



REVIEW ARTICLE

CLIMATE-INDUCED MIGRATION: PATTERNS, DRIVERS, AND POLICY IMPERATIVES FOR A WARMING WORLD

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ABSTRACT

Background: Climate change is increasingly recognized as a fundamental driver of human displacement. Rising sea levels, prolonged droughts, intensifying cyclones, and unpredictable precipitation patterns are disrupting livelihoods and forcing communities from their homes. While migration has historically been a human adaptive strategy, the scale and compulsion associated with climate-induced displacement challenges existing humanitarian, legal, and policy frameworks. **Objective(s):** This paper examines the principal mechanisms through which climate change drives human migration, analyses the demographic and geographic profiles of climate migrants, evaluates the adequacy of current international legal frameworks to protect climate-displaced persons, and proposes evidence-based policy recommendations to address this escalating global challenge. **Methods:** A systematic review of peer-reviewed academic literature, reports from intergovernmental organisations (UNHCR, IOM, IPCC, World Bank), and case studies from climate-vulnerable regions was conducted. Thematic analysis was employed to identify patterns in drivers, destinations, and policy gaps. Comparative analysis of legal instruments was undertaken to assess protection deficits. **Results:** Evidence indicates that climate change currently displaces an estimated 21.5 million people annually, with projections suggesting 216 million internal climate migrants by 2050 under moderate warming scenarios. Slow-onset events, including desertification and sea-level rise, produce sustained displacement, while sudden-onset disasters generate acute migration surges. The most affected populations are in South Asia, Sub-Saharan Africa, and Small Island Developing States. Existing refugee law does not recognise climate displacement, creating a significant protection gap. **Conclusions:** Climate-induced migration represents one of the most pressing humanitarian and governance challenges of the twenty-first century. The existing international framework is inadequate to protect climate migrants. A multi-pronged response — encompassing legal recognition, adaptation financing, managed retreat programmes, and bilateral migration agreements — is urgently required. Early, ambitious climate action remains the most effective long-term preventive measures.

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INTRODUCTION

Human beings have always moved. Migration is as old as the species itself — a response to scarcity, conflict, opportunity, and the restless human impulse for survival. Yet the migration of the twenty-first century carries a new and uniquely troubling character: an increasing proportion of people are not choosing to move but are being compelled to do so by the changing climate of the planet they inhabit. Climate-induced migration — the movement of people driven, in whole or in significant part, by environmental and climatic changes — has emerged as one of the defining humanitarian crises of our time. The evidence is unambiguous. The Intergovernmental Panel on Climate Change (IPCC) in its Sixth Assessment Report (2021–2022) confirmed with high confidence that anthropogenic greenhouse gas (GHG) emissions have already

raised average global temperatures by approximately 1.1°C above pre-industrial levels. This seemingly modest rise has already set in motion cascading physical consequences — melting glaciers, rising seas, more intense storms, deeper droughts, and longer heatwaves — that are undermining the ecological foundations upon which human settlements depend. When those foundations erode, people move. The Internal Displacement Monitoring Centre (IDMC) estimates that weather-related disasters displaced approximately 21.5 million people annually between 2008 and 2016, and these figures have grown since. The World Bank's Groundswell report (2021) projects that, without decisive climate action, up to 216 million people could become internal climate migrants across six world regions by 2050. These are not abstract future projections: communities in Bangladesh, Kiribati, the Sahel,

and coastal Louisiana are already relocating. The question is no longer whether climate-induced migration will occur, but rather how it will be governed, who will bear its costs, and how those displaced can be protected. This paper is structured as follows. The Introduction contextualises the phenomenon within the broader discourse on climate change. The Materials and Methods section describes the review methodology. The Results synthesise findings on drivers, patterns, and affected populations. The Discussion critically evaluates the legal and policy landscape and proposes recommendations. The Conclusion summarises key insights and identifies avenues for future research.

MATERIALS AND METHODS

This paper adopts a qualitative, systematic review methodology. A comprehensive search of peer-reviewed academic literature published between 2000 and 2024 was conducted using databases including Google Scholar, JSTOR, and ResearchGate. Search terms employed included 'climate migration,' 'environmental displacement,' 'climate refugee,' 'sea-level rise displacement,' 'drought-induced migration,' and 'climate adaptation migration.' Only sources available in English were included. In addition to academic literature, grey literature was systematically reviewed. This included flagship reports from the IPCC, UNHCR, IOM, World Bank, Internal Displacement Monitoring Centre (IDMC), and UNFCCC subsidiary bodies. Policy documents, treaty texts, and decisions from major climate conferences (COP21 through COP28) were also reviewed for their relevance to the governance of climate displacement. Thematic analysis was employed to organise findings around three primary themes: (1) the physical drivers and mechanisms of climate-induced migration; (2) the demographic, geographic, and gendered dimensions of climate displacement; and (3) the legal and policy frameworks governing climate migrants. Comparative analysis was used to assess the gap between current legal protections and the protection needs of climate-displaced persons. Case studies from Bangladesh, Sub-Saharan Africa, Pacific Island nations, and the Maldives were selected on the basis of their salience in the existing literature and their representativeness of different displacement typologies.

RESULTS

Mechanisms and Drivers of Climate-Induced Migration:

The relationship between climate change and migration is mediated through a complex set of environmental, economic, and social pathways. Scholars distinguish between two principal categories of climate-related displacement: sudden-onset and slow-onset events, each producing distinct migration dynamics. Sudden-onset disasters — including tropical cyclones, floods, and storm surges — represent the most visible drivers of climate displacement. These events displace people acutely, often within hours or days, and on a massive scale. Cyclone Amphan (2020) displaced nearly 2.4 million people in India and Bangladesh in a single event. While many displaced by sudden-onset disasters eventually return home, repeated events can render return impossible, particularly when infrastructure is destroyed or land is permanently inundated. The compounding frequency of such events under climate change is critical: as global temperatures rise, the intensity of tropical storms is projected to increase, and extreme

precipitation events are expected to become more frequent and severe.

Slow-onset events are equally — perhaps more — consequential but attract less immediate media attention. These include sea-level rise, glacial retreat and downstream water scarcity, desertification, soil salinisation, and the gradual degradation of agricultural viability. In low-lying coastal and delta regions — Bangladesh's Ganges-Brahmaputra delta, the Mekong Delta in Vietnam, and Pacific atolls — incremental sea-level rise is making land permanently uninhabitable through a combination of permanent inundation, storm surge amplification, and saltwater intrusion into freshwater aquifers and agricultural soil. Drought and water scarcity constitute perhaps the most globally widespread slow-onset driver of migration. The Sahel region of Sub-Saharan Africa provides one of the most documented cases. Declining and increasingly erratic rainfall, combined with desertification driven by both climate change and land use practices, has undermined pastoral and agricultural livelihoods across Niger, Mali, Chad, and Sudan. The resulting migration flows — largely internal and to regional urban centres — are intertwined with violent conflict over shrinking resources, illustrating the difficulty of isolating 'climate' as a cause from a nexus of intersecting vulnerabilities. The concept of the 'climate-conflict-migration nexus' has gained increasing scholarly attention. Research by Hsiang et al. (2013) demonstrated a statistical correlation between interannual temperature variations and conflict incidence. The Syrian civil war (2011–present), often cited as a partial case study of climate-conflict-migration linkage, was preceded by an extraordinary 2006–2010 drought that devastated agriculture in northeastern Syria, displacing approximately 1.5 million rural inhabitants to cities, exacerbating unemployment and political grievances. While it would be reductive to attribute the Syrian crisis to climate alone, the drought was a significant stress multiplier that interacted with political repression, economic inequality, and ethnic tension to produce a catastrophic humanitarian outcome.

Geographic and Demographic Dimensions: Climate-induced migration is not uniformly distributed. It is concentrated overwhelmingly in regions that have contributed least to global GHG emissions, raising profound questions of climate justice. Three regions are consistently identified in the literature as facing the most severe displacement risk: South and Southeast Asia, Sub-Saharan Africa, and Small Island Developing States (SIDS).

South Asia — particularly Bangladesh — represents perhaps the most acute case globally. Bangladesh combines extreme exposure (low-lying geography, major river deltas, high cyclone frequency) with extremely high population density and significant poverty. Estimates suggest that up to 20 million Bangladeshis could be displaced by sea-level rise alone by 2050. Internal migration from coastal and char (river island) areas to Dhaka and other cities is already well underway. Studies of communities on chars in the Jamuna River system demonstrate that repeated flooding cycles have trapped households in a pattern of displacement, return, and redisplacement that erodes assets and deepens poverty across generations. In Sub-Saharan Africa, the World Bank's Groundswell report (2021) identifies the region as facing the highest number of internal climate migrants: up to 86 million by 2050 under a pessimistic scenario. Drivers include drought

in the Sahel and Horn of Africa, cyclones in Mozambique and Madagascar, and sea-level rise threatening coastal cities including Dar es Salaam, Lagos, and Accra. The 2022 East Africa drought — the worst in 40 years — displaced hundreds of thousands across Kenya, Ethiopia, and Somalia, compounding existing displacement from conflict. SIDS face an existential threat from sea-level rise that is qualitatively different from that faced by larger nations: the loss not merely of homes but of entire national territories. The Republic of Kiribati, Tuvalu, and the Maldives have all engaged in international diplomacy premised on the prospect of national territory becoming uninhabitable within decades. Kiribati has purchased land in Fiji as part of a 'migration with dignity' strategy. These cases challenge fundamental concepts of international law including sovereignty, statehood, and nationality. Gender intersects with climate migration in critical ways. Women and girls are disproportionately vulnerable to the negative consequences of forced displacement. In many climate-affected communities, when men migrate in search of income (economic migration driven by climate-impacted livelihoods), women are left behind to manage households with reduced resources, increased workloads, and heightened exposure to gender-based violence. Conversely, when entire families are displaced, women and girls face heightened risks in displacement camps and urban informal settlements. A gender-responsive approach to climate migration policy is therefore not optional but essential.

The Legal and Policy Landscape: Protection Gaps: The most significant finding of this review with respect to governance is the profound legal protection gap facing climate-displaced persons. The 1951 Refugee Convention and its 1967 Protocol — the cornerstone of international refugee law — define a refugee as a person who is outside their country of origin owing to a well-founded fear of persecution on the grounds of race, religion, nationality, political opinion, or membership of a particular social group. Climate and environmental displacement does not fit within this definition.

Attempts to expand the refugee definition to include climate migrants have been consistently resisted by states wary of the financial and political implications of accepting broader protection obligations. National courts in Australia and New Zealand have considered — and rejected — asylum claims by Pacific Islanders on climate grounds, though New Zealand's Immigration and Protection Tribunal came close to recognising such a claim in 2014. The result is that climate-displaced persons who cross international borders have no recognised legal status: they are neither refugees nor economic migrants in any established category, leaving them in a regulatory vacuum. Within international climate negotiations, the Warsaw International Mechanism for Loss and Damage (WIM), established at COP19 (2013) and expanded at COP27 (2022) with a new Loss and Damage Fund, represents the most direct acknowledgment of climate-induced displacement within the UNFCCC process. The WIM's Task Force on Displacement has produced actionable recommendations, including strengthening national capacities for displacement risk monitoring and integrating displacement risk into National Adaptation Plans. However, implementation has been slow, funding remains inadequate, and the Loss and Damage Fund — while a significant political achievement — has not yet generated the scale of resources required. The Global Compact on Refugees (2018) and the Global Compact for Safe, Orderly and Regular Migration (2018) both reference environmental

and climate factors as drivers of displacement, marking a significant normative shift. However, neither compact is legally binding. They represent soft law — aspirational frameworks that depend on voluntary state commitment for implementation. While they represent meaningful progress, they fall far short of creating enforceable rights for climate migrants.

DISCUSSION

The evidence reviewed in this paper points to an intensifying and spatially concentrated humanitarian challenge that current international frameworks are structurally ill-equipped to address. The discussion proceeds through three analytical lenses: the inadequacy of existing law, the case for adaptation-centred policy, and the imperative of structural climate action. The definitional exclusion of climate migrants from the 1951 Refugee Convention is not merely a legal technicality. It has material consequences. Without recognised status, climate migrants are unable to access the protections, legal rights, and resettlement pathways available to Convention refugees. They are rendered invisible to the humanitarian system. Addressing this gap requires political will at the global level. Two principal approaches have been proposed in the literature. The first is to negotiate a new, standalone legal instrument specifically for climate migrants — a 'climate refugee convention.' The second is to develop complementary protection mechanisms under existing frameworks, avoiding the politically fraught renegotiation of the 1951 Convention. The second approach is more realistic in the near term, though less normatively satisfying.

Regardless of legal architecture, adaptation-centred policy represents the most humane short-to-medium-term response to climate-induced migration. Adaptation reduces the drivers of displacement by strengthening communities' capacity to remain in place despite climate stresses. Investment in coastal protection infrastructure, drought-resistant agriculture, early warning systems, and urban resilience in receiving cities can reduce forced displacement. 'Managed retreat' — the planned, supported relocation of communities from high-risk areas — represents an intermediate approach that acknowledges the limits of in-situ adaptation while seeking to make relocation voluntary, dignified, and supported rather than chaotic and impoverishing. Examples from the Pacific, including the relocation of communities from Fiji's coastal islands with government support, offer instructive (if imperfect) models. The climate justice dimension of climate-induced migration demands emphasis. The populations most exposed to climate migration risk have contributed negligibly to the GHG emissions that are destabilising the climate system. The global north, which bears primary historical responsibility for cumulative emissions, has a corresponding ethical obligation to finance adaptation, provide climate migration pathways, and support loss and damage mechanisms. The political unwillingness of wealthy nations to accept climate migrants or fund adequate adaptation in the global south represents a form of moral inconsistency — accepting the benefits of industrialisation while externalising the costs onto the world's most vulnerable people. It is also essential to resist the securitisation of climate migration — the framing of climate migrants as a 'security threat' requiring border enforcement rather than a humanitarian challenge requiring protection. This framing, common in political discourse in Europe and North

America, distorts both the ethical obligations and the practical policy choices available. Climate migrants are not threats. They are people whose displacement has been, to a significant degree, caused by the emissions of the very countries now building walls against them. Looking forward, several policy priorities emerge from this analysis. First, states should develop bilateral and multilateral labour mobility pathways that allow climate-vulnerable populations in SIDS and other high-risk areas to migrate in an orderly, dignified manner before displacement becomes acute — transforming reactive emergency displacement into proactive, planned migration. New Zealand's Pacific Access Category, which already provides managed migration pathways for Pacific Islanders, is an imperfect but instructive model. Second, climate finance flows must be substantially scaled up, with a specific allocation for human mobility and managed retreat. Third, national disaster risk reduction strategies and National Adaptation Plans must integrate migration as a legitimate adaptation strategy, not merely a failure of adaptation. Fourth, investment in data collection on climate migration — particularly disaggregated by gender, age, and economic status — is essential to evidence-based policymaking. The role of urban areas deserves particular mention. The majority of climate migrants move not across international borders but within their own countries, and most move to cities. Dhaka, Karachi, Lagos, and Dar es Salaam are already absorbing large flows of climate-affected internal migrants, often into informal settlements with inadequate water, sanitation, and housing. Urban planning and governance in climate-receiving cities must anticipate these flows and invest proactively in inclusive infrastructure rather than reacting after informal settlements become entrenched and social tensions escalate.

CONCLUSION

Climate-induced migration is not a future possibility. It is a present reality, already reshaping communities, cities, and international relations across the globe. This paper has argued that the physical drivers of climate displacement — sudden-onset disasters and slow-onset environmental degradation alike — are intensifying under anthropogenic climate change, and that the populations most severely affected are those least responsible for the crisis and least equipped with resources to manage it. The existing international legal framework, centred on the 1951 Refugee Convention, was designed for a different world and does not adequately protect climate-displaced persons. This protection gap is compounded by the inadequate flow of climate finance to adaptation in the most vulnerable regions, the slow operationalisation of loss and damage mechanisms, and the political reluctance of wealthy nations to accept climate migration as a legitimate form of managed mobility. The policy imperatives identified in this paper — legal recognition or complementary protection for climate migrants, substantially scaled adaptation finance, integration of managed migration into adaptation planning, urban investment in climate-receiving cities, and proactive bilateral mobility agreements — are not new. They have been articulated by scholars, advocates, and international bodies for more than a decade. What is lacking is the political will to implement them at the scale required. The most powerful long-term intervention, however, remains ambitious, rapid decarbonisation. Every fraction of a degree of warming averted reduces the scale of future displacement. Climate-

induced migration is ultimately a symptom; the disease is unmitigated climate change. Addressing the symptom requires urgent humanitarian and legal action. Addressing the disease requires a transformation of the global energy system. Both are necessary. Neither is sufficient alone. Future research should focus on longitudinal studies of climate migrant communities to track outcomes over time; on the psychosocial dimensions of climate displacement; on the specific vulnerabilities of groups at the intersection of climate exposure and pre-existing marginalisation (including women, children, indigenous communities, and persons with disabilities); and on the effectiveness of different policy instruments — from managed retreat programmes to climate-specific visa categories — in different regional contexts. The governance of climate migration is a field in urgent need of evidence, creativity, and political courage.

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GLOSSARY OF ABBREVIATIONS

GHG — Greenhouse Gas
IDP — Internally Displaced Person
IDMC — Internal Displacement Monitoring Centre
IPCC — Intergovernmental Panel on Climate Change
IOM — International Organisation for Migration
MENA — Middle East and North Africa
NDC — Nationally Determined Contribution
SIDS — Small Island Developing States
UNHCR — United Nations High Commissioner for Refugees
UNFCCC — United Nations Framework Convention on Climate Change
WIM — Warsaw International Mechanism for Loss and Damage

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