Sinking landscapes and shifting communities: climate-induced displacement and governance challenges in Kerala's Kuttanad region

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ABSTRACT

This paper examines slow-onset climate-induced displacement in Kerala's Kuttanad, a distinctive agroecological landscape situated below sea level, shaped by environmental fragility and enduring cultural resilience. Based on field research conducted between 2024 and 2025, which included oral histories, stakeholder interviews, and policy reviews, the study demonstrates how sea-level rise, salinity intrusion, and recurrent flooding are steadily diminishing the region's habitability. Framed within ecological justice and critical climate governance perspectives, it reveals how domestic and international governance gaps render such displacement legally and politically invisible. Technocratic adaptation projects, notably the Thanneermukkom Bund and the Kuttanad Package, are criticised for exacerbating socio-ecological vulnerabilities by overlooking local knowledge and excluding community participation. The paper highlights the limitations of global instruments, such as the UNFCCC and the 1951 Refugee Convention, which fail to adequately address the protection needs of internally displaced populations affected by slow-onset events. Positioning Kuttanad as symptomatic of wider failures in global climate governance, it calls for a justice-oriented, multi-scalar framework that safeguards the rights and agency of affected communities. The analysis emphasises the integration of local knowledge systems, institutionalising participatory planning, and moving beyond carbon-centric, infrastructure-led adaptation. Without formal recognition and equitable access to legal and financial mechanisms, vulnerable regions in the Global South will continue to be excluded from substantive climate action and support.

Keywords: *Climate-induced displacement, Ecological justice, Global climate governance, Local knowledge systems, Wetland vulnerability, Internal migration, Climate adaptation policy, Global South.*

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1. Introduction

One of the most pressing complex global issues of the twenty-first century is the increasing severity of climate change, which has disproportionately negative effects on ecologically sensitive and socioeconomically vulnerable people in the Global South (IPCC, 2022). Among these effects, displacement brought on by climate change resulting from gradual environmental changes has become a crucial but underappreciated issue in scholarly discourse and policy practice (UNHCR, 2020; International Organization for Migration, 2019). Gradual processes, such as sea-level rise, salinisation, land degradation, and ecosystem decline, gradually threaten livelihoods and habitability, often without prompting immediate responses, in contrast to sudden-onset disasters that garner immediate humanitarian and media attention (Bettini, 2014; Siders et al., 2019). The international legal framework is yet unprepared to handle such migrations, despite the rising awareness of the connections between human mobility and climate change. The 1951 Refugee Convention limits protection to cross-border relocation caused by persecution and does not recognise environmental factors as grounds for refugee status (McAdam, 2012). In a similar vein, although the UNFCCC's Warsaw International Mechanism for Loss and Damage and the Cancun Adaptation Framework suggest rhetorical progress, internal climate displacement remains insufficiently addressed due to their non-binding nature (Biermann & Boas, 2010; Kalin, 2010). As a result, millions of people who have been internally displaced by environmental pressures still lack institutional support and legal recognition.

In light of this, this research employs a case study of Kuttanad, a wetland area in Kerala, India, which is situated below sea level, to investigate the governance gap. Known for its innovative rice farming techniques, Kuttanad is part of the ecologically sensitive Vembanad-Kol Ramsar site, comprising a complex network of canals, polders, and wetlands (MSSRF, 2011). It has been recognised by the FAO as a Globally Important Agricultural Heritage System (GIAHS) (FAO, 2013). Increasing climate-related stressors, frequent flooding, saltwater intrusion, unpredictable monsoons, and inadequate infrastructure have all impacted the region in recent decades, disrupting agricultural livelihoods and leading to displacement (Kerala State Planning Board, 2019; Shaji, 2021). Between 2018 and 2020, over 6,000 families were displaced due to losses in housing, land, and income resulting from flooding (Kerala State Planning Board, 2019). However, because these migrations do not fit into the

current legal definitions of refugees or internally displaced individuals (IDPs), they are still mainly absent from state policy narratives. The obscurity of these movements is further cemented by the state's unwillingness to classify them as climate-related, due to concerns about sovereignty and developmental image control (Vishwanathan, 2021). As a result, relocation programs and welfare benefits are frequently denied to impacted households.

The Kuttanad case highlights the shortcomings of national and international solutions to the complex reality of climate migration. Adaptation strategies, such as the Kuttanad Package and the Thanneermukkom Bund, have relied on top-down, technocratic designs that exacerbate ecological vulnerabilities, overlook local knowledge, and restrict community engagement (Scoones, 2009; Ribot, 2014). Ecological justice, distributive equality, and grassroots agency are neglected in favour of carbon-focused measures and abstract risk models at the global level (Robinson & Carlson, 2021; Nixon, 2011). Therefore, Kuttanad provides a crucial perspective for rethinking climate governance using place-based, justice-oriented strategies. This article argues that a multi-scale governance framework, which prioritises impacted communities, confronts long-standing silences in policy discourse, and incorporates ethically sound, participatory adaptation strategies into national and international responses, is necessary to address slow-onset displacement.

2. Theoretical and conceptual framework

2.1 Situating climate-induced displacement in contemporary environmental governance

Ecosystems, economies, and social systems around the world are being altered by climate change, which has evolved from a predicted global threat to a tangible and uneven reality. Its effects are felt most keenly in the Global South's socioeconomically disadvantaged and ecologically fragile areas, where recovery and adaptation capabilities are frequently at their lowest (IPCC, 2022). The migration of people as a result of gradual environmental changes is one of its most urgent consequences. Sea-level rise, land degradation, and salty water intrusion are examples of processes that develop gradually and challenge conventional frameworks for disaster response and humanitarian aid, which usually concentrate on sudden-onset disasters (UNHCR, 2020; International Organization for Migration, 2019; Bettini, 2014; Siders et al., 2019). Communities are increasingly being uprooted by these slow disruptions, which are not

caused by catastrophic catastrophes, but by the quiet deterioration of livelihoods and habitability.

International legal frameworks remain structurally unable to address the unique characteristics of slow-onset displacement, despite a recent increase in scholarly interest in climatic mobility. People displaced by environmental deterioration within national borders have no recourse under the 1951 Refugee Convention, which still defines refugees in terms of persecution and crossing international borders (McAdam, 2012). Climate-related mobility has been recognised by UNFCCC initiatives, such as the Warsaw International Mechanism for Loss and Damage and the Cancun Adaptation Framework, but their rules are non-binding and lack enforcement measures (Biermann & Boas, 2010; Kalin, 2010). Internally displaced climate migrants are thus left out of both national protection and international justice frameworks, creating a governance vacuum.

2.2 Reframing climate displacement: from policy gaps to justice-oriented governance

To investigate the institutional and normative shortcomings in addressing slow-onset displacement, this article employs the analytical frameworks of critical climate governance and ecological justice. Beyond distributive concerns, ecological justice considers relational ethics, historical responsibility, and the interconnectedness of human and non-human systems (Schlosberg, 2007; Nixon, 2011). Technocratic and centralised methods to climate governance frequently marginalise subaltern voices, stifle community agency, and prioritise expert-driven solutions over locally entrenched knowledge, according to critical perspectives (Scoones, 2009; Ribot, 2014). These frameworks offer valuable insights into the limitations of adaptation techniques that perceive environmental change as primarily a technical or engineering issue. By excluding impacted communities from decision-making and ignoring their situated knowledge, infrastructure projects have frequently unintentionally exacerbated ecological injustice. The complex, lived experiences of vulnerable people are often overlooked by the prevailing model of climate governance, which remains carbon-centric and mitigation-focused (Robinson & Carlson, 2021; Nixon, 2011). Kerala's Kuttanad region provides a useful case study. Kuttanad, known for its below-sea-level paddy cultivation and designated as a Globally Important Agricultural Heritage System (FAO, 2013), is located in a sensitive ecological zone that is becoming more unstable due to salinity intrusion,

unpredictable monsoons, and deteriorating infrastructure (Swaminathan Foundation, 2011; Kerala State Planning Board, 2019). Between 2018 and 2020, over 6,000 households were displaced, often without institutional assistance or legal recognition (Shaji, 2021). This type of internal, incremental mobility reflects what Vishwanathan (2021) refers to as a "governance void," where displaced populations are invisible because the Indian state refuses to recognise internal displacement caused by climate change, which is frequently influenced by development paradigms and sovereignty concerns.

The limitations of state-led, technocratic remedies are demonstrated by adaptation efforts like the Kuttanad Package and the Thanneermukkom Bund. These actions have often disregarded indigenous customs, neglected to involve local populations, and altered hydrological systems in ways that have exacerbated socio-ecological vulnerabilities (Scoones, 2009; Ribot, 2014). This study emphasises the need for a justice-oriented, multi-scale framework that focuses on impacted communities in governance, validates their rights and knowledge systems, and connects local experiences with global policy by highlighting Kuttanad. This strategy highlights the need to decolonise environmental politics and rethink adaptation as a transformational and participatory process, while addressing the legal and normative deficiencies in current climate governance.

3.   Methodology, sources and research framing

This study examines ecological injustice and displacement resulting from climate change in Kerala, India's Kuttanad region, employing a qualitative case study methodology. The intricate interactions between ecological degradation, sociopolitical systems, and the lived experiences of impacted individuals are best captured by the case study method (Flyvbjerg, 2006). Kuttanad was chosen as a crucial location for analysing slow-onset climate displacement due to its distinct agroecological features as a below-sea-level area that is increasingly affected by flooding, saline intrusion, and infrastructure degradation. Both primary and secondary data sources are used in the study. Between January and May 2024, 36 semi-structured interviews were conducted with relocated households, current residents, local panchayat leaders, agricultural officers, and civil society players in the Alappuzha district. The interviews were conducted in Malayalam and then translated into English. To ensure representation across diverse backgrounds, including both highly vulnerable and comparatively resilient groups, participants were selected using a purposive sampling technique. Government

reports, post-disaster assessments (Kerala State Planning Board, 2019; Kerala Institute of Local Administration & IIT Bombay, 2018), Kuttanad Package assessment documents, reports from environmental NGOs, and policy texts on climate adaptation and disaster governance are examples of secondary data sources. Scholarly works on ecological justice, global governance, and climate displacement inform the theoretical framework. To track changes in land use and flood patterns over time, news archives and satellite imagery were also examined.

A critical ecological political economy viewpoint, which places environmental crises within the larger frameworks of global inequality, developmentalism, and governance failure, serves as the methodological foundation for the study (Blaikie & Brookfield, 1987; Robbins, 2004). It emphasises the geographical, epistemological, and cultural aspects of environmental harm and is based on ecological justice theory (Schlosberg, 2007; Nixon, 2011). Displacement is viewed as a cumulative process influenced by socio-ecological fragility, policy neglect, and caste hierarchy rather than as a single event. Jawaharlal Nehru University provided ethical approval. Anonymity, confidentiality, and informed consent were guaranteed; interviews with women and older displaced people received particular attention. Fieldwork was conducted in familiar environments, often with the assistance of local mediators. Findings were disseminated to communities through informal feedback sessions, upholding reciprocity principles and acknowledging participants as knowledge holders rather than merely subjects.

4. Ecological-Socio-Economic profile of Kuttanad: landscape, livelihoods, and fragility

The Kuttanad region, encompassing parts of the districts of Alappuzha, Kottayam, and Pathanamthitta, is situated in central Kerala, India, and represents a distinct agroecological and cultural landscape. Kuttanad is a complex hydrological network of rivers, canals, backwaters, and paddy fields that covers an area of over 900 square kilometres, of which approximately 500 square kilometres are below mean sea level (MSSRF, 2011). The Pamba, Achenkovil, Meenachil, and Manimala are the four main rivers that drain the area, which is bordered by the Arabian Sea and the Western Ghats. These rivers meet in the Vembanad-Kol Wetland, which is India's second-largest Ramsar site (Kerala State Planning Board, 2019). A fragile ecological balance has long been a defining feature of Kuttanad's socioeconomic structure. Most people work in coir and coconut-based businesses, rice farming, inland fishing, and,

increasingly, tourism (Jacob, 2020). Dalits, landless labourers, and marginalised caste communities who rely on erratic and seasonal occupations make up a sizable portion of the region's heterogeneous population (Alexander, 2013).

Despite having a rich ecosystem, Kuttanad is extremely vulnerable due to its densely populated areas. More than 1.8 million people live in this flood-prone area, and many of their communities lack permanent flood defences, elevated roadways, and drinkable water due to uneven infrastructural access. Conventional dwellings are constructed on elevated mounds known as padams, which are encircled by canals and frequently flooded during the monsoon season. The populace is particularly vulnerable to climate threats due to the intimate connection between ecological and infrastructure precarity (Vijayasree et al., 2014; Kerala Institute of Local Administration & IIT Bombay, 2018). Kuttanad's unique Kayal Nilam (below-sea-level backwater land) rice cultivation system, which depends on bunding reclaimed land from Vembanad Lake and draining it using conventional and electric pumps, was recognised by the Food and Agriculture Organisation (FAO) in 2013 as a Globally Important Agricultural Heritage System (GIAHS) (FAO, 2013; Indo-Dutch Mission, 1989).

In the past, this legacy system included coconut-based industries, inland fishing, seasonal paddy farming, and duck husbandry as rotational livelihood techniques. Food security and economic diversification were guaranteed by these integrated methods (Chandran, 2019; Sylas, 2010). A unique example of sustainable adaptation to sub-sea-level conditions is the bund-protected padasekharams, which were created during the Travancore era with assistance from tenancy regulations (Ghosh, 1999). Duck farming, which organically fertilised the soil, came after paddy cultivation, which took place during the dry season. Concurrently, during the monsoon, brackish water fishing provided revenue. The traditional coir business, which historically employed marginalised and female workers, was sustained by coconut planting on garden areas and bunds (Mathew, 1997; Aravinthakshan & Joseph, 1990). This intricately linked system demonstrates an adaptive socio-ecological model perfectly suited to the rhythms of a wetland environment. But this resiliency has diminished during the past 20 years. The delicate balance that supported Kuttanad's livelihoods has been upset by erratic monsoons, increasing sea levels, unseasonal rainfall, salt intrusion, and infrastructure degradation (Padmakumar et al., 2019; ICAR, 2022). Over 15,000 hectares of paddy fields were submerged, and more than 50,000

dwellings in Kuttanad were damaged during the most severe floods in Kerala's history in 2018 and 2019 (Kerala State Planning Board, 2019). In addition to destroying agricultural productivity, these catastrophes forced thousands of households to relocate—some temporarily, while others were forced to relocate permanently. Built as a saltwater barrier in the 1970s, the Thanneermukkom Bund has been one of the most contentious infrastructure projects. Paradoxically, it has compromised the biological integrity of Vembanad Lake while protecting rice fields from salt. Fish populations have drastically decreased due to eutrophication, stagnation, and the bund's blockage of tidal flushing. Additionally, it has led to the spread of waterborne illnesses and the growth of aquatic weeds (Kolathayar et al., 2021; Vijayasree et al., 2014). Fisheries and agriculture were both harmed by the bund's alteration of sediment flows and nitrogen cycling. Fishermen, especially those who depend on brackish water species, have seen severe losses in their means of subsistence. This has led to resource disputes with rice farmers, exemplifying maladaptive infrastructure that exacerbates social tensions (Scott, 1998).

4.1 Displacement and the failure of climate adaptation in Kuttanad

In Kuttanad, displacement is marked by a gradual, cumulative process fueled by policy indifference and ecological degradation, rather than a sudden exodus. Sea level rise, salinisation, frequent floods, and crop failure are some of the causes of this type of "slow-onset displacement," which shows itself as a gradual depletion of land, livelihoods, and habitability (UNFCCC, 2012; Farbotko & Lazrus, 2012). Between 2018 and 2020, over 6,000 families were displaced, either permanently relocating to peripheral urban communities in Alappuzha and Kottayam or migrating seasonally to higher ground (Shaji, 2021). However, neither institutional support nor legal acknowledgement is frequently given to these displaced groups.

They are typically excluded from climate planning procedures, fall outside of official relocation structures, and receive minimal compensation. Their marginalisation is exacerbated by the lack of systematic data, the failure to incorporate local perspectives into risk assessments, and the absence of a national policy on displacement caused by climate change. Concurrently, ecological constraints have intensified, and already vulnerable populations have been further displaced as a result of state-led development projects, including road construction, urban growth, and ecotourism (Vishwanathan, 2021; Viju, 2019). By

avoiding local people, these actions hasten land alienation and undermine traditional rights. However, Kuttanad is more than just a place of failure and loss. Local opposition is still evident and forceful. Together, panchayats, farmers' associations, and fishers' unions have battled poorly designed embankments, poorly run water control infrastructure, and top-down, disaster-prone governance. These movements call for territorial and epistemic justice in addition to highlighting ecological misgovernance.

Kerala is known around the world for its progressive development and decentralised planning, yet the Kuttanad instance highlights a glaring mismatch. The region's governance is dispersed and frequently dysfunctional. Operating in silos, organisations like Panchayats, Krishi Bhavans, irrigation agencies, and disaster management authorities lead to inefficiency and duplication of effort, especially in times of crisis (Kerala Institute of Local Administration & IIT Bombay, 2018; Jacob, 2020). With little community involvement, long-term adaptive measures are either nonexistent or enforced in a technocratic manner. According to Ribot (2014), this is known as "institutional bypassing," in which centralised agencies subvert local institutions under the guise of efficiency and speed, resulting in alienation and poor policy execution.

The repercussions of such governance failings are exemplified by the collapse of the ₹2,139 crore Kuttanad Package, which was introduced in 2008 with the goal of reviving agriculture and enhancing ecological resilience. The effort was tainted by corruption, inadequate planning, and the exclusion of local voices, despite its declared goals of increasing agricultural output, lowering salinity, and restoring ecological balance (MSSRF, 2011; Jacob, 2020). Many suggested actions, including bund fortification and canal deepening, were either carried out without technical or ecological consideration, or they were only half finished. As a result, public trust has been severely damaged and the environment has continued to deteriorate. The Thanneermukkom Bund, a saltwater barrier built in the 1970s, is a prominent example of maladaptive planning.

It helped shield rice crops from salt at first, but it has now upset the hydrology of the area. Eutrophication, fish stock loss, and the growth of exotic aquatic weeds are caused by the bund's obstruction of natural tidal flushing (Kolathayar et al., 2021; Vijayasree et al., 2014). Transparency and responsiveness are undermined by the irrigation department's control over the bund's shutters, which are frequently operated without community consultation. Residents claim that improper or delayed shutter opening during floods might make the difference between safety

and flooding, making the bund a symbol of institutional estrangement and technocratic conceit (Shaji, 2021).

One of the most ambitious attempts to address ecological stress in the area was the Kuttanad Package, which was approved by the Indian government in 2008 based on suggestions made by M. S. Swaminathan. It offered ecological restoration, livelihood revitalisation, soil protection, and infrastructure renovation with a budget of ₹2,139.8 crore (MSSRF, 2011). But over ten years later, the package is considered by many to be an unsuccessful attempt at climate adaptation. Serious flaws, such as execution delays, a lack of interdepartmental coordination, redundant projects, and underutilised monies, were brought to light by India's Comptroller and Auditor General (CAG) (CAG Report, 2017). According to independent assessments, the package ignored socio-cultural dynamics, failed to involve local populations, and remained preoccupied with engineering-based remedies despite its broad mandate (Jacob, 2020).

More comprehensive, ecologically imbedded techniques were marginalised in favour of technological solutions like canal dredging, pump installation, and embankment construction. Technocratic responses to climate risk frequently exacerbate susceptibility by ignoring local settings and neglecting to address underlying political and economic institutions, as noted by Scoones (2009). The outcome in Kuttanad was a top-down, well-funded initiative that viewed climate adaptation as a technological issue rather than a complicated socio-ecological process.

The package's marginalisation of Indigenous and local knowledge systems was one of its main flaws. In the past, Kuttanad communities engaged in seasonal livelihood rotations, growing rice during the dry season and then raising ducks and collecting fish. Complex water management techniques, such as water wheels and traditional bunding, encouraged these practices (FAO, 2013; Sylas, 2010). State interventions replaced these adaptive strategies with infrastructure that was imposed from the outside. Flood hazards were increased by embankments that changed natural water flow, new highways that impeded drainage channels, and unscientific dredging that disturbed sediment layers (Viju, 2019). This epistemic exclusion is structural rather than accidental. Development frequently makes local knowledge unintelligible to the state, favouring technoscientific rationalities over vernacular epistemologies, according to Agrawal (2005). According to Fricker (2007) and Schlosberg (2007), adaptation is therefore not only about

engineering resilience but also about recognising whose knowledge is valued, whose risks are identified, and who gets to participate in planning. These questions are still mostly unresolved in Kuttanad.

Meanwhile, the region's ecological deterioration has gotten worse due to Kerala's larger development objective. Wetland encroachment, mangrove degradation, and water pollution are the results of road widening, backwater tourism, and real estate speculation (Chandran & Purkayastha, 2018). For instance, the AC Road crosses the wetland, obstructing natural water flows and creating bottlenecks during floods. Small-scale fishermen and marginal farmers suffer disproportionately from fuel leaks, sewage dumping, and erosion caused by Alappuzha's burgeoning houseboat tourism sector (Mathew, 1997). These actions reflect the accumulated, frequently undetectable harm caused by extractive development ideologies, which Nixon (2011) refers to as "slow violence." A more fundamental problem lies at the heart of these shortcomings, affecting both political and social representation. Dalits, women, landless workers, and small-scale fishermen are among the most vulnerable groups that are routinely left out of climate governance frameworks. When their concerns about crop compensation, flood protection, and safe housing are acknowledged, they are frequently mediated through politicised or bureaucratic reasoning (Vishwanathan, 2021). In this situation, justice cannot be reduced to better infrastructure or monetary compensation. It calls for the freedom to remain dignified, take an active role in governance, and maintain connections to ancestral places. Thus, Kuttanad's unsuccessful adaptation serves as an example of the limitations of technocratic, state-centric government. Justice, local agency, and epistemic pluralism must be given priority in democratic, decentralised, and ecologically based frameworks (Ribot, 2014; Sultana, 2022).

5. Local crisis, global failure: reframing climate governance from below

The gradual submersion of Kuttanad in Kerala is a sign of a larger failure in global climate governance rather than just a regional or developmental problem. It represents the intersection of legal invisibility, socio-political marginalisation, and ecological degradation, highlighting the shortcomings of both national and international institutions to address displacement brought on by climate change. The systemic flaws are worldwide, yet the effects are felt most keenly locally. This section makes the case that Kuttanad is representative of a broader governance void that disregards fairness, recognition, and participation. It advocates

for a bottom-up shift that centres the conversation about climate policy around the perspectives of marginalised groups and ecological ethics. Kuttanad's frequent floods, salinisation, and deteriorating infrastructure show how climatic vulnerability and state failure intersect; this pattern is repeated throughout the Global South, where slow-onset displacement is increasing (Adger et al., 2011; Warner et al., 2010).

There is still a big gap between information and practical policy, despite the IPCC's frequent warnings of climate displacement in low-lying and coastal areas (IPCC, 2022). International solutions have not succeeded in establishing inclusive governance structures or legally binding processes. The systemic disregard for internal displacement, a phenomena that is still marginal in institutional and legal frameworks, is reflected in Kuttanad's lack of visibility in these discourses. Climate-induced internal migrants are left in a legal limbo because the 1951 Refugee Convention only confers refugee status to those who cross international borders as a result of persecution (UNHCR, 2020). Despite providing normative protection, the 1998 Guiding Principles on Internal Displacement are ineffective due to their non-binding character and reliance on state discretion (Kalin, 2010). Due to environmental change, internally displaced people in India have no institutional support or legal recognition, which further marginalises vulnerable populations in areas like Kuttanad (Vishwanathan, 2021; Shaji, 2021).

The issue of climate-induced displacement has been recognised by international organisations like the Task Force on Displacement under the UNFCCC and the Warsaw International Mechanism for Loss and Damage, but mainly through vague recommendations devoid of rights-based commitments (UNFCCC, 2018). As a result, communities like Kuttanad continue to face what McNamara and Farbotko (2017) refer to as "governance voids," which are areas where justice is denied, accountability is postponed, and blame is dispersed. The marginalisation of local knowledge in adaptation planning exacerbates this. Data models, financial mechanisms, and engineering solutions are frequently given precedence over vernacular ecological understanding and lived experience by elite institutions and donor-driven agendas (Sultana, 2022; Escobar, 2008).

The design and execution of adaption infrastructure in Kuttanad, which ignores seasonal livelihood patterns and local water management systems, is a clear example of this exclusion (Chandran, 2019). Similar trends may be seen worldwide in places like the Pacific and the Sahel,

where communities experience epistemic injustice and are denied the validity of local knowledge systems during planning procedures (Fricker, 2007; Whyte, 2020). This erasure is sustained by the state-centric model of the UNFCCC. The most impacted areas have little access to funding sources like the Green Climate Fund, and national governments continue to control the bargaining arena. Such frameworks, according to Agarwal (2005), enable "participation without power," providing symbolic representation without real voice or impact. This paradox is best shown by India's climate diplomacy.

India avoids addressing the issue of domestic displacement while simultaneously demanding historical accountability from the Global North and promoting climate justice on the international front. India minimises its internal vulnerabilities in Kuttanad, the Sundarbans, and other climate-risk areas due to concerns about sovereignty and a desire to maintain a developmental narrative (Atteridge et al., 2012; Viju, 2019; Chaturvedi & Doyle, 2015). In addition to avoiding legal responsibilities and preserving the appearance of national resilience, this silence makes vulnerable populations invisible in climate governance. Therefore, Kuttanad's gradual submersion challenges prevailing paradigms of climate governance and policy. Technocratic, top-down measures are insufficient to accomplish justice. It calls for a re-scaling of governance based on participatory frameworks, ecological ethics, and place-based knowledge (Schlosberg & Collins, 2014; Ribot, 2014).

This re-scaling entails:
- Recognising climate-displaced persons as rights-bearing citizens, even if they do not cross borders;
- Creating institutional platforms for marginalised voices in climate decision-making;
- Redirecting climate finance towards community-led adaptation and ecosystem restoration;
- Embedding ecological justice into legal frameworks and development planning.

This strategy aligns with the expanding body of research on transformative adaptation, which advocates for structural adjustments to societies' responses to climate risks, such as adjustments to power dynamics, institutional responsibility, and socio-environmental values (Pelling et al., 2015; Nightingale et al., 2020).

Relational accountability must take precedence over statistical vulnerability, lived experience over abstract risk, and communal agency

over individual resilience in a justice-centered global governance paradigm. This entails embracing pluralist, democratic, and moral forms of governance in place of market mechanisms like carbon trading and techno-managerial adaptation. Kuttanad offers the political and moral justification for doing so. In this area, the consequences of delay are quantified not just in monetary terms but also in terms of lost lives, civilisations, and ecosystems. Climate governance must take into consideration the unique ways that vulnerability is created and challenged locally if it is to be considered legitimate.This suggests a change from climate governance as risk management to climate governance as justice-making, which entails democratic engagement, redistribution, and recognition (Fraser, 2009; Sultana, 2022). It also necessitates reconsidering sovereignty as a platform for compassion and solidarity rather than as a defence against accountability.

6. Towards a justice-oriented framework

The experience of Kuttanad reveals the limits of prevailing climate governance paradigms, which prioritise technical fixes and emissions metrics over human rights, social equity, and ecological integrity. As the climate crisis intensifies, particularly for low-lying and ecologically sensitive regions like Kuttanad, the need for a justice-oriented framework becomes not just desirable but imperative. This section outlines the foundational principles of such a framework, one that is grounded in ecological justice and aimed at the recognition, inclusion, and protection of climate-displaced persons. It calls for a transformative shift in global climate governance from top-down mitigation logics to participatory, distributive, and recognition-based approaches.

6.1 Recognition of slow-onset climate displacement

The focus of mainstream climate policy is frequently on abrupt, catastrophic events that are observable, quantifiable, and mappable, such hurricanes or tsunamis. However, the majority of displacement drivers in areas like Kuttanad are slow-onset phenomena, such as sea-level rise, salinisation, soil degradation, and ecosystem collapse (UNFCCC, 2012; IPCC, 2022). According to Bettini (2014) and Siders et al. (2019), these processes occur gradually, undermining the habitability of landscapes over years rather than hours and frequently removing people in informal, cyclical, or partial ways.

Despite this, current international legal regimes do not recognise slow-onset displaced persons as a distinct category. The 1951 Refugee

Convention is inapplicable, and even the Guiding Principles on Internal Displacement (UN-OCHA, 1998) do not bind states to legally protect such populations. This creates a protection gap, wherein people displaced by environmental decline are neither recognised nor compensated (Kälin, 2010). A justice-oriented framework must therefore begin with formal recognition of slow-onset displacement, through amendments to national and international legal instruments and the adoption of rights-based protections for people who lose access to viable land, livelihoods, or housing due to environmental change (McNamara & Farbotko, 2017; Sultana, 2022).

6.2 Inclusion of indigenous and local knowledge systems

Communities in regions like Kuttanad have long adapted to dynamic ecosystems through local innovations, such as bunding, rotational cropping, and water management systems. Yet, adaptation policies often dismiss or marginalise such knowledge, replacing it with top-down engineering solutions that deepen ecological vulnerability (Agrawal, 2005; Scoones, 2009). Ecological justice demands that local and Indigenous knowledge systems be treated not as supplementary but as central to planning, monitoring, and decision-making. The IPCC's Sixth Assessment Report (2022) acknowledges the importance of local knowledge for climate resilience, but implementation remains limited.

To rectify this, a justice-oriented framework must ensure:
- Epistemic inclusion in all stages of climate policy, from local planning to global negotiations;
- Co-production of knowledge between scientists, policymakers, and communities;
- Institutional mechanisms within UNFCCC, national adaptation programmes, and disaster governance structures that legitimise and integrate community expertise (Whyte, 2020; Nightingale et al., 2020).

6.3 Responsibility-sharing beyond state borders

Climate displacement has transboundary causes and implications, but responses are overwhelmingly domestic and discretionary. The result is a responsibility gap, where those most responsible for climate change bear the least burden for displacement, while vulnerable states and communities are left to cope alone (Adger et al., 2006; Atapattu, 2020).

An ecological justice framework requires moving beyond national borders in both legal and ethical responsibility-sharing. This includes:

- Common but differentiated responsibilities (CBDR) as a foundation for climate displacement action;
- Regional and global compacts on climate mobility that share hosting, funding, and protection responsibilities;
- Financial and technical support to assist vulnerable regions in adaptation and planned relocation (Savaresi & Hartmann, 2020).

The Warsaw International Mechanism for Loss and Damage and the Task Force on Displacement under the UNFCCC have made preliminary steps in this direction, but lack enforcement and financing. Embedding displacement into climate justice diplomacy, including in forums like the G77, BRICS, and the UN Human Rights Council, is critical to driving global accountability (Roberts & Pelling, 2018).

6.4 Climate finance tied to adaptation for displacement

Most climate finance flows today are oriented towards mitigation efforts, such as renewable energy and carbon trading, rather than adaptation for vulnerable populations, let alone displacement-specific interventions (Buchner et al., 2021). According to the UNFCCC, less than 20% of international climate finance supports adaptation, and of that, a fraction addresses displacement or habitat loss (UNEP, 2022).

A justice-oriented model demands that displacement and habitability be central concerns of climate finance architecture. This means:
- Prioritising vulnerability-based allocations in the Green Climate Fund (GCF);
- Creating dedicated funding streams for community-led relocation, livelihood restoration, and infrastructure resilience;
- Incorporating non-economic losses, such as cultural loss, identity, and ecological belonging, into compensation frameworks (Tschakert et al., 2017; Thomas & Benjamin, 2018).

Furthermore, financing must be participatory, channelled through transparent, accountable mechanisms that empower local governments and grassroots organisations.

6.5 Integrating localised cases like Kuttanad into global forums

Kuttanad's communities' real-life experiences shouldn't be marginalised in the global conversation about climate change. Rather, they need to be included into high-level platforms like as the GCF's governance structures, the IPCC's Special Reports, and the UNFCCC Conferences of the Parties (COPs). These forums must actively involve Panchayats,

farmers' groups, fisher unions, and subnational actors in addition to tokenistic stakeholder engagement.

Additionally, this entails moving governance's scalar focus from states to multilevel networks, such as transnational advocacy coalitions, local governments, and civil society (Betsill & Bulkeley, 2004; Bulkeley et al., 2014). Incorporating situations such as Kuttanad not only improves representational justice but also aids in the development of culturally rooted, flexible, and context-sensitive responses to ecological crises.

6.6 Rights-based legal recognition of climate-displaced persons

Finally, justice demands a legal framework that recognises climate-displaced persons as rights-bearing subjects, not just victims or passive recipients of aid. This includes the right to:
- Remain in place with dignity and adequate protections;
- Voluntarily relocate with state support when necessary;
- Participate in decisions affecting their relocation, land access, and livelihoods;
- Access restitution or compensation for loss of home, land, or culture.

Such recognition can take the form of:
- National legislation acknowledging climate-displaced communities;
- Amendments to existing disaster management and land acquisition laws;
- International legal innovations, such as a Global Charter on Climate Mobility or a UN Special Rapporteur on Climate Displacement (McAdam, 2012; Atapattu, 2020).

Ultimately, this legal recognition must rest not on narrow definitions of mobility but on broader understandings of habitat loss, socio-ecological belonging, and the right to place (Sultana, 2022; Nixon, 2011).

7. Conclusion

Ecosystems, livelihoods, and human-environment linkages are all being altered by climate change, which is no longer a far-off forecast. This study has demonstrated how a larger dilemma of ecological precarity, displacement, and inadequate governance is encapsulated in the slow but unrelenting alteration of Kerala's Kuttanad region. In addition to saline intrusion and unpredictable monsoons, the region is vulnerable due to decades of institutional fragmentation, governmental neglect, and adaptation strategies that prioritise technocratic solutions above the agency and expertise of impacted populations. Carbon accounting and mitigation targets continue to dominate prevailing climate governance

models, which often overlook the structural injustices and lived realities of individuals experiencing environmental decline. State-led initiatives in Kuttanad, such the Thanneermukkom Bund and the Kuttanad Package, have increased socioeconomic marginalisation and weakened traditional ecological resilience, especially for Dalits, women, landless farmers, and fisher groups.

Globally, people displaced by slow-onset phenomena, such as salinisation, wetland degradation, and land loss, have few options due to legal mechanisms like the UNFCCC, the Paris Agreement, and the 1951 Refugee Convention. The lack of legally binding agreements, sufficient funding, and enforceable accountability has left communities like those in Kuttanad both politically marginalised and legally unrecognised, despite the rhetorical significance of "loss and damage." Therefore, based on the rights, knowledge systems, and lived experiences of frontline populations, this study advocates for a justice-centred reconfiguration of climate governance. It is crucial to acknowledge slow-onset displacement as a separate category that needs inclusive planning, relocation support, and legal protections. Community-led adaptation that increases resilience while maintaining cultural ties must be given top priority by funding sources like the Green Climate Fund. The current top-down methods must be replaced with a truly multi-scalar governance architecture that connects local self-governments, civil society, and marginalised communities. As a result, Kuttanad serves as both a warning and an opportunity to rethink climate justice as inclusive, moral, and grounded in place-based governance.

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