2026 Volume: 02 Issue: 01 www.ijrpa.com ISSN 2456-9995 Research Article

International Journal Research Publication Analysis

Page: 01-21

SILENT DISPLACEMENT: CLIMATE-INDUCED MIGRATION AND THE INTERSECTING CRISIS OF LIVELIHOODS, GOVERNANCE, AND SOCIAL EQUITY

Dr. Ravindra D. Hande*[1] and Dr. Piyush Telang[2]

[1]Assistant Professor, Dept. of Geography, SNDT College of Arts and Commerce for Women, Pune.

[2]Assistant Professor, Dept. of Geography, Sir Parashurambhau College (Empowered Autonomous), Pune.

Article Received: 19 December 2025
Article Revised: 07 January 2026
Published on: 27 January 2026

***Corresponding Author: Dr. Ravindra D. Hande**
Assistant Professor, Dept. of Geography, SNDT College of Arts and Commerce for Women, Pune.

DOI: https://doi-doi.org/101555/ijrpa.5784

ABSTRACT

Climate-induced migration represents one of the most pressing yet underappreciated global crises of the twenty-first century. As climate change accelerates, millions of people worldwide are being forcibly displaced due to rising sea levels, extreme weather events, droughts, and environmental degradation. This comprehensive review paper synthesizes current knowledge on climate-induced population displacement, examining the social, economic, and political consequences for both migrants and receiving communities. Drawing on 30+ contemporary academic sources and empirical studies from 2017-2025, this paper explores the multifaceted dimensions of climate migration, including the push- pull dynamics of environmental stressors, the gendered vulnerabilities of displaced populations, livelihood adaptation strategies, and the critical governance gaps in international and national policy frameworks. The review identifies that while climate migration is increasingly recognized as an adaptation strategy, displaced populations remain largely excluded from formal decision-making processes, left vulnerable to exploitation, trafficking, and resource scarcity. The paper argues that addressing climate migration requires integrated, transnational governance mechanisms that recognize the intersecting vulnerabilities of women, marginalized communities, and least-developed countries. Research gaps identified include the need for comprehensive longitudinal studies on livelihood outcomes of climate migrants, nuanced understanding of the climate-conflict nexus in migration decision-making, and policy

frameworks that center the agency and rights of displaced populations.

KEYWORDS: Climate migration, environmental displacement, livelihood resilience, gender vulnerability, governance, adaptation strategies, social equity.

INTRODUCTION:

The relationship between environmental change and human migration is not new. Historically, societies have responded to ecological stress through strategic relocation, seasonal migration, and adaptive livelihood practices. However, the pace, scale, and irreversibility of contemporary climate change presents unprecedented challenges. The United Nations High Commissioner for Refugees (UNHCR) projects that between 50 to 200 million people may be displaced by 2050 due to climate-related factors (Adger et al., 2014). More recent estimates suggest that 170 million people could be internally displaced by 2050 under pessimistic climate scenarios, with significant concentrations in Sub- Saharan Africa, South Asia, East Asia, and the Pacific regions (Statista, 2023). Yet despite these alarming projections, climate-induced migration remains one of the most under- resourced, under-researched, and legally ambiguous crises of the contemporary moment. Unlike refugees displaced by conflict or political persecution, climate migrants lack international legal protection. They are not recognized in the 1951 Refugee Convention, leaving them vulnerable to exploitation, statelessness, and exclusion from basic services. This legal invisibility is compounded by the problem of multi-causality: climate change rarely acts in isolation. Environmental stressors intersect with poverty, political instability, weak governance, and deeply entrenched inequalities making it difficult to isolate "climate" as a primary driver of migration (Piguet, 2008; Daoust & Selby, 2024).

The consequences of climate-induced displacement extend far beyond individual migrants. Receiving communities face strain on water, food, and energy resources. Host governments grapple with tensions between providing humanitarian support and managing xenophobia. Origin communities experience demographic disruption, loss of labor capacity, and erosion of cultural continuity. At the global level, climate migration intersects with existing geopolitical inequalities: low-latitude countries with low development status experience increasing out-migration, while mid-to-high latitude developed countries experience in-migration exacerbating existing global inequalities in a warming world (Bordone et al., 2025).

This review paper synthesizes contemporary knowledge on climate-induced population

displacement. It examines the environmental, socio-economic and political drivers of climate migration which analyzes the differential impacts on women, marginalized communities, and least-developed countries. The paper also synthesizes evidence on livelihood adaptation strategies and critically assesses the governance frameworks (or lack thereof) that should be managing this crisis. The paper concludes by identifying critical research gaps and suggesting pathways for integrated, transnational, rights-based policy responses.

Defining Climate Migration:

Climate-induced migration, also called environmental migration or climate displacement, refers to the movement of people whether voluntary or forced driven primarily by environmental degradation, climate variability, and climate change impacts (Bates, 2002). However, this seemingly straightforward definition masks considerable theoretical and practical complexity.

Typologies of Climate Stressors:

Bates (2002) proposed an influential taxonomy distinguishing three categories of environmentally-driven migration:

1. **Disasters**: Sudden-onset environmental events (floods, cyclones, earthquakes, tsunamis) that necessitate immediate displacement.
2. **Expropriation**: Deliberate human actions that displace populations (dam construction, land acquisition, mining development)
3. **Degradation**: Slow-onset environmental changes (desertification, salinization, sea- level rise, groundwater depletion) that gradually render landscapes uninhabitable.

This typology is important because rapid-onset and slow-onset stressors operate through different mechanisms. Rapid-onset events (floods, cyclones) trigger immediate, acute displacement; slow-onset changes allow households to adapt, resist, or migrate progressively, but their cumulative effect can be equally or more devastating (Kaenzig & Piguet, 2021).

The Problem of Multi-Causality:

A persistent challenge in climate migration scholarship is isolating "climate" as a singular cause. The decision to migrate rarely depends on environmental factors alone. Rather, migration decisions reflect complex negotiations among multiple push factors (environmental degradation, poverty, violence, political marginalization) and pull factors (economic opportunities, access to services, social networks in destination areas). Adger et al. (2014)

emphasize that environmental stress operates as a "threat multiplier," exacerbating existing vulnerabilities created by poverty, inequality, and weak governance.

Fransen & Dasgupta (2025), in a comprehensive scoping review of climate risks for displaced populations, argue that conceptual clarity is necessary but missing from current literature. Many studies use the terms "sensitivity," "vulnerability," and "adaptive capacity" interchangeably, leading to confusion about whether populations are vulnerable because of their exposure to hazards, their inherent sensitivities, or their limited capacity to adapt. This lack of definitional clarity obscures rather than illuminates the mechanisms through which climate change displaces people.

Distinguishing Climate Migration from Climate Immobility:

Emerging research reveals a further complication: not all climate-stressed populations migrate. Appiah et al. (2025), working in Ghana, found that while 21.7% of people migrated in response to climate exposure, 49.9% remained immobile despite significant climatic vulnerabilities. This immobility occurs for multiple reasons: lack of resources to migrate, social networks concentrated in origin areas, cultural attachment to land, legal status restrictions, or household responsibilities. Understanding climate immobility which is the constraints that prevent people from migrating despite climate stress is as important as understanding climate migration itself.

Global Patterns and Regional Vulnerabilities:

Climate-induced displacement is not evenly distributed globally. Rather, it concentrates in regions with specific combinations of high climate exposure, low adaptive capacity, and socio-economic vulnerability.

The Global Geography of Climate Migration:

According to the World Bank's 2021 Groundswell Report, climate migration will disproportionately affect the Global South. Projections suggest that by mid-century, 216 million people could become internal climate migrants across six regions: Sub-Saharan Africa, South Asia, East Asia & Pacific, North Africa, Latin America, and Eastern Europe & Central Asia (Statista, 2023). However, these are conservative estimates assuming significant adaptation investments; without such investments, numbers could be substantially higher.

Almulhim et al. (2024), in a systematic literature review on climate-induced migration in the

Global South, found that rising temperatures, water stress and droughts, and floods and sea-level rise have displaced millions of people, resulting in both internal and transboundary migration. Their analysis revealed disproportionate impacts on populations in South Asia (Bangladesh, India, Pakistan) and Sub-Saharan Africa, where climate-sensitive agricultural livelihoods combine with limited adaptive capacity and weak governance.

South Asia (The Regional Epicenter):

South Asia exemplifies the interconnection of climate vulnerability, migration, and geopolitical complexity. Bangladesh, positioned at the delta of the Ganges-Brahmaputra-Meghna River systems and facing rising sea levels, is particularly at risk. The Bangladeshi government projects that millions of people could be internally displaced by 2050 due to riverbank erosion, cyclones, flooding, and sea-level rise (BBS, 2019). The southwestern coastal region faces particular threats from salinity intrusion, which has rendered previously productive agricultural land unusable, forcing pastoral and farming communities to migrate.

India also faces significant climate migration pressures, particularly in regions like the Sundarbans (a shared ecologically sensitive region with Bangladesh), the Deccan Plateau, and drought-prone areas of Rajasthan and Gujarat. The Indian government, recognizing these pressures, introduced the Climate Migrants (Protection and Rehabilitation) Bill 2022, though the legislation has not yet passed Parliament (Migration Policy Institute, 2024). The bill's proposed measures include legal recognition of climate migrants, employment guarantees, education access, and mental health support.

However, South Asian governments face a critical governance challenge: the absence of bilateral or regional agreements on climate migration. India and Bangladesh, despite being neighbors and allies, have no formal agreements on migration management or climate adaptation cooperation. This governance vacuum is filled by non-governmental organizations (NGOs) like Practical Action and ENGAGE4Sundarbans, which facilitate cross-border knowledge sharing and adaptation support but NGO efforts cannot substitute for comprehensive governance frameworks (Kishtwari, 2024).

Drought, Desertification, and Displacement in Sub-Saharan Africa:

Sub-Saharan Africa faces escalating displacement pressures from drought and desertification. The Sahel region—a semi-arid zone spanning multiple countries—

experiences recurrent droughts exacerbated by climate change. These droughts destabilize pastoral livelihoods, forcing pastoral communities from Mali, Niger, Burkina Faso, and beyond to migrate in search of water and grazing land. Unlike agricultural communities that migrate once and resettle, pastoral communities experience complex patterns of seasonal and circular migration, with climate variability triggering permanent displacement when dry seasons become prolonged or rainfall becomes too unpredictable (Migration Policy Institute, 2023).

Food and water insecurity compounds displacement pressures. As agricultural productivity declines due to changing rainfall patterns and ecosystem degradation, rural populations, particularly subsistence farmers who face intensifying livelihood crises that make migration increasingly necessary (FAO, 2018). Recent research from Appiah et al. (2025) on Ghana, and from earlier studies in Burkina Faso and Niger, reveals that migration often represents not a preferred strategy but a survival response to the exhaustion of all other adaptation options.

Existential Threats in Island Nations and Coastal Zones:

For island nations like Kiribati, the Maldives, and Tuvalu, climate migration is not an abstract future risk but an existential present reality. Rising sea levels threaten to render these territories uninhabitable within decades. Citizens of these nations face unique legal and political challenges: they face potential statelessness if their territories become submerged. The international community has yet to develop legal frameworks for "climate refugees" from sinking island nations (UNFCCC, 2007). The case of small island states underscores the profound inadequacy of existing international legal instruments for addressing climate-induced displacement.

Environmental Drivers of Climate Migration:

Climate-induced migration emerges at the intersection of multiple environmental stressors. Understanding these stressors and how they interact is essential for designing effective adaptation and policy responses.

Rapid-Onset Environmental Stressors:

The extreme weather events such as cyclones, floods, and storms cause immediate displacement and destruction of livelihoods. Bangladesh experiences recurrent cyclones; Pakistan endured catastrophic flooding in 2022 and Sub-Saharan Africa experiences increasingly intense rainfall events. However, recent research complicates the assumption

that rapid-onset events necessarily increase migration. Rahman et al.'s (2017) research in Bangladesh found that migration actually decreased immediately after flooding, as households remained to salvage assets or cope with the acute crisis. This "disruption versus displacement" phenomenon suggests that rapid-onset events disrupt existing livelihood strategies rather than necessarily triggering permanent migration.

Apart from these, the gradual sea-level rise from thermal expansion of oceans and ice sheet melting erodes coastlines and inundates low-lying areas. Bangladesh's Sundarbans, the Indus Delta in Pakistan, and the Mekong Delta in Vietnam all experience saltwater intrusion, rendering agricultural land unusable. These processes often force migration but operate on decadal timescales, creating periods of "adaptation" before forced displacement becomes inevitable.

Slow-Onset Environmental Degradation:

The persistent drought in regions like the Sahel, Horn of Africa, and Central Asia drives desertification—the conversion of productive land to desert. This process, while gradual, is often irreversible on human timescales. Once desertification reaches certain thresholds, land cannot support grazing or agriculture, and communities have no choice but to migrate. The Sahel's expanding desert has displaced millions of pastoral communities over recent decades (IOM, 2024).

Groundwater depletion, glacier retreat, and changing precipitation patterns reduce access to freshwater in many regions. The depletion of aquifers in South Asia and North Africa threatens both agricultural livelihoods and urban water security. As freshwater becomes scarce, populations migrate from water-stressed regions toward areas with more reliable water access.

Deforestation, overfishing, and biodiversity loss deplete resources essential for subsistence livelihoods. In regions dependent on forest products (timber, forest foods, medicinal plants) or marine resources, ecosystem degradation directly undermines livelihoods and triggers migration (IUCN, 2021).

Compound and Intersecting Environmental Stressors

Environmental stressors rarely operate in isolation. Droughts reduce agricultural productivity and water availability; floods destroy infrastructure and contaminate water; heat stress reduces crop yields and labor productivity; sea-level rise combines with storm surge to amplify coastal flooding. These compound stressors create cascading vulnerability that

exceeds the impact of any single stressor (Fransen & Dasgupta, 2025).

Recent research emphasizes the importance of understanding how slow-onset and rapid-onset stressors interact. For example, prolonged drought weakens agricultural livelihoods and depletes household assets; when a rapid-onset flood then occurs, households lack the resources to recover. This cascade of shocks often triggers migration as the final adaptation strategy when all other options are exhausted.

Socio-economic Consequences:

Climate-induced migration has profound socioeconomic consequences for both migrants and receiving communities. These consequences extend far beyond the individual migrant to affect households, communities, and national economies.

Livelihood Collapse and Economic Vulnerability:

For millions of people in the Global South, livelihoods depend directly on climate- sensitive sectors: agriculture, pastoralism, fishing, forestry. Climate change destabilizes these sectors through multiple mechanisms: changed rainfall patterns reduce crop yields; heat stress increases livestock mortality; shifting fish stocks reduce catches; and ecosystem degradation reduces forest resources. Black et al. (2013) estimate that climate change- driven agricultural collapse is a primary driver of migration among subsistence farmers in Sub-Saharan Africa and South Asia.

The economic consequences are staggering. In 2019, an estimated 302 billion hours of potential labor capacity were lost globally due to extreme heat equivalent to 4-6% of GDP in countries like India and Indonesia (Bordone et al., 2025). These losses disproportionately affect poor households and low-wage workers, deepening existing economic vulnerabilities.

Migration as Livelihood Diversification Strategy:

For many rural households, particularly in South Asia, migration has become a central component of livelihood diversification. Rather than viewing migration as a failure of adaptation or a last resort, scholars increasingly recognize migration as a rational livelihood strategy as one of several mechanisms households use to manage risk, smooth income volatility, and access new economic opportunities (Mallick & Saha, 2025). Diversified livelihoods combining agriculture, remittances from migrated family members, and local wage labor provide households with greater resilience than dependence on agriculture alone.

However, this scholarly emphasis on migration as livelihood strategy risks obscuring the

coercive pressures driving migration. Households don't freely "choose" to have family members migrate; rather, they migrate because environmental stress leaves them no alternative. The distinction between migration as rational strategy and migration as forced displacement is critical for policy design.

The Urban Challenge:

Climate migrants predominantly move to urban areas and secondary cities, where they anticipate better access to employment, services, and infrastructure. Dhaka, Lagos, and other rapidly urbanizing cities in the Global South have experienced explosive growth partially driven by climate migration (Siddiqui, 2012). However, the rapid influx of climate migrants often overwhelms urban infrastructure. Water systems become strained; solid waste management becomes inadequate; housing becomes unaffordable; and informal settlements proliferate.

Moreover, rapid urbanization driven by climate migration creates conditions for social tension. Competition for water, land, and jobs between migrants and established urban residents can trigger xenophobia and conflict. Research from Nigeria documents rising urban instability associated with the influx of climate migrants, particularly in contexts where governance is weak and inequality is high (Adeola, 2021). The phenomenon of "double displacement" where migrants escape climate risks only to encounter severe urban vulnerabilities underscores that urban migration is not necessarily a successful adaptation strategy.

Transnational Remittances and Origin Community Impacts:

Climate migrants who successfully secure employment in destination areas often send remittances to family members remaining in origin communities. These remittances can fund adaptation investments (improved housing, livelihood diversification) and provide crucial income smoothing for vulnerable households. However, origin communities also experience significant economic disruption when working-age individuals migrate. Agricultural productivity declines due to lost labor; cultural and social continuity is disrupted; and communities become increasingly dependent on remittance income, creating vulnerability if migrant employment becomes unstable.

Gendered Vulnerabilities:

Climate-induced migration does not affect all populations equally. Women, particularly in

low-income countries and developing regions, experience heightened vulnerability to climate stressors and differential consequences from migration.

Structural Foundations of Gendered Climate Vulnerability:

Gender inequalities shape climate vulnerability across multiple dimensions. Anjum et al. (2025), in a systematic review of climate change and gendered vulnerability in low- and middle-income countries, found that women experience heightened vulnerability due to:

1. **Reduced access to productive resources**: In many societies, women have limited land rights, credit access, and agricultural training. When climate stress threatens livelihoods, women have fewer alternative livelihood options than men.
2. **Caregiving burdens**: Women disproportionately bear responsibility for water collection, food preparation, care of children and elderly, and household maintenance. When climate change increases water scarcity or reduces food availability, women's workload intensifies. This caregiving burden limits women's time for income-generating activities and adaptation planning.
3. **Health vulnerabilities**: Climate-driven health crises (diarrheal disease from water insecurity, malnutrition from food insecurity) disproportionately affect women through increased maternal mortality and reproductive health complications. In Bangladesh, climate events restrict women's access to sexual and reproductive health services, heightening vulnerability to maternal complications (Anjum et al., 2025).
4. **Limited voice in decision-making**: Women are significantly under-represented in formal climate adaptation decision-making, agricultural extension services, anddisaster risk reduction planning. This exclusion means that adaptation strategies often neglect women's specific vulnerabilities and priorities.

Gender Dynamics of Migration

The relationship between gender and climate migration is complex and context- dependent. In some contexts, men migrate while women remain experiencing intensified immobility, workload, and vulnerability. Diis (2024) research from Nepal found that men's climate-driven labor migration, often to India or the Gulf states, leaves women with all household and agricultural responsibilities. When male migration is driven by failed livelihood strategies or economic desperation, women left behind experience what researchers call "gendered immobility" however, they cannot migrate due to cultural norms, family responsibilities, and lack of independent income, yet remain vulnerable to climate stresses without support

networks.

Conversely, in some contexts, women do migrate. Research from Vietnam and Bangladesh shows that women migrate to engage in domestic work, informal sector jobs, and sex work. However, women migrants face heightened risks of exploitation, trafficking, and gender-based violence. The absence of legal protection and recognition for climate migrants exacerbates these vulnerabilities.

Preston et al. (2024) emphasize that gender dimensions of climate migration intersect with other forms of inequality (caste, ethnicity, disability, sexuality). Madhesi Dalit women in Nepal, Adivasi women in India, and Rohingya women in Bangladesh face compounded vulnerabilities arising from the intersection of climate stress, gender inequality, caste/ethnic discrimination, and political marginalization.

Adaptation Exclusion:

A critical paradox characterizes climate adaptation in many developing regions: women play central roles in sustaining household and community resilience, yet are largely excluded from formal adaptation decision-making and adaptation financing. Women's traditional ecological knowledge about drought-resistant crops, water conservation, and resource management is crucial for community adaptation. Yet women are largely absent from agricultural extension services, community disaster risk reduction committees, and climate adaptation policy design.

Research from South Asia documents this paradox extensively. Despite women being primary agricultural producers in many regions and bearing disproportionate adaptation burdens, they are excluded from agricultural credit schemes, training programs, and formal adaptation planning (Anjum et al., 2025). This exclusion means that adaptation strategies often fail to address women's vulnerabilities and may inadvertently exacerbate them by reinforcing existing gender inequalities.

Political Consequences:

Climate-induced migration intersects with political economy in multiple ways, from exacerbating resource-based conflicts to revealing profound governance failures.

The Climate-Conflict Nexus:

Research increasingly documents connections between climate stress, migration, and conflict.

Environmental degradation and climate-driven livelihood collapse can trigger resource competition, social tensions, and violence. Raleigh et al. (2015) document this "climate-conflict nexus" in detail: as water and land become scarcer due to environmental degradation, competition intensifies; when governance is weak or corrupt, this competition can escalate into organized violence.

The relationship is not deterministic and climate stress doesn't automatically cause conflict. Rather, climate stress operates as a "threat multiplier," exacerbating existing political tensions, inequality, and group grievances. In contexts where governance is weak, inequality is high, and grievances are salient, climate stress can tip dynamics toward conflict. The Syrian drought (2006-2009) and subsequent rural-to-urban migration contributed to social tensions that, combined with political grievances, contributed to the outbreak of civil war (Siddiqui, 2012).

Governance Failures and the Protection Gap:

The most fundamental political consequence of climate migration is the protection gap. Unlike refugees fleeing persecution (who are protected under the 1951 Refugee Convention), climate migrants lack international legal status. They are not recognized in any major international convention. This legal invisibility creates profound protection gaps: climate migrants cannot access humanitarian assistance mandated under international law; they cannot claim asylum status; and they are vulnerable to exploitation, trafficking, and discrimination.

Kishtwari (2024) documents how India's Citizenship Amendment Act (2019) and Assam's National Register of Citizens have intensified this protection gap for Bangladeshi climate migrants. Millions of Bangladeshi nationals live in India without legal status, facing deportation threats while contributing significantly to India's economy. Yet without legal recognition, they cannot access education, healthcare, or formal employment.

The governance failure extends beyond international law to national adaptation planning. Despite recognizing climate migration as an issue, most governments in vulnerable regions have failed to develop comprehensive adaptation strategies. Bangladesh has been a partial exception, developing its National Adaptation Programme of Action and promoting secondary city development to direct climate migration. However, most national climate adaptation plans remain vague on migration, inadequately funded, and disconnected from livelihood support and social protection systems (Migration Policy Institute, 2024).

The Geopolitics of Climate Migration:

Climate migration raises novel geopolitical tensions. Migration patterns follow climatic gradients: low-latitude vulnerable countries experience out-migration while mid- to-high latitude developed countries experience in-migration. This pattern exacerbates existing global inequalities, concentrating migrants from the poorest regions into wealthier destinations that resist accepting them. Developed countries benefit from climate-driven out-migration from vulnerable regions (which reduces pressure for climate justice and climate finance), while those same countries are unwilling to accept climate migrants, creating a morally and politically untenable situation.

Bilaterally, climate migration creates tensions between neighbors. India and Bangladesh face mounting tensions over cross-border migration, with Indian politicians making unsubstantiated claims about millions of "illegal Bangladeshi immigrants." These claims fuel xenophobia and impede bilateral cooperation on shared challenges like Sundarban ecosystem management and coastal protection (Kishtwari, 2024). Without formal bilateral agreements, cooperative mechanisms, and political commitment, cross- border climate migration will continue generating geopolitical friction.

Livelihood Adaptation Strategies and Resilience-Building:

How do households and communities adapt to climate stress without migrating? What strategies allow displaced populations to rebuild livelihoods? Understanding livelihood adaptation is crucial for supporting community resilience and reducing forced displacement.

On-Farm and Agricultural Adaptation:

There is a vast majority of agricultural producers having small landholdings in the Global South who employs multiple on-farm adaptation strategies. Aniah et al. (2019) and Liu et al. (2022) document the range of agricultural adaptations: changing planting dates and cropping patterns, adopting drought-tolerant crop varieties, diversifying crops, implementing soil conservation strategies, and drawing on indigenous ecological knowledge. These adaptations, while valuable, require inputs (improved seeds, water infrastructure, extension services) and knowledge that many marginal farmers lack.

Research reveals that successful agricultural adaptation depends on three critical factors: (1) access to credit for purchasing improved inputs; (2) participation in farmer cooperatives for collective knowledge-sharing and collective bargaining; and (3) agricultural training and extension services. He et al. (2024) found that smallholder farmers with access to all three

factors demonstrated significantly higher livelihood resilience than those without. Conversely, many small farmers lack access to any of these factors, limiting their adaptive capacity.

Livelihood Diversification:

Beyond agricultural adaptation, livelihood diversification combining agriculture with non-farm income sources (petty trade, wage labor, informal manufacturing) is a crucial adaptation strategy. Liu et al. (2022) distinguish between two types of livelihood diversification: "stepping out" (developing entirely new livelihoods away from agriculture) and "stepping up" (enhancing existing agricultural production). Both strategies can enhance resilience by reducing dependence on climate-sensitive agriculture.

Intergenerational livelihood strategies are particularly important. Mallick & Saha (2025) research from Bangladesh documents how multi-generational households distribute livelihood responsibilities: older adults provide experiential knowledge and long-term perspective; working-age adults engage in wage labor and business; younger members bring innovation and access to new markets. This intergenerational cooperation allows households to combine traditional agricultural knowledge with access to new livelihood opportunities, enhancing overall household resilience.

Planned Relocation and Managed Adaptation:

For populations in highly vulnerable areas (sinking coastal zones, severely desertified regions), traditional in-situ adaptation may be insufficient. Planned relocation; the deliberate, pre-planned movement of communities away from vulnerable areas to safer locations, with government support and community consent represents a form of proactive adaptation. Bangladesh and India have experimented with planned relocation programs, though with mixed results. Successful planned relocation requires: (1) genuine community participation in decision-making; (2) livelihood support and income generation in relocated areas; (3) cultural sensitivity and respect for community attachment to place; and (4) long- term government commitment rather than one-time resettlement assistance.

Critical Research Gaps:

Despite growing scholarly attention, significant gaps remain in climate migration research that limit both theoretical understanding and policy effectiveness. While extensive research documents the displacement process and immediate migration drivers, far less examines the long-term livelihood outcomes of climate migrants in destination areas. Critical unanswered

questions include how climate migrants fare economically compared to other migrants, whether they successfully transition to new livelihoods or remain trapped in precarious informal employment, how outcomes differ based on gender, age, education, and origin community characteristics, and whether remittances from climate migrants effectively support origin communities. These questions remain largely unexplored due to the methodological difficulty of conducting longitudinal research that follows migrant populations over extended periods (Rajan & Gosh, 2025). Additionally, while research increasingly examines impacts on migrants, relatively little systematically analyzes how climate migration affects receiving communities. The environmental impacts of concentrated in-migration on urban and peri-urban ecosystems, perceptions of climate migrants among receiving communities and their effects on social cohesion, and the conditions under which host communities benefit versus experience strain all require deeper investigation. Issa et al. (2023) identified this gap in the climate change-migration-health nexus as particularly critical for understanding indirect consequences of displacement.

Fransen & Dasgupta (2025) argue convincingly that climate migration research suffers from lack of conceptual clarity regarding fundamental terms including "exposure," "sensitivity," "vulnerability," and "adaptive capacity." Without unified definitions and consistent terminology, findings from different studies cannot be easily compared or aggregated, limiting the field's cumulative knowledge. Moreover, the research landscape relies heavily on qualitative case studies, which provide rich contextual understanding but constrain generalizability; more comparative research using standardized metrics would strengthen the evidence base and enable meta-analyses. While researchers have documented correlations between climate stress and conflict, understanding the specific mechanisms through which environmental change triggers violence remains incomplete. Under what conditions does climate stress escalate to organized violence versus leading to peaceful adaptation or migration? How do institutional factors such as governance quality, presence of land titling systems, and minority status mediate the climate-conflict relationship? These questions require more rigorous, theory-driven research that moves beyond correlation to identify causal pathways and contextual moderators.

Appiah et al. (2025) highlight that research on "climate immobility" where people remaining in climate-vulnerable areas despite environmental stress is dramatically under- developed, representing a critical blind spot in the migration literature. Why do some people remain

immobile when environmental conditions deteriorate? What are the consequences of immobility for health, livelihoods, and social cohesion? How does immobility interact with migration among other household members, and what does this mean for household survival strategies? Understanding immobility is crucial for designing adaptive policies that recognize that not all populations can or choose to migrate, and that immobility often reflects constrained agency rather than preference. The legal status of climate migrants remains contested and unresolved at the international level, creating a protection vacuum. International law currently provides no specific protection for climate migrants, and while multiple proposals have been advanced including the concept of "climate refugees" but none have gained international consensus. More research is needed on the feasibility and implications of formally recognizing "climate refugees" in international law, alternative protection mechanisms that don't require formal refugee status, how existing conventions such as the Guiding Principles on Internal Displacement and Palermo Protocol on human trafficking can be adapted to address climate migration, and the relative merits of regional agreements versus universal frameworks.

While research increasingly recognizes that climate impacts are gendered, less attention addresses other dimensions of inequality and how they intersect. How do age, disability, caste/ethnicity, sexuality, and religious identity shape climate vulnerability and migration experiences? How do intersecting inequalities create compounded vulnerabilities beyond what gender alone explains? Research from Nepal (Diis, 2024) begins addressing intersectionality, but this remains an under-developed area that requires theoretical advancement and empirical investigation. Finally, much research identifies necessary policy responses, but few studies systematically evaluate which policies or policy combinations actually reduce climate migration risks or effectively support climate migrants. Which adaptation investments most effectively build livelihood resilience? Do cash transfer programs enhance adaptive capacity or increase dependency? How do different forms of livelihood support compare in terms of effectiveness and sustainability cash transfers, in-kind assistance, training, or credit access? Rigorous impact evaluation research using experimental or quasi-experimental designs is urgently needed to move from policy prescriptions to evidence-based best practices.

Policy Imperatives:

The research synthesized in this paper points toward several critical policy priorities. The absence of international legal status for climate migrants represents a fundamental governance failure that demands immediate attention. While formally recognizing "climate

refugees" may prove difficult given persistent disagreements about definition and scope, alternative protection mechanisms must be developed without delay. Options include expanding the 1951 Refugee Convention to explicitly include climate migrants, developing a standalone international convention specifically addressing climate migration, strengthening existing mechanisms such as the Guiding Principles on Internal Displacement to explicitly address climate-induced displacement, or creating a hybrid approach that combines international soft law with robust national legislation. Each pathway presents distinct advantages and challenges, but the status quo where millions lack legal protection simply because their displacement stems from environmental rather than political causes constitutes an untenable moral and legal vacuum.

Nations sharing vulnerable regions must establish bilateral agreements and regional cooperation mechanisms for climate migration management, particularly in hotspots like the Sundarbans shared by India and Bangladesh, the Indus Valley spanning Pakistan and India, and countries bordering the Sahel. These mechanisms should address data sharing on climate impacts and migration flows, joint adaptation investments that benefit both sending and receiving areas, protocols for managing cross-border migration, comprehensive livelihood support for migrants, and formal dispute resolution mechanisms to handle tensions that inevitably arise. Regional organizations like SAARC and BIMSTEC should be leveraged for this purpose, as they provide existing institutional frameworks through which climate migration cooperation can be routinized and normalized (Kishtwari, 2024).

National governments must develop comprehensive adaptation strategies that explicitly address climate-induced migration, with particular focus on livelihood protection as the cornerstone of such efforts. These frameworks should prioritize investing in livelihood diversification and on-farm adaptation for vulnerable populations who wish to remain in place, expanding access to credit, training, and cooperatives for rural populations to build resilience, constructing climate-resilient infrastructure in vulnerable areas to reduce risk exposure, supporting planned relocation where in-situ adaptation is insufficient, and providing robust livelihood support and social protection for displaced populations to prevent their descent into extreme poverty.

Adaptation policies must explicitly address gender inequalities that amplify climate vulnerability through transformative rather than merely incremental approaches. This requires including women in adaptation decision-making at all levels from household to national planning, recognizing and valorizing women's traditional knowledge and livelihood contributions rather than dismissing them as informal, addressing care burden

inequalities through expanded public service provision rather than expecting women to absorb additional responsibilities, ensuring women's land and property rights through legal reform and enforcement, and implementing gender-transformative rather than merely gender-sensitive adaptation that challenges rather than reinforces existing gender norms. Without such transformation, adaptation risks entrenching the very inequalities that make women more vulnerable to climate change in the first place.

Cities experiencing in-migration from climate stress must plan proactively for population growth rather than treating migrants as temporary or illegitimate residents. This requires expanding informal settlements into planned neighborhoods with adequate water, sanitation, and housing rather than demolishing them, creating informal-to-formal livelihood transition pathways that recognize and build upon migrants' existing skills, investing in climate-resilient urban infrastructure that can accommodate growing populations, addressing social tensions through community dialogue and inclusive planning rather than reactive policing, and ensuring access to education and healthcare for migrant populations, particularly children who represent the future workforce and citizenry. Urban planning that fails to account for climate migration will inevitably produce fragmented, inequitable, and crisis-prone cities.

CONCLUSION:

Climate-induced migration represents one of the defining challenges of the coming decades. As this review has documented, environmental change, social inequality, and political failure have converged to create unprecedented displacement. Unlike refugees fleeing violence or persecution, climate migrants lack international legal protection. Unlike economic migrants, their movement is driven by environmental necessity rather than opportunity. They occupy a legal and political limbo invisible to international law, neglected in national adaptation planning, and vulnerable to exploitation and trafficking. Yet this review also documents emerging scholarship and policy responses that offer hope. Research increasingly recognizes climate migration as a central adaptation issue rather than a peripheral environmental problem. Bangladesh and India have begun developing climate migration policies, and India's proposed Climate Migrants Bill represents a step toward legal recognition. NGOs are filling governance voids by facilitating cross-border cooperation and livelihood support. Scholarly consensus is emerging around several key principles: (1) climate migration must be understood as intersecting with existing inequalities of gender, caste, class, and geography; (2) adaptation and livelihood support are preferable to migration when possible, but migration is a legitimate adaptation strategy when necessary; (3) climate migrants require legal

protection and rights-based support; and(4) addressing climate migration requires integrated, transnational governance frameworks.

The research gaps identified in this review point toward necessary next steps. Longitudinal studies of migrant livelihood outcomes, comparative research using standardized metrics, impact evaluations of adaptation policies, and intersectional analyses of vulnerability are all needed. Equally important are governance innovations: bilateral agreements between vulnerable neighbors, adaptive management of climate migration within national frameworks, and international legal mechanisms for climate migrant protection. Ultimately, climate migration is not merely an environmental or development issue but it is a justice issue. People in least-developed countries, who have contributed minimally to greenhouse gas emissions, are bearing disproportionate costs of climate change through displacement, livelihood loss, and impoverishment. The Global North benefits from the out-migration of climate-vulnerable populations (reducing pressure for climate justice) while resisting their in-migration. Addressing this injustice requires recognition of climate migrants' rights, support for livelihood resilience in vulnerable regions, and commitment to equitable global responses to a fundamentally unequal crisis.

REFERENCES:

1. Adger, W. N., Safra de Campos, R., & Siddiqui, T. (2014). Migration, remittances, and adaptation to climate change. Working Paper. World Bank.
2. Almulhim, A. I., Zhang, L., & Thompson, R. (2024). Climate-induced migration in the Global South: An in-depth systematic review on environmental stressors, impacts, and population displacement. *Nature Communications*, 15(4821), 1-15.
3. Adeola, F. O. (2021). Climate migration and urban governance in Nigeria: Between adaptation and vulnerability. *Environmental Research Letters*, 16(5), 054025.
4. Aniah, P., Ohakwe, J., Amoakoh, S., & Owusu-Prempeh, N. (2019). Smallholder farmers' livelihood adaptation to climate change in the Upper West Region of Ghana. *Cogent Food & Agriculture*, 5(1), 1628746.
5. Anjum, G., Shafique, M., Aziz, I., & Ahmed, W. (2025). Climate change and gendered vulnerability: A systematic review of health impacts in low- and middle- income countries. *The Lancet Public Health*, 13(3), e156-e167.
6. Appiah, S. C. Y., Osei-Amponsah, C., & Andoh, B. (2025). Climate-induced migration and climate immobility in Ghana: A mixed-method assessment of adaptation and vulnerability. *Journal of Environmental Studies*, 45(2), 234-256.
7. Bates, D. C. (2002). Environmental refugees? Classifying human migrations caused by

environmental change. *Population and Environment*, 23(5), 465-477.

8. BBS (Bangladesh Bureau of Statistics). (2019). Cyclone preparedness and climate migration in Bangladesh. National Bureau Report.
9. Black, R., Kniveton, D., & Schmidt-Verkerk, K. (2013). Migration and climate change: Assessing the evidence. *Global Environmental Change*, 23(5), 1209-1221.
10. Bordone, V., Brüderl, J., & Reuter, M. (2025). Evidence of climate and economic drivers affecting migration in an unequal and warming world. *Nature Climate Change*, 15(1), 78-85.
11. Cipollina, C., Daoust, G., & Selby, J. (2024). Climate as a hidden driver: Rethinking migration in the context of global warming. *Environmental Politics*, 33(2), 245-263.
12. Climate-Diplomacy. (2024). India and Bangladesh must address climate migration together. Retrieved from https://climate-diplomacy.org/magazine/environment/india-and-bangladesh-must-address- climate-migration-together
13. Daoust, G., & Selby, J. (2024). Climate change and the patterns of migration: A meta-analysis. *Global Environmental Change*, 85, 102795.
14. Diis (Danish Institute for International Studies). (2024). Climate migration amplifies gender inequalities. Policy Brief. Copenhagen: DIIS.
15. FAO (Food and Agriculture Organization). (2018). Climate change, agriculture and food security: Impacts and adaptation. FAO Technical Report.
16. Fransen, S., & Dasgupta, A. (2025). Climate risks for displaced populations: A scoping review and theory-driven research agenda. *Journal of Refugee Studies*, 38(3), 722-751.
17. He, X., Liu, W., & Chen, Y. (2024). Linking smallholders' livelihood resilience with their adaptive strategies to climate change on the Tibetan Plateau. *Ecology and Society*, 29(2), art7.
18. IUCN (International Union for Conservation of Nature). (2021). Ecosystem degradation and climate-driven displacement: Global assessment. IUCN Technical Report.
19. IOM (International Organization for Migration). (2024). Global Report on Climate- Related Migration. Geneva: IOM.
20. Issa, R., Patel, V., & Vinck, P. (2023). Gaps and opportunities in the climate change, migration and health research nexus. *Health Policy and Planning*, 38(2), 183-192.
21. Kaenzig, R., & Piguet, E. (2021). Synthesizing the literature on environmental migration: A classification framework. *Environmental Research Letters*, 16(4), 043005.
22. Kishtwari, S. (2024). India and Bangladesh climate migration governance: Challenges and pathways to cooperation. *Asian Security*, 20(1), 45-68.
23. Liu, W., He, X., & Chen, Y. (2022). Livelihood adaptive capacities and adaptation strategies of farmers confronting multiple disaster types under climate change. *Frontiers in Sustainable Food Systems*, 6, 1067649.
24. Mallick, S., & Saha, P. (2025). Intergenerational strategies for adaptive livelihoods among

climate-displaced families in Bangladesh. *Forced Migration Review*, 88, 42- 47.

25. Migration Policy Institute. (2023). Climate migration and the Sahel: Governance, adaptation, and resilience. Policy Report. Washington: MPI.
26. [26] Migration Policy Institute. (2024). Climate change in Bangladesh shapes internal migration patterns. MPI Analysis. Available at: https://www.migrationpolicy.org/article/bangladesh-india-climate-migration
27. Piguet, E. (2008). Climate change and forced migration. In *Environmental Migration and Social Conflict* (pp. 67-89). Springer.
28. Pimentel, D. (2020). Human rights and climate displaced populations: Towards new legal frameworks. *International Journal of Human Rights*, 24(3), 406-429.
29. Rajan, M., & Gosh, S. (2025). Climate migration research: Gaps in existing literature. *Journal of Environmental Studies and Sciences*, 15(1), 89-106.
30. Raleigh, C., Jordan, L., & Salehyan, I. (2015). Assessing the impact of climate variability on civil conflict. *Climatic Change*, 113(3-4), 711-736.
31. Rigaud, K. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., ... & Shearer, C. (2021). Groundswell: Preparing for Internal Climate Migration. Washington DC: World Bank.
32. Siddiqui, T. (2012). Mapping internal climate migration in South Asia. *Regional Development Dialogue*, 32(2), 54-67.
33. Statista. (2023). Global climate migration projections. Munich: Statista Research Department.
34. UNFCCC (United Nations Framework Convention on Climate Change). (2007). Climate change: Impacts, vulnerabilities and adaptation in developing countries. Technical Paper.
35. UNHCR (United Nations High Commissioner for Refugees). (2020). Global trends: Forced displacement in 2020. UNHCR Annual Report. Geneva: UNHCR.
36. UNHCR. (2021). UNHCR's strategic framework for climate action. Geneva: UNHCR.
37. UN Women. (2023). Gender and climate change in South Asia. Regional Report. New York: UN Women.