychological well-being and social status.

Another significant finding of the study is the role of community support in enhancing resilience among marginalized populations. Participants who reported strong relationships with family members, neighbors, and community groups demonstrated greater psychological resilience. This finding supports the socio-ecological model of resilience proposed by Ungar (2011), which emphasizes the interaction between individuals and their social environment.

According to this perspective, resilience is not solely determined by individual characteristics but also by the availability of supportive social and cultural resources. Community solidarity, shared cultural values, and collective identity can help individuals cope with adversity and maintain psychological well-being. In marginalized communities, cultural traditions and collective practices often provide emotional comfort and strengthen social bonds.

The findings of the present study also highlight the importance of cultural identity in promoting psychological well-being. Cultural traditions, shared values, and community participation can provide individuals with a sense of purpose and belonging. Phinney (1990) found that individuals who maintain strong cultural identities tend to have higher self-esteem and better psychological adjustment. For marginalized communities, cultural identity often serves as a source of resilience in the face of social exclusion and discrimination.

Age differences observed in the study also provide valuable insights into psychological coping mechanisms. Younger participants reported higher levels of anxiety compared to older participants. This may be due to uncertainties related to education, employment opportunities, and future prospects. In contrast, older participants demonstrated slightly higher resilience levels, possibly due to greater life experience and exposure to coping strategies over time.

Previous research has also suggested that life experience plays an important role in developing resilience. Bonanno (2004) argued that individuals who have successfully overcome past adversities are more likely to develop adaptive coping strategies that help them manage future challenges. This may explain why older participants in the study demonstrated higher resilience levels compared to younger participants.

The findings of the study also have important implications for mental health interventions and policy development. Mental health programs targeting

marginalized populations should focus on strengthening community support systems and promoting resilience-building strategies. Community-based interventions that encourage social participation, peer support, and collective problem-solving can significantly improve psychological well-being.

Wallerstein (2006) emphasized that empowerment-based approaches can enhance community participation and improve health outcomes. By involving community members in decision-making processes and promoting local leadership, such interventions can create supportive environments that foster psychological resilience.

In addition, integrating mental health services into primary healthcare systems can help address the treatment gap faced by marginalized populations. Patel et al. (2018) argued that community-based mental health programs are particularly effective in low-resource settings because they utilize existing social networks and cultural practices.

The findings of the present study also highlight the need for policies that address structural inequalities such as poverty, unemployment, and lack of access to education. Sustainable development efforts should incorporate psychological well-being as an important component of social development. Sen (1999) emphasized that development should focus on expanding individuals' capabilities and opportunities to lead meaningful lives.

Improving access to education, employment opportunities, and healthcare services can significantly enhance psychological well-being among marginalized populations. Social policies that promote equality, inclusion, and community empowerment are essential for reducing mental health disparities.

In conclusion, the findings of the present study highlight the complex relationship between marginalization, psychological resilience, and mental health. While marginalized communities face significant socio-economic challenges, social support and resilience play crucial roles in protecting individuals from the negative psychological effects of adversity. Strengthening community networks, promoting psychological empowerment, and addressing structural inequalities are essential steps toward improving mental health outcomes and supporting sustainable futures for marginalized populations in the Global South.

Conclusion

The present study examined the relationship between psychological resilience, social support, and psychological distress among individuals belonging to marginalized communities in the Global South. The findings highlight the complex and multidimensional psychological challenges experienced by individuals living under socio-economic marginalization. Structural inequalities such as poverty, unemployment, limited educational opportunities, and restricted access to healthcare services contribute to chronic stress, thereby significantly affecting mental health outcomes.

The results revealed that individuals from marginalized communities experience moderate to high levels of psychological distress, particularly in the form of anxiety and depression. These findings are consistent with existing literature indicating that socio-economic disadvantage is strongly associated with adverse mental health outcomes. Persistent stressors such as financial instability, social discrimination, and limited access to psychological resources further exacerbate psychological vulnerability.

Despite these adversities, the study found that many participants demonstrated moderate levels of psychological resilience, highlighting its role as a crucial protective factor. Individuals with higher resilience reported lower levels of depression, anxiety, and stress, suggesting that resilience mitigates the negative effects of marginalization. Additionally, a strong positive relationship was observed between social support and resilience. Participants who perceived greater support from family, friends, and community networks exhibited lower psychological distress, emphasizing the importance of social connectedness in maintaining mental well-being.

The study also identified gender differences, with female participants reporting relatively higher levels of anxiety and depression compared to male participants. This finding reflects the additional socio-economic and cultural burdens faced by women in marginalized communities, including gender inequality, limited opportunities, and increased domestic responsibilities.

In light of these findings, the study underscores the need for accessible and inclusive mental health interventions. Integrating mental health services into primary healthcare systems and strengthening community-based support networks can enhance resilience and reduce psychological distress. Addressing broader socio-economic inequalities through improved access to education, employment, and social welfare schemes is equally important for promoting

psychological well-being. Furthermore, targeted interventions for women and youth, along with mental health awareness initiatives, can contribute to reducing stigma and fostering help-seeking behavior.

However, certain limitations must be considered while interpreting the findings. The use of a cross-sectional research design restricts the ability to establish causal relationships among the variables, indicating the need for longitudinal studies to better understand the development of psychological resilience over time. Additionally, the sample size was limited to 200 participants from specific communities, which may affect the generalizability of the results. The reliance on self-reported questionnaires may also introduce biases, such as social desirability and subjective interpretation. Future research should adopt larger and more diverse samples and incorporate mixed-method approaches, including qualitative interviews, to provide deeper and more comprehensive insights into the psychological experiences of marginalized populations.

Overall, the study highlights that strengthening psychological resilience, enhancing social support systems, and addressing structural inequalities are essential for improving mental health outcomes and achieving inclusive and sustainable development in marginalized communities of the Global South.

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Chapter 58: Future Prospects and Employment Dilemmas of Older Workers under the Sustainability and ESG Framework

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Abstract

With the evolution of aging, the retirement time of middle-aged and elderly people has been delayed; coupled with the growth of global population life expectancy, the provision of labor has been continuously extended, and the retirement age of some advanced countries has gradually increased. This paper examines the difficulties of middle-aged and elderly people in Taiwan's labor market through literature analysis and policy discussion and directly puts forward relevant suggestions for helping middle-aged and elderly people return to the workplace. As Taiwan enters a super-aged society in 2025, maintaining competitiveness despite losing the demographic dividend will require not only improvements in production equipment and technology but also the effective utilization of middle-aged and elderly human resources, making this an urgent social issue. This article will refer to the specifications and subsidy scope of job redesign services of the Workforce Development Agency of the Ministry of Labor of Taiwan, summarize the current difficulties in job redesign services, and give suggestions for government departments in the formulation and implementation of future labor policies and laws.

Keywords: human resource management, employment promotion for middle-aged and elderly people, job redesign, job flexibility, friendly workplace

1. Introduction

With rapid changes in global economic structures and demographic transitions, declining fertility and accelerated population aging have become critical structural challenges in Taiwan. Promoting employment among middle-aged and older workers has therefore become a central policy concern, and with

the evolution of the global demographic structure, the social and economic system is facing unprecedented challenges. According to the demographic statistics released by the National Development Council (2020), Taiwan officially became an aged society in 2018 and will enter a super-aged society by 2025, with more than 20% of the population aged 65 and above. By 2050, this proportion is projected to exceed 35%, placing Taiwan among the most rapidly aging societies globally; it is estimated that the proportion will even reach as high as 37%. With the rapid rise of the elderly population and the declining birthrate in recent years, many previous studies have foreseen that the labor market will inevitably experience a significant reduction in the labor force, an increasing proportion of elderly care, a growing burden of family support, and a narrowing of family structures (Kossek et al., 2025). It is important to find a way to better use and integrate the workforce of older and middle-aged people. With the advancement of high-tech technology and the transformation of the workforce, China's middle-aged and elderly population will actively participate in emerging fields and high-tech industries through "job redesign," which will help meet the demand for professional skills in the future labor market and, at the same time, create more diverse employment opportunities and promote sustainable economic development. The promotion of middle-aged and elderly employment will prompt enterprises to rethink and optimize organizational culture. Properly utilizing the rich experience and knowledge of middle-aged and elderly employees will become a key strategy for enterprises to enhance their competitiveness. The idle life of retirement will have a negative impact on the elderly themselves, resulting in the waste of human resources, which will inevitably increase the financial burden of the entire society, so the issue of reusing retirement manpower has received great attention from many countries. By promoting the employment of the middle-aged and elderly population, society will gain a more stable economic foundation, reduce the burden on the social security system, and promote social diversification and integration.

At present, the "job redesign" in Taiwan's relevant employment promotion policies and employment measures in the workplace are still mainly based on the improvement of assistive devices and machinery and equipment, and there are few examples of rights and interests such as improving working conditions or processes. This paper will utilize literature analysis and policy discussions to present conclusions and suggestions regarding the current employment situation of middle-aged and elderly individuals in Taiwan, the actual practices of job redesign, and the future prospects for their re-employment.

2. Methodology

This study mainly uses literature analysis and policy discussions. First, I used statistics from the National Development Council and the Ministry of Labor to outline the current situation and challenges of Taiwan's workforce as it enters a "super-aging society," and then deeply examined the current subsidy regulations and limitations of "job redesign," and combined with the internationally popular ESG sustainable governance and DE&I (Diversity, Equity, and Inclusion) frameworks, I discussed how companies can shift from hardware improvement to "soft redesign." In addition, this study also analyzes the phenomenon of "silver hair diversion" caused by pension differences from the institutional level and analyzes its deep impact on the economic security and willingness of middle-aged and elderly people to re-employment. Based on the above interdisciplinary discussions, specific suggestions are put forward for the formulation of labor policies and regulatory amendments in the future.

3. A friendly workplace in Taiwan

The establishment of a friendly workplace has evolved from a single-faceted "family-friendly" or "hardware subsidy" in the past to a core strategy to enhance the organization's competitive advantage and employee retention. According to the research framework of Taiwan's Ministry of Labor (2026), a friendly workplace should include three dimensions: "work-friendly," "life-friendly," and "treat-friendly." Among them, "treating people kindly" emphasizes a sense of security and respect at the psychological level, which means that employees can feel rational, worry-free, and respected at work, which is embodied in the adaptability of work content, flexibility in life support, and goodwill and empathy in organizational interactions (Ministry of Labor, 2026). Sandelin (2025) confirms that the design of a friendly workplace should not only be compensated for specific age groups but should also create an inclusive, supportive, and cross-generational knowledge flow for all employees through "integrated workplace management." This "experience-centered" design approach will become the core key for enterprises to retain a critical knowledge workforce and improve organizational resilience in a super-aged society in the future. Workplace management must cross organizational boundaries. A truly friendly workplace should have a high degree of flexibility and integration, including remote human factors engineering support for working from home, and more flexible working hours to meet the increasing demand of middle-aged and elderly workers to "take care of their elderly parents" (Sandelin, 2025). More importantly, a friendly workplace should be considered a platform to promote the transmission of tacit knowledge, preventing the loss of critical organizational experience due to the

retirement of older employees by improving the current unsupportive "social interaction" environment.

According to practical case studies, the implementation of a friendly workplace is crucial for the digital transformation and manpower connection in traditional manufacturing. Cai Kunyu (2024) pointed out that the current pressure on labor shortages at the industrial interface has made it an inevitable trend to create a friendly working environment for middle-aged and elderly people. The study emphasizes that "organizational support" and "supervisory support" are key mediating factors affecting the willingness of middle-aged and elderly employees to stay. Specifically, a friendly workplace is not only about salary and remuneration but also about providing "job redesign" and "health support" that are in line with physiological functions and reshaping the sense of work value of middle-aged and elderly people by reducing age discrimination in the workplace. In line with the global trend, this friendly policy oriented toward "demand satisfaction" is gradually aligning with the international DE&I (Diversity, Equity, and Inclusion) management framework. An effective friendly workplace should be based on cross-generational collaboration, and by meeting the needs of middle-aged and elderly workers for "job security," they can lower their psychological threshold in the face of new technologies and physical aging. By integrating the dual-track strategy of "hardware job adjustment" and "soft psychological support," companies can build a sustainable workforce model with social resilience in a super-aging society.

Zhan et al.'s (2022) study extends the perspective from traditional physiological protection to the long-term impact of organizational management systems on employees' economic and psychological stability. The study proposes the concept of "organizational age-inclusive practices," arguing that the core of a friendly workplace lies in whether the organization has established an age-conscious human resource system, including providing age-oriented career counseling, professional skills training, and flexible mechanisms to support postponed retirement. These practices are not simply economic benefits but convey the organization's value recognition to older employees through system design. The study's principal finding indicates a positive correlation between organizational inclusive practices and the "subjective financial well-being" of older employees. When organizations demonstrate a high degree of inclusivity, older employees experience a higher level of "psychological capital," an intrinsic resource that can effectively alleviate their anxiety about their post-retirement financial life. In other words, a friendly workplace environment can serve as a psychological buffer for employees, allowing them to maintain a sense of control

and security over their future economic life in the face of aging (Zhan et al., 2022).

4. The challenges faced by older workers in the context of the global ESG trend are significant.

In today's increasingly connected globalization, population aging is no longer a social issue in a single country but a systemic challenge that multinational enterprises must face in terms of sustainable operation. As ESG indicators increasingly shape corporate valuation and investment decisions, workforce sustainability has become a measurable governance issue rather than a normative aspiration. Within the “Social” dimension of ESG, age diversity and inclusive employment practices are now interpreted as indicators of long-term human capital resilience. Therefore, older worker employment is no longer merely a labor policy concern but a strategic component of corporate sustainability governance.in global capital markets, the resilience and diversity of the workforce structure (Diversity, Equity, and Inclusion (DEI)) are regarded as key scoring items in the "Social" dimension. For companies, how to maintain competitiveness in an aging society has evolved from simple regulatory compliance to a strategic layout for implementing social responsibility and corporate governance (OECD, 2025). In 2018, the elderly population over 65 years old accounted for 14% of the total population, officially entering an aging society, and is expected to further reach a super-aged society within eight years; that is, the population over 65 years old will exceed 20%. This trend shows no signs of slowing down, with the number of people over 65 expected to exceed 30% by 2040 and surpass Japan as the world's oldest country by 2050. Such a significant demographic change is not only the most obvious phenomenon in the world but also unprecedented in human history and will trigger a series of changes at the individual, family, social, national, and global levels.

Despite the complexity of the issue of population aging and the intertwining of various aspects, the challenges posed by a "longevity society" in the context of economic and social security include pensions, long-term care, and health care. All three challenges arising from demographic changes are significant, and while developed countries face similar dilemmas, the solutions may vary; however, the underlying logic remains consistent. Countries commonly respond to the challenges of population aging by postponing or reducing pensions, promoting community and in-home long-term care as a global development direction, and focusing on establishing care systems that meet the health needs of the elderly through medical reform.

However, there is still a disconnect between China's current policies and corporate practices to promote employment for middle-aged and elderly people in Taiwan and the "sustainable human resource management" advocated by global ESG. The current approach to "job redesign" relies too heavily on improvements in hardware and the purchase of assistive devices, while neglecting the significant changes in labor patterns brought about by globalization (Naqvi, F., Nair, M., 2026). In a highly digital competitive environment, the challenges faced by older workers are not only the decline of physiological functions but also the invisible ageism in the workplace culture and the inflexible traditional employment framework. According to the latest research, companies with a high level of ESG awareness should strive to promote "soft redesign," such as work flexibility, remote collaboration, and job-sharing systems, which can not only alleviate the physical and mental burden on the elderly, but also attract young and older workers to prosper together and establish a "generational balance" workplace (International Labour Organization, 2025).

Additionally, with the relaxation of the mandatory retirement system in Taiwan's Labor Standards Act in 2024, elderly workers are given the right to negotiate with their employers to stay in their positions, marking the dawn of an era of flexible retirement (Ma, 2024). In the context of increasingly stringent labor rights and social responsibility requirements in the global supply chain, if companies can proactively regard the middle-aged and elderly workforce as strategic assets and improve their participation in the labor force through institutional optimization, they can not only effectively alleviate the labor shortage crisis caused by the disappearance of the demographic dividend, but also improve their ESG performance ratings (Liu., Fan., & Li., 2025) and establish a differentiated sustainable advantage in global competition.

5. This section provides an overview of the labor force participation of middle-aged and elderly individuals in Taiwan.

Taiwanese society is currently at a critical juncture between drastic demographic changes and the maintenance of individual employability. According to the National Development Council (2020), Taiwan will officially enter a "super-aged society" by 2025, when the proportion of the elderly population over 65 years old will exceed 20%. Compared to international trends, Taiwan's population is aging rapidly, and it is expected to climb to the third place in the world by 2050, which directly leads to a significant increase in the elderly welfare ratio and a heavy burden on the future labor supply (National Development Council, 2020). In terms of labor force structure, although Taiwan's overall participation in the labor force has increased in recent years, and the

proportion of middle-aged and elderly workers has reached 37.8% (Ministry of Labor, 2022), middle-aged and elderly workers still face severe challenges of employment decline. Studies have pointed out that "employability" is the key to employees' potential in the labor market, but the older the individual, the more likely it is to have a tendency to decline in employability (Hillage & Pollard, 1998; Lin et al., 2022). When the "demographic dividend" disappears, if the employability of middle-aged and elderly employees cannot be effectively maintained through the system, companies will face a serious labor shortage crisis. The workplace performance of middle-aged and elderly workers is deeply affected by their "Occupational Future Time Perspective (OFTP)". According to social-emotional choice theory (Carstensen et al., 1999), employees will show higher learning motivation when they perceive that they have a longer career time left; Conversely, it may reduce motivation to continue working. Lin et al. (2022) further confirmed that improving work resources (such as supervisor support and task autonomy) can strengthen the "successful aging in the workplace" of middle-aged and elderly people, thereby enhancing their competitiveness in the labor market. Consequently, promoting "job redesign" and transforming corporate culture through policy has become a fundamental objective in the implementation of the "Employment Promotion Act for Middle-aged and Elderly Persons" (Ministry of Labor, 2019).

According to the research and analysis of Lin Zonghong, Zhang Yijun, and Li Junying (2022), the current situation of middle-aged and elderly labor in Taiwan is deeply affected by the dual mechanisms of "welfare stratification" and "labor market stratification", showing a very significant phenomenon of "silver hair divergence". In the context of Taiwan's transition to a super-aged society, the retirement choices and economic security of middle-aged and elderly people are not purely a manifestation of personal will, but are subject to institutional differences brought about by professional status. The study points out that The divergence between public and private sector retirement benefits has institutionalized a stratified aging trajectory. Public sector workers, protected by annuity-based pension systems, enjoy income continuity and voluntary retirement decisions. In contrast, private-sector workers, frequently limited to lump-sum benefits, often re-enter the labor market under financial pressure. Reemployment in such cases reflects structural compulsion rather than active aging. in the way they receive pensions directly determine their labor participation patterns in their later years: public education workers have a higher sense of economic security due to stable monthly pension protection, and their income after retirement is significantly higher than that of workers receiving lump sum benefits; On the

contrary, most private sector employees are forced to receive a lump sum benefit, and when the average amount received is not enough to cover long-term living expenses, this group of workers often faces strong economic pressure, resulting in them having to "be forced to return to the labor market" after statutory retirement, forming an involuntary "bridging employment" cycle.

This diversion phenomenon further accelerates income inequality in old age. The difference between human capital and social status extends from the early stage of career to after retirement, and those with higher education and stable professional titles not only accumulate more resources in their careers, but also tend to choose retirement plans with annuity protection due to institutional incentives. Relatively speaking, low-educated or labor-intensive workers face the risk of declining wages and job instability in the later stages of their careers, and lack sufficient pension protection when they retire, so they must re-employ to make up for the gap in living expenses. The current situation in Taiwan shows that the design differences in the retirement system have become the main cause of economic differentiation in later life, with those receiving monthly pensions having the highest income, while those receiving a one-time benefit and no longer employing are at the bottom of society.

In addition to social progress and the general increase in human life expectancy, the decline in the birth rate is also a key factor. The combination of these two phenomena will transform the social structure into one where a few people have to bear the responsibility of taking care of the majority. According to a 2018 report released by the National Development Commission, the dependency ratio is expected to rise from 37.9 to 101.4 between 2018 and 2065, which means that every 100 young adults need to support 101.4 dependent population, which is equivalent to 1 elderly person for every 1.2 young adults. This social structure cannot be sustainable, either from the perspective of labor or taxation. Regardless of the form of annuity, long-term care, or medical care, maintaining these systems is difficult if they cannot be adjusted. As countries around the world push to extend the retirement age or redefine the elderly, these ideas will become a global consensus. But in addition to revising the definition of the elderly, the continued downturn in the birth rate is a bigger challenge. Despite the clear correlation between economic development, rising female employment, and declining fertility rates, some Western countries can still effectively boost fertility rates through their policies. It is important to note that the impact of childcare allowances is limited, and that the overall social system can be more conducive to increasing fertility rates if it can move towards encouraging childbirth and supporting parenting (National Development Council, 2018).

6. Employment promotion for middle-aged and elderly people: an institutional integration strategy

Currently, most of Taiwan's employment policies for middle-aged and elderly people stay at the level of individual subsidies or short-term programs, such as job redesign subsidies or corporate employment incentives. However, from an institutional standpoint, these measures frequently overlap and lack a cohesive governance framework. If we have discussed the theoretical basis of ESG sustainable human resources and job redesign, the next key question is how to translate these concepts into policy tools that can be absorbed by the system and operate for a long time, rather than just advocacy.

The current job redesign framework remains largely hardware-oriented, emphasizing equipment acquisition and ergonomic adjustments. However, sustainable employability requires a shift from physical accommodation to institutional redesign. Soft redesign mechanisms such as phased retirement systems, task restructuring, flexible scheduling, and intergenerational knowledge transfer programs should be embedded into corporate governance standards rather than treated as temporary subsidy projects, such as equipment acquisition and space adjustments. While these measures hold significance, their actual impact remains relatively limited. The real problem faced by many middle-aged and elderly workers is not simply physical burden, but the lack of flexibility in working hours, the inability to adjust job content, or the high linkage between the promotion system and age. Therefore, it is necessary to gradually shift the policy direction towards "soft redesign" (Bayona et al., 2025), such as flexible working hours (Nagarajan, N. R., & Sixsmith, A., 2023)., remote collaboration, job sharing, or phased transfer mechanism. If tax incentives, evaluation systems, or corporate sustainability disclosure requirements can be used to enable companies to incorporate age-friendly measures into human capital management, ESG will no longer be just the language of reports, but will become the actual logic of operation. In other words, the focus is not on increasing the amount of subsidies, but on changing the incentive structure of the system.

The discussion of "empirical capital" should not stop at value claims. Companies often emphasize the importance of senior employees but lack a clear knowledge transfer mechanism, leading to the loss of experience with retirement. Therefore, it is necessary to rethink the institutional design of cross-generational cooperation. The so-called "mentorship system 2.0" does not return to the traditional one-way mentoring model but establishes a two-way collaborative relationship: middle-aged and elderly people provide industry judgment and decision-making experience, while the younger generation supplements digital

skills and new technology applications. If the government can require companies to establish a cross-generational teamwork mechanism through project subsidies or performance evaluation design, knowledge transfer will become an institutional arrangement rather than a goodwill arrangement with individual supervisors. This arrangement also helps break the linear career imagination, allowing career development to transition and cycle rather than be a one-way rise or exit. However, if the middle-aged and elderly reemployment policy does not face up to the differences in the retirement system, it may actually strengthen class differentiation. Some workers are forced to re-enter the low-wage or unstable labor market due to insufficient retirement protection, forming the so-called "silver hair divergence." In this case, reemployment is no longer self-fulfillment but an extension of economic pressure. Therefore, policy design should distinguish the needs of different groups and provide more complete career transition support for low-income workers receiving one-time benefits, such as reskilling, transitional wage subsidies, and social insurance bridging arrangements. Otherwise, reemployment policies may nominally promote labour force participation but in practice perpetuate unequal structures. The employment issue of middle-aged and elderly people involves multiple interests of enterprises, governments, and civil society, and it is difficult for a single department to handle it comprehensively. If policy design lacks a participatory mechanism, it often fails to respond to the actual needs of different industries. Therefore, it is necessary to establish a multi-party consultation platform so that middle-aged and elderly people, business representatives, competent authorities, and relevant groups can discuss policy directions together. The labor conditions of high-tech industries and service industries are very different, and job redesign regulations cannot be applied uniformly. Through continuous dialogue and revision, policies can avoid becoming mere formalities.

In other words, the promotion of employment for middle-aged and elderly people should not only be a technical issue of delaying retirement or increasing the labor participation rate (Peng X, Tian X, Peng X, 2026), but a comprehensive issue involving institutional incentives, knowledge inheritance, and social distribution structure. Without integrated system design, single-point measures are difficult to produce long-term results. The real challenge lies in how to connect the logic of corporate governance with the social security system so that an aging society is not seen as a burden but as a resource that can be absorbed and transformed by the system.

7. The future prospects for the globalized aging workforce are significant.

Ultimately, the challenge of aging employment is not merely about extending working years but about restructuring the relationship between labor markets, social security systems, and corporate governance. Without systemic coordination, isolated employment incentives may inadvertently reinforce inequality rather than enhance sustainability.

Currently, Taiwan's labor market is facing a severe age structure transformation, and the participation and protection of middle-aged and elderly labor have become core issues in social policy. Existing research has pointed out that middle-aged and elderly people often face structural "labeling" difficulties in the job market and are seen as vulnerable groups with reduced productivity or difficulty adapting to new technologies, which leads to age discrimination and recruitment thresholds in the workplace. However, as the world enters a super-aged society, the international trend has begun to shift from the early "economic subsidies" to a more proactive "empowerment and participation" mindset. Referring to the practical experience of AGE Platform Europe, the middle-aged and elderly workforce should not be regarded as surplus manpower but should be positioned as "experience capital" with deep industrial wisdom and cross-generational inheritance value (Vasconcelos, A. F., 2018).

In terms of future prospects, establishing a "de-labeling" employment environment and a "lifelong career" model has become a global trend. By promoting anti-age discrimination legislation, implementing job redesign, and providing inclusive digital empowerment resources, we can effectively ensure that different age groups remain equally competitive in the wave of digital transformation. In addition, the establishment of a cross-generational collaboration mechanism reshapes the traditional linear career into a cyclical process that includes continuous learning and flexible working hours, which not only alleviates the labor shortage but also achieves the stable continuation of social capital through the "mentorship system."

In the current labor market, where the aging population and the declining birthrate are both attacked, the labor participation of middle-aged and elderly people has become the strategic core of the country's sustainable development. According to existing research and analysis, middle-aged and elderly workers often face an imbalance between physiological decline and job requirements, and this "work ability" gap can easily lead to their marginalization in the workplace if there is no institutional reinforcement. The international community's discourse on the middle-aged and elderly workforce has shifted from mere economic efficiency considerations to a holistic evaluation based on the "work ability model," emphasizing the use of health promotion, job redesign, and flexible work

arrangements to extend workers' careers and improve their quality of work and life. In line with world trends, European experiences such as the "AGE Platform Europe" emphasize that the key to solving the labor dilemma of middle-aged and elderly people lies in promoting the legalization and practice of "age-friendly environments." This not only involves anti-age discrimination norms but also focuses on optimizing the working environment and processes through "job redesign," reducing physiological load, and improving the digital adaptability of middle-aged and elderly people so that their rich "experience capital" can be deeply integrated with new technologies. In addition, in the face of the challenges of digital transformation, the establishment of continuous vocational training and lifelong learning mechanisms can effectively prevent labor exclusion for middle-aged and elderly people due to skill gaps. The deepening of the future outlook focuses on establishing an "all-age" social participation model. This means that policies need to go beyond just providing one type of job support to create a system where different groups work together, including encouraging older and younger workers to mentor each other, so that everyone's strengths can help each other in the workplace. The government should play an intermediary role to guide companies to reverse stereotypes about age and view the work participation of middle-aged and elderly people as a sustainable accumulation of social capital rather than a social burden. To sum up, China should benchmark international standards and strive to build a labor ecosystem that supports workers in maintaining their choices and dignity at different stages of life.

China's policies should deepen the concept of "multi-party governance," allowing middle-aged and elderly people to directly participate in the decision-making process to ensure that policy design meets actual labor needs. By integrating the concept of age-friendly cities and diverse labor participation models, the future society will no longer use age as a criterion for dividing values but will strive to build a resilient and supportive workforce model for all ages, transforming the middle-aged and aging into a positive driving force for promoting the country's sustainable development.

7. Conclusion

Although current policies have provided hardware assistive devices or short-term subsidies for middle-aged and elderly employment, they often ignore the deeper age discrimination in the workplace environment and the phenomenon of "silver diversion" that leads to the extreme labor participation pattern due to differences in retirement systems. Through literature analysis and policy evaluation, this study breaks away from the traditional physiological compensation framework, advocates that middle-aged and elderly workers should

be regarded as "experience capital" under ESG governance, and proposes institutionalized suggestions for shifting from the physical environment to "soft job redesign." This can not only fill the governance gap of the current single-point subsidy but also provide a systematic path for how to build a resilient workplace with cross-generational collaboration in a super-aged society.

Taiwan, along with the rest of the world, is currently experiencing a significant shift towards a society dominated by the elderly. The drastic changes in the demographic structure have transformed the middle-aged and elderly labor force from being seen as social welfare recipients to becoming core strategic assets for national sustainable development and corporate competitiveness. Taiwan's labor market has seen more middle-aged and older people join it at this time, but there is still a common problem of "silver hair diversion" caused by the labor market and retirement system. The result means that older people from different job backgrounds have very different levels of economic security and motivation to find new work. To meet this challenge, future labor policies and corporate management should stop focusing only on hardware aids, mechanical improvements, or short-term subsidies. Instead, they should focus on "soft job redesign" with ESG sustainability frameworks at the center. This includes encouraging flexible work hours, remote collaboration, gradual retirement plans, and creating a "mentorship 2.0" knowledge transfer platform that connects the "experience capital" of older people with the digital skills of younger people. This will make organizations more resilient and improve the flow of knowledge, ultimately leading to enhanced innovation and adaptability in the workforce. The government should also help different political parties work together by making sure that age diversity is included in corporate governance indicators. Things like workplace-friendly certification, tax breaks, and information disclosure can achieve this. The government should also make sure that there are laws against age discrimination and stereotypes in the workplace. We can turn the aging population from a social burden into a force for economic stability and build a strong society where people of all ages can keep their dignity, develop their strengths, and keep their career options open for life by fully integrating workplace management, social security systems, and models for participation by people of all ages.

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Chapter 59: Digital Culture, Mental Health & Identity: A Survey on How Gen Z Navigates Social Media, Stress, and Belonging

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Abstract:
This work explores the connection between the trends in digital use and identity experiences and mental health in generation Z in Punjab, India. The study examines interrelations among the use of social media, social comparison, perceived social support online, identity exploration, and psychological outcomes such as anxiety, depressive symptoms, and loneliness using the data obtained through an online survey (346 college students aged 1825). The survey considered both the quantitative and qualitative variables in online behaviour, which included the difference between active participation (posting, creating a content, engaging in discussions) and the passive consumption (scrolling, viewing the material of others). Descriptive statistics revealed high usage of social media daily with passive use as the common trend. Correlational and regression analyses showed that passive use and upward social comparison were the important predictors of high levels of anxiety and depressive symptoms. Although positively related to a sense of belonging and self-expression, identity exploration also revealed a small connection to a short-term emotional distress, indicating that identity work on digital platforms can be empowering and distressing. The cluster analysis showed three different user profiles, namely, Active Creators, who use the digital space predominantly by producing content; Passive Browsers, who use the digital space with little interaction; and Support-Seekers/Explorers who enter the digital space to establish emotional closeness and negotiate their identity. The groups had a considerable difference in mental health indicators and a sense of belonging online. The research is relevant to the research in explaining the effects of digital culture on the psychological world of Gen Z in Punjab. It has implications to educators, mental health practitioners, and policymakers who may wish to create healthier digital practices and institutional supportive interventions.
Keywords: Identity experiences, Mental health, social media, Digital culture, Gen Z

1. Introduction

Generation Z (hereafter, also known as Gen Z) is the first generation that has spent its life with the uninterrupted and unending exposure to digital media. Social media is not merely a means of communication to these young adults but a social space that is all-encompassing, in that social relationships are built, identities are discovered, and ordinary experiences are captured and shared. These virtual environments provide channels of belonging, entertainment, seeking information, creativity and even political engagement. Meanwhile, they are able to intensify factors that concern appearance, accomplishment, fashion, and peer approval. Consequently, social media acts as a resource and a risk factor among the youth of the current time and influences the emotional health, coping strategies, and self-identities. Gen Z is in their key developmental period as college life is associated with increased academic demands, becoming adults, and exploring their identities. Colleges are also a setting in which mental health needs are often manifested, and online and offline identities run into each other. To a lot of students, online communication affects their self-esteem, stress, and feelings of belonging to a group. These processes, in particular, are what should be comprehended in the context of the Indian setting, where mental health discussion is gaining momentum, yet stigma is still widespread. This paper concentrates on the Gen Z population in Punjab, India, in their college-going years. The young generation in Punjab is an active user of online platforms like Instagram, YouTube, WhatsApp, Snapchat, and short-video applications that are based on Tik Tok. They work in international cultures of the digital world and also negotiate local values, language identities, and social expectations. This hybridity of global and local forces (glocal digital identity) is what determines Punjab as a significant location to examine the influence of social media on psychological experiences. This study is based on theoretical frameworks, such as the Social Comparison Theory, the Uses and Gratifications Theory, and the Social Identity Theory, and focuses on how the various types of engagement, especially the passive and active modes of engagement, are associated with mental health outcomes and identity formation. The study will utilize the survey data of 346 students in various colleges in Punjab to achieve the following:

(a) outline trends of social media use,

(b) determine correlations between social comparison, digital support, identity exploration and mental health outcomes,

(c) consider mediation and moderation possibilities, and

(d) classify individual profiles using a cluster analysis.

Using the connection between digital behaviour and mental health and identity processes, the study will add to a further understanding of the lived experiences of Gen Z in an ever-digitized world.

2. Literature Review and Theoretical Framework

Maximizing opportunities and presenting challenges to mental health and identity formation, social media has become an essential part of the life of Generation Z. Studies indicate a two-fold effect: although online platforms may offer social connection, emotional support, and self-expression opportunities, they can also cause a negative social comparison and be a source of stressful content. Visual platforms (Instagram and TikTok) regularly feature filtered highlight reels of the lives of their users, and these may produce upward social comparisons. Such comparisons are always associated with low self-esteem, anxiety and depressive symptoms in young adults. On the other hand, being involved in online communities can also create a sense of belonging, offer peer support and counter stressor effects, which can be shown to be a complex interaction between social media use and psychological health. There are three theoretical perspectives that set the direction of this study. The Social Comparison Theory (Festinger, 1954) is the theory that postulates that people compare themselves to others. In a social media, where edited and perfected content is common, upward comparisons can enhance a sense of incompetence and stress. According to Uses and Gratifications Theory, the selection of platforms and behaviours is done on an active basis, depending on individual need, that is, entertainment, seeking information, and expressing identity; thus, motivations to use social media might affect psychological outcomes. Social Identity and Self-Concept Theories underline the importance of online space in exploring identities, in which there are multiple ways to be presented and this presentation will bring either identity solidification or fragmentation depending on responses and the social setting. Combining these frames, the current research will examine the impact of the patterns of social media use on the processes of mental health and identity among Gen Z. Also, identity exploration on the internet is conceptualized as a two-sided phenomenon: it may strengthen a sense of belonging and self-discovery, but it can also make the person more sensitive to bad criticism. The proposed research will help to better understand how digital culture influences stress experiences and identity formation by adopting a survey methodology to describe how the generation Z manages the impact of social media, mental health, and belonging at the intersection.

3. Research Aims, Questions, and Hypotheses

The main objective of the research paper is to examine the way Generation Z university students in Punjab manage the use of social media, social comparison, perceived online support, identity exploration, and mental health. Specifically, the research aims at understanding the complicated interrelation between online activity and psychological health, and the way online relationships determine a sense of belonging and self-identity among young adults. Through these dynamics, the research will seek to determine trends and processes, which may enhance or mitigate the presence of stress, anxiety, and depressive symptoms in the digital world.

3.1 Research Questions (RQs)

- RQ1: How Gen Z students in Punjab use social media (type of media, time spent on it, active and passive use)?
- RQ2: What are the relationship patterns between these social media usage patterns and mental health indicators, i.e. anxiety, depressive symptoms, and loneliness?
- RQ3: Does social comparison cause the influence of passive use of social media on mental health outcomes?
- RQ4: Does perceived online social support mediate any negative impact of social comparison on mental health?
- RQ5: Are there groups or individual users who vary in terms of social media behaviours, identity exploration, and mental health outcomes?

3.2 Hypotheses

- H1: It will be found that active social media use (e.g., scrolling without using) is positively correlated with anxiety, depressive symptoms, and loneliness.
- H2: Social comparison will mediate the effect of passive use of social media on worse mental health outcomes, whereby students who engage in social media measurement as contrasted to others will report more distress.
- H3: Perceived online social support will mediate the importance between social comparison and mental health, and more so high perceived social support will lessen the negative consequences of social comparison.
- H4: Online spaces and identity exploration will be positively related to a sense of belonging, though can also be marginally related to temporary distress through the exploration of self-idea and social role.

The study will yield empirical data on how social media influences psychological and social experiences of Gen Z learners in a subtle way. The study will shed light

on the approach to promoting digital well-being and adaptive identity formation in the college environment by defining the risk factors (e.g., passive use, social comparison) and protective factors (e.g., perceived online support).

4. Methods

4.1 Design

The research design in the study was a cross-sectional, quantitative survey conducted over the internet in order to examine the connections between social media usage, mental health, and identity among Gen Z college students.

4.2 Participants and Sampling

The sample that was analysed included 346 college students aged 18-25 years (Gen Z) of various colleges and universities located in Punjab, India. The respondents were contacted through college mailing lists, student clubs, and social media posts which targeted the Punjab-based student groups. The stratified convenience sampling was used to represent all the major academic disciplines (arts, commerce, science, and professional courses) and year of study. The following were the sample characteristics: mean age = 20.8 years (SD = 2.1); gender distribution: 159 males (46%), 180 females (52%), and 7 non-binary/prefer not to say (2%). Year of study consisted of 1st year = 78 (22.5%), 2 d year = 94 (27.2%), 3rd year = 92 (26.6%), and 4th year/ final UG and PG = 82 (23.7%). There was urban- background (210) and rural- background (136) participants. The data collection and recruitment were conducted at a period of three weeks and the survey took about 12 minutes of time.

4.3 Measures

Multi-item scales all used the 5-point Likert response scales (1 = Strongly disagree / Never; 5 = Strongly agree / Very often), and scale scores were computed as the mean of items, with higher scores indicating increased levels of the construct.

- Demographics and platform usage: age, gender, study year, urban/ rural status, devices, and daily social media usage (mean = 4.2 hours, SD = 1.8).
- Passive vs Active Use (4 items): evaluated propensity to browse content, in comparison to creation of content (0.78).
- Social Comparison (5 items): online comparisons frequency and impact (84 = 0.84).
- Perceived Online Social Support (5 items): the perceived online emotional and practical support (r = 0.81).
- Identity Exploration / Fragmentation (6 items): measured the use of social media to explore oneself and sensitivity of feedback (alpha = 0.76).

- Mental Health Indicators: anxiety (GAD-2, mean = 2.8, SD = 1.7), depressive symptoms (PHQ-2, mean = 2.6, SD = 1.6) and loneliness (UCLA-3, mean = 1.9, SD = 0.6).
- Other items: cyberbullying experiences (3 item), academic interference (2 item), help-seeking (1 item) and three open-ended questions regarding the perceived positives/negatives of social media.

4.4 Procedure

The survey started with an information sheet and informed consent; the answers were anonymous. The clarity and timing were tested during a pilot test using 28 students and some slight changes to the words were made.

4.5 Data Preparation and Analysis Plan

Data cleaning entailed elimination of duplicate data and cases whose response fraction was more than 30%. Mean imputation was used to deal with the missing values of the respondents whose missing percentage is lower than 10% on a scale. R and SPSS were used to make the analyses. Descriptive statistics were used to summarize sample variables in terms of social media usage and psychological health factors. Cronbach alpha was used to determine the internal consistency of multi-item scales. Bivariate analyses of important variables were done using Pearson correlations. To predict anxiety and depression, hierarchical multiple regression analyses were done and controlled the demographics and usage patterns. Mediation analyses were done to assess the role of social comparison in the relationship between passive use of social media and anxiety. Perceived online social support was tested to moderate moderation using moderation terms and include interaction terms. Lastly, the k-means cluster analysis was adopted in order to determine the specific social media usage pattern among the participants and this offered the study insight into the behavioural patterns and mental health outcomes of the patterns.

5. Results

5.1 Descriptive Statistics and Reliability

Descriptive statistics and reliability of the selected study. The researchers used 346 participants mostly Gen Z college students and assessed the main constructs in terms of social media use, identity exploration, and mental health outcomes. Table 1 presents the descriptive statistics and the internal consistency coefficients of the key scales performed in the survey.

Table 1. Descriptive statistics and reliability (n = 346)

Construct	Items	Mean	SD	Range	Cronbach's α
Passive Use	4	3.60	0.92	1–5	0.78
Social Comparison	5	3.41	0.88	1–5	0.84

Construct	Items	Mean	SD	Range	Cronbach's α
Online Social Support	5	3.11	0.93	1–5	0.81
Identity Exploration	6	3.52	0.76	1–5	0.76
Anxiety (GAD-2)	2	2.80	1.70	0–6	—
Depression (PHQ-2)	2	2.60	1.60	0–6	—
Loneliness (UCLA-3)	3	1.90	0.60	1–3	—

The internal consistency of all the multi-item scales was acceptable (meaning, 0.76 or higher) which is reliable enough to analyse it at the group level. 5.2 Platform Use and Patterns The respondents indicated that they had a heavy use of various social networks. WhatsApp was most popular (96%), then YouTube (88%), a photo-sharing platform like Instagram (84%), a short video application like Tik Tok (72%), and Facebook (46%). The average time per day on social media was 4.2 hours (SD = 1.8), with 62% of the respondents saying that they spend more than 3 hours per day on it. Active content creation was less common: only a quarter said that they posted original content regularly or very frequently, but 72 percent of them had moderate to heavy passive browsing, like scrolling or looking at posts put up by others. This tendency indicates that there is more observational use than interactive or creative interaction in the sample.

5.3 Correlations

Pearson correlations between main constructs are presented in Table 2.

Table 2. Selected correlation matrix

Variable	1	2	3	4	5	6
1. Passive Use	—					
2. Social Comparison	.45**	—				
3. Online Support	.10*	−.28**	—			
4. Identity Expl.	.22**	.20**	.18**	—		
5. Anxiety (GAD-2)	.38**	.50**	−.30**	.15**	—	
6. Depression (PHQ-2)	.35**	.48**	−.26**	.13*	.72**	—

*p < .05; **p < .01

Key observations include

- Passive use is fairly correlated with social comparison (r =.45) and anxiety (r =.38).

- Social comparison indicates good relationships with anxiety (r =.50) and depression (r =.48).
- The perceived online social support has negative associations with anxiety (r = -.30) and social comparison (r = -.28), which implies a protective role of perceived online social support.
- There is a positive relationship between identity exploration and perceived belonging and a moderate positive relationship between identity exploration and anxiety (r =.15), indicating that there may be slight stress or uncertainty associated with identity exploration online.

5.4 Predicting Anxiety: Hierarchical Regression

The hierarchical regression mode was performed to find the predictors of anxiety (GAD-2 scores). Demographics (age, gender, urban / rural) were addressed in Block 1, time on social media and passive use in Block 2, social comparison and online support in Block 3 and identity exploration in Block 4.

Model	**ΔR²**	**Predictors (standardized β)**
Block 1	.02	Gender (β = .06, p = .11), Age (β = −.03)
Block 2	+.16***	Passive Use (β = .21, p < .001); Hours (β = .12, p = .02)
Block 3	+.18***	Social Comparison (β = .35, p < .001); Online Support (β = −.22, p < .001)
Block 4	+.01*	Identity Exploration (β = .09, p = .04)

Table 3. Hierarchical regression summary predicting anxiety Final model R^2 = .37 (Adjusted R^2 = .36), F(8,337) = 24.9, p < .001.

The results have shown that the strongest positive predictors of anxiety are passive browsing and social comparison, and the perceived online support has a protective effect. The positive contribution of the identity exploration is a minor yet significant difference, which emphasizes the potential of self-exploration to produce a weak form of stress in the control of other factors. 5.5 Mediation Analysis A mediation analysis was used to determine the mediating effect of social comparison on passive use in anxiety. Bootstrap estimation with 5,000 samples was used and demonstrated: • β of total effect of passive use on anxiety: = -.36, p <.001. And, directly affecting social comparison: β =.18, p <.01. • Indirect effect through social comparison: 95%

CI =.12- 25. Interpretation: The passive use to anxiety relationship has a partial mediation by social comparison where a higher passive browsing increases social comparison which subsequently increases anxiety. 5.6 Moderation Analysis The moderation analysis explored the possibility of social support over the internet alleviating the social comparison to anxiety relationship. It is significant (Social Comparison × Online Support) (= -.11, p =.01, 50=.02). Simple slope analysis was revealed: Low online support (−1 SD): strong social comparison - anxiety association (=.62, p =.001). • High online support (+1 SD): weaker association (0.30, p <.001). In this way, the negative impact of social comparison on anxiety is alleviated but not completely removed by perceived online support. 5.8 Cluster Analysis: User Profiles. Passive use, hours of use, social comparison, and online support as the input data in K-means clustering (k = 3) resulted in three user profiles: 1. Active Creators (n = 98; 28.3%): Low passive- use, decreased social comparison, online support, reduced anxiety/depression. Those who participated often published original content and indicated they had a positive experience in the community. 2. Passive Browsers (n = 142; 41.0%): The greatest passivity using, social comparison, less online support, and most anxiety and depressive symptoms. 3. Support-Seeker/Explorer (n = 106; 30.7%): Moderate use/browsing, exploratory high identity, moderate support online, and high anxiety. The results of ANOVA proved that differences between clusters were significant in the case of anxiety (F (2,343) = 38.4, p <.001), social comparison (F = 72.1, p <.001) and online support (F = 45.2, p <.001). 5.8 Qualitative Responses The thematic analysis of open-ended answers (n 280) revealed positive and negative experiences: + Intangibles: There is a sense of belonging and community, availability of information and career opportunities, creative self-realization. • Dangers: Being exposed to unrealistic social comparisons, distracting studies, misinformation, and cyber-bullying. Suggestions: The respondents suggested campus digital literacy workshops, peer-moderated support groups, and mechanisms of handling the notifications and internet time. 5.9 Summary of Results On the whole, the results show that passive use of social media, as well as interaction based on comparison, is closely associated with anxiety and depressive symptoms in Gen Z, whereas online

social support becomes a protective factor that neutralizes the adverse impact. Heterogeneous experiences can be seen through the individual user profiles, and an emphasis should be placed on the idea that the interventions must be designed according to the varying patterns of social media use.

6. Discussion

6.1 Summary of Main Findings

With this research on 346 Gen Z college students in Punjab, researchers get to understand that social media use and connection to mental health and identity formation are intertwined in their complexity. The findings emphasize the fact that the social media use patterns are not only recreational but also have significant psychological consequences. To start with, passive social media consumption where an individual scrolls and reads posts of others without any action is closely linked to increased distress. Unless they are active users, they tend to participate in upward social comparison comparing themselves with edited images of their fellow users. This comparison highly forecasts anxiety and depressive symptoms. Mediation analysis establishes that social comparison is the best way to describe a significant part of the relationship between passive browsing and unfavourable mental health, highlighting the cognitive and emotional processes of digital stress. Secondly, there is perceived online social support which acts as a protective mechanism. The students, who feel supported within online communities, report a reduced number of depressive symptoms and reduced negative effects brought about by social comparison. Passive engagement has mental health risks that are mitigated by online interactions that are validate, encouraging, and can give empathetic feedback. This observation highlights how digital spaces can be used as a source of emotional strength in case they are perceived as supportive as opposed to evaluative. Thirdly, there are inconsistent effects of identity exploration on social media. Although searching interests, communities, and self-expression online will bring about a sense of belonging in students, it also creates anxiety. Self-discovery and affirmation are among the positive factors in identity work that runs side by side with weaknesses of feedbacks, comparing with peers, and not knowing how to present oneself. Lastly, individual user profiles are significant in the prediction of mental health. Clustering analysis shows that there is the heterogeneity among students: Passive Browsers were more susceptible to anxiety and depression whereas Active Creators (people who generate and share content) reported fewer instances of distress and were positively correlated with perceived social support. These trends are in line with the social comparison theory and previous research findings

that engagement style, and not just the duration of screen time, is a well-being determinant.

6.2 Theoretical Implications

The results narrow down our knowledge on the formation of digital identity among Gen Z members, especially in the regional area of Punjab. Social media is a feedback mechanism, and positively rewarded, identity and belonging are reinforced, whereas negatively appraised or upward comparatively, uncertainty and stress may increase. Parital mediation through social comparison indicates that there are several mechanisms through which social media behaviour has an impact on mental health: some of the impacts are cognitive-affective (comparison-driven) whereas others might be due to sleep disturbance, distracter or other lifestyle factors that are not addressed in this study. These findings demonstrate the subtly different impact of digital culture on the identity and psychological wellbeing.

6.3 Implications to Campuses and Policy Practically

- The research recommends practical measures to learners and the policy makers:
- Digital literacy and resilience initiatives: Educate students on passive versus active use, awareness on identifiable curated content, and the way of coping with social comparison (e.g., mindfulness, cognitive reappraisal).
- Create positive online communities: Support regulated peer networks on academic topics, hobbies or recovery and foster compassionate and collaborative behaviour

Similar to depression screen: Pinpoint the students with self-reported high passive use and social comparison regarding anxiety or depressive symptoms, addressing the concept of digital behaviours as a part of mental health testing, the following strategy is recommended:

- Platform design suggestions: Keep encouraging social media sites to test out features to minimize comparison (e.g. hide likes, encourage private sharing), and maximize supportive interaction.

6.4 Limitations

The research has a number of limitations. The cross-sectional design does not allow inference of causality; longitudinal studies must be conducted to determine directionality. Self-report measure dependence can cause bias, and a possibility of future work involves incorporating passive digital trace data into work. The sample is not completely random, though the sample is diverse throughout

Punjab, and this restricts the outer applicability to non-college students. Lastly, short screening tools (GAD-2, PHQ-2) do not offer as much diagnostic detail.

6.5 Future Research Direction.

This future research must consist of:

- The longitudinal monitoring of the use of social media and mental health during college transitions.
- Interview based mixed method research to investigate the narrative of identity and interpretation of feedback.
- Intervention trials that examined digital literacy interventions and peer-based support of reduction of social comparison.
- Comparison of platforms, visual, text-based, and ephemeral content effects.

Conclusion

This analysis of 346 Gen Z college students in Punjab is an example of the interplay between social media use and mental health and identity development in complex ways. Social media is not merely a communication and entertainment device, but it acts as the place where identity exploration, social comparison, and emotional experiences intersect. Passive use, when an individual scrolls and views the content of other users without becoming active, is one of the most important results that turn out to be one of the most important predictors of anxiety and depressive symptoms. This trend is mostly attributed to upward social comparison where students compare themselves with the filtered and possibly idealistic images of their peers. The passive users are especially susceptible to stress and negative affect; thus, the risk of cognitive and emotional harm related to digital observation. On the other hand, online social support is perceived as a protective measure. Online student communities that provide support to students display reduced depressive symptoms and have a greater capacity to counter the negative impacts of social comparison. This result highlights how online platforms would help to promote resilience and a sense of belonging, as long as the communication is not judgmental. The manifestation of identity exploration by means of social media is a two-sided phenomenon. On the one hand, it increases the sense of belonging and self-discovery of the students, but at the same time, it may cause anxiety because of the uncertainty, peer evaluation, and feedback mechanisms. The cluster analysis also indicates that users are heterogeneous: Passive Browsers are more distressed and Active Creators are less distressed and are more likely to report perceived social support. Such tendencies indicate that the psychological effects of social media are not only related to the time of use, but also depend on the content and the type of interaction.

Interventions that are tailored, as opposed to unanimous ones, will probably be most effective in the context of encouraging well-being. Finally, social media can influence Gen Z and their stress, belonging, and identity in subtle manners. Passive browsing and social comparison make people prone to the development of anxiety and depressive symptoms; meanwhile, positive online relationships and engagement may make the person feel better. Together with the insight into these dynamics, educators and policymakers can devise plans to make the most of the positive aspects of the digital culture and minimize its risks, which will result in healthier and more resilient student communities in the world where people are becoming more interconnected.

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