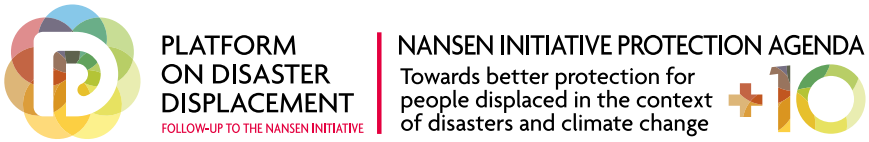
PROTRACTED DISASTER DISPLACEMENT: A GLOBAL REVIEW OF THE STATE OF KNOWLEDGE

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PLATFORM ON DISASTER DISPLACEMENT
FOLLOW-UP TO THE NANSEN INITIATIVE

NANSEN INITIATIVE PROTECTION AGENDA
Towards better protection for people displaced in the context of disasters and climate change
+10

iDMC internal displacement monitoring centre



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The Platform on Disaster Displacement (PDD) was established in July 2016 as a State-led initiative to follow-up on the work of the Nansen Initiative and to support States and other stakeholders in implementing the recommendations of the Nansen Initiative Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change (Protection Agenda), endorsed by 109 States in October 2015. The Internal Displacement Monitoring Centre (IDMC) is the world's leading source of data and analysis on internal displacement. PDD and IDMC have collaborated for several years to raise awareness on disaster displacement at global, regional and national levels, and to strengthen the capacity of governments and partners to avert, minimize and address disaster displacement through data, evidence, policy guidance and technical support.

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1 Introduction

PURPOSE AND SCOPE OF THE STUDY, METHODOLOGY

Hazardous and extreme events, such as earthquakes, storms and floods trigger large-scale evacuations and displacement every year. Pre-emptive and spontaneous evacuations for sudden-onset hazards respond to the immediate threat to life and are often associated with short-term displacement. Evidence is growing, however, that significant numbers of people remain displaced for long periods after such evacuations, or resettle permanently.[1] Environmental degradation and slow onset processes and events further contribute to long-term displacement as sea-level rise, extreme temperatures and desertification result in the loss of habitable land and livelihoods.

In 2025, IDMC recorded 29.9 million internal disaster displacements and estimated that 13.6 million people remained displaced at the end of the year [IDMC 2026]. Protracted displacement is often associated with negative impacts on the physical and mental wellbeing of individuals and with socioeconomic decline of households and communities. Thus, protracted disaster displacement is increasingly understood as a long, uneven process shaped by repeated hazard exposure, pre-existing vulnerability, housing, gender, and governance, rather than a temporary interruption that ends when the emergency response is over.

However, beyond the headlines, information on what happens to evacuees and the displaced in the months after an event, and our knowledge of who they are, what their resources for recovery and aspirations are, remains scarce. Further, as land use changes, environmental degradation and climate change increasingly render certain areas uninhabitable, the number of people at risk

[1] Protracted displacement is here defined as meeting the following three conditions: 1) displacement lasting 12 months or more; 2) not successful either in returning to place of origin and reintegration, integrating in host community, or in resettling in another location of choice; and 3) not suffering from displacement-related vulnerabilities. The study is limited to analysing the scale and nature of protracted displacement in the context of disasters. Conflict-related displacement is not considered, however lessons from such contexts and durable solutions programmes may be cited where they bear relevance to disaster displacement situations.

of long-term and protracted displacement is expected to rise in the coming decades.

This study contributes to strengthening the evidence base on protracted disaster displacement and to informing policy, legal and financing responses aimed at preventing such situations and supporting durable solutions for affected populations. It specifically unpacks the factors prolonging displacement and hindering durable solutions and provides an overview of recent research and data on protracted displacement and displacement risk modelling. As such, it can be considered a snapshot of the state of knowledge on protracted displacement in the context of disasters.

The study focuses on displacement associated with disasters, triggered by sudden-onset events (such as earthquakes, floods, storms and storm surges, tsunamis and landslides) and slow-onset processes (such as drought, desertification, sea-level rise, glacial retreat and coastal erosion). It unpacks the different pathways to protraction with a particular focus on weather-related hazard contexts, and assesses, where relevant, current knowledge about compound events, including conflict or development-induced displacement, and simultaneous or sequential hazards affecting the same population.

The study was conducted through a review of academic and grey literature, existing data sets and risk models, combined with select expert interviews.[2]

[2] For details on the methodology and list of interviews, see Annex 1 Methodology.

2

Key Findings

Protracted disaster displacement is best understood not as a temporary interruption ending with the emergency response, but as a long, uneven process shaped by access to housing, tenure, livelihoods, governance, and repeated hazard exposure. This review synthesises academic and grey literature, existing data, and risk models to characterise what is currently known, where the evidence is strongest, and where critical gaps remain.

The scale of protracted displacement is not reliably measured

In 2025, 29.9 million internal disaster displacements were recorded and an estimated 13.6 million people remained displaced at year-end. Yet reporting on displaced populations typically ends within a week of sudden-onset events and within four months of slow-onset ones, so the point at which recovery stalls into protraction is largely invisible in global statistics.

Definitions of "protracted" vary widely

Thresholds across the literature range from more than 12 months to more than five years. This review defines displacement as protracted when it has lasted at least 12 months, no durable solution (return, local integration, or settlement elsewhere) has been achieved, and displacement-linked vulnerability persists.

Duration is itself a self-reinforcing risk factor

Across geographies and hazard types, the longer people remain displaced, the lower their likelihood of reaching a durable solution and the worse their physical, mental, and economic outcomes become. Evidence from post-tsunami Indonesia (Aceh), Japan, and post-earthquake Italy shows accumulating disadvantage over months and years of displacement, including elevated post-traumatic stress disorder (PTSD) symptoms persisting five to twelve years after the event.

Physical damage is necessary but insufficient to explain protracted displacement

The scale of damage strongly predicts initial displacement, but socio-economic status, tenure, social networks, institutional capacity, and policy environment determine how long that displacement lasts. Remoteness, poverty, and population density compound the effects of housing and infrastructure damage.

Homeownership and secure tenure are the most consistent household-level protective factors

Renters, squatters, informal occupants, and the landless face systematically higher barriers to return and to durable solutions across virtually every context studied. Land tenure emerges as the single strongest structural predictor of long-term housing quality and displacement resolution.

The relationship between wealth and displacement duration is non-linear

The very poorest households can face immobility traps that prevent human mobility, middle-income households have the widest set of choices, and wealthier households can both move and return. Apparent contradictions across country studies dissolve once this non-linearity is accounted for.

Slow-onset hazards can produce more persistent displacement than rapid-onset ones, however the evidence is not conclusive

Drought, heat stress, and environmental degradation drive long-term out-migration and permanent relocation in ways that established relief systems, which are largely oriented to sudden-onset events, do not buffer. Sea-level rise, coastal erosion, and desertification will increasingly render specific locations physically or economically uninhabitable, but adaptation policies can mitigate the risk significantly.

Multi-hazard and conflict-affected contexts are qualitatively distinct

Where disasters intersect with conflict, protective factors such as tenure security and social capital operate very differently and can even be reversed. These contexts warrant separate analytical and policy treatment rather than extrapolation from single-hazard studies.

Off-site, contractor-driven resettlement consistently produces poor long-term outcomes, and community-led, in-situ or near-site approaches show the strongest evidence of positive outcomes

Across Ecuador, the Philippines, China, Zimbabwe, Nepal, Sri Lanka, Bangladesh, and Iran, government-built off-site resettlement is associated with abandonment, declining satisfaction, disrupted livelihoods, and residents modifying or leaving units. Owner-driven and community-led reconstruction produce comparatively better outcomes but still under-serve the most marginalised.

The separation of housing from livelihood support is the dominant mechanism driving poor outcomes

Programmes deliver shelter but not the economic infrastructure needed to sustain households in it. Access to land, employment, markets, and services near the new location repeatedly proves as decisive as the quality of the housing itself.

Temporary housing routinely becomes long-term

Transitional shelter arrangements have persisted for years in Japan, Italy, Indonesia, and elsewhere. Prolonged residence in temporary housing directly drives population decline, mental health deterioration, and permanent out-migration.

Governance and institutional design matter more than hazard magnitude in shaping displacement duration

Infrastructure recovery speed, coordination across agencies, legal recognition of internally displaced persons, perceived fairness of aid distribution, and community participation in decision-making are stronger determinants of outcomes than the physical intensity of the triggering event.

Post-disaster programmes systematically produce differential outcomes

Renters, women, ethnic and indigenous minorities, extended and multi-generational families, people with disabilities, and older adults are consistently excluded from, or poorly served by, programmes nominally designed to help them.

Uninhabitability is a socio-political condition, not a purely physical threshold

Projected ranges for climate-driven coastal migration this century vary by more than an order of magnitude, driven mainly by assumptions about adaptation policy, not climate uncertainty. Treating uninhabitability as inevitable risks undermining in-situ adaptation and legitimising forced displacement.

Current risk models cannot yet estimate the duration of displacement

Probabilistic risk models now provide credible estimates of initial displacements associated with sudden-onset hazards, but they do not capture the socio-economic and institutional factors that determine whether displacement resolves in weeks or persists for years. No model currently answers the core question: given a hazard event of a given intensity, what share of the displaced remain so at 12 months, three years, or indefinitely?

The evidence base is geographically and methodologically skewed

More than half of reviewed studies come from Sri Lanka, the Philippines, Indonesia, and Nepal, with limited coverage of sub-Saharan Africa, Latin America, and high-income island states. Most studies are qualitative and short-term, and treat displacement as a static state rather than an evolving process, limiting what can be said about long-term outcomes and durable solutions.

A durable-solutions agenda requires moving beyond restoring pre-displacement conditions

Growing evidence supports investment that lifts displaced households to a higher level of resilience, akin to “building back better,” and explicitly integrates displaced populations into national development planning, social protection systems, and sectoral budgets, rather than treating displacement as a bounded humanitarian episode.

3

The limits of knowledge

3.1

UNDERSTANDING THE SCALE OF PROTRACTED DISASTER DISPLACEMENT

The definition of protracted displacement varies substantially across geographies, institutions and research studies. This study uses a temporary threshold of displacement of more than 12 months, as used by IDMC[3] and others but several studies apply thresholds of more than two years, more than four years, or even more than five years [Kabir et al. 2018; Behnke et al. 2020; Tanji et al. 2018; Lind et al. 2023; Ferris and Kerwin 2023; Sabates-Wheeler et al 2025].[4] Paul et al. [2024] apply an operationally practical definition, categorizing displacement into emergency phase (less than one month), recovery phase (one or more months), and non-return, defined as potentially permanent displacement. Thus, protracted displacement begins where recovery stalls and durable solutions are not achieved, regardless of the precise number of months since displacement.

The absence of a universal definition complicates direct comparison across studies but also reflects actual differences in what constitutes "protracted" across disaster types, cultures, and recovery contexts.

For the purpose of this study, displacement is considered protracted when it meets all three of the following conditions:

- **Duration:** The displaced person or household has been unable to achieve a durable solution for 12 months or more following the initial triggering event

- **Durable solutions failure:** None of the three formally recognized durable solutions (sustainable return, local integration, or settlement elsewhere) has been achieved.

3 See www.internal-displacement.org/monitoring-tools.

4 IDMC provides annual estimates of IDPs in disaster contexts, based on the assumption that people whose homes were destroyed are likely to remain displaced for up to one year. The one-year threshold for IDMC therefore reflects the annual reporting cycle and serves as a practical operational proxy, rather than representing a normative threshold for defining protracted displacement. It is important to note that housing reconstruction does not necessarily imply durable solutions and that some households may find durable solutions elsewhere without rebuilding their original homes.

- **Ongoing vulnerability:** The person remains in a condition of material, legal, or protection vulnerability directly attributable to their displacement status

Further, protracted displacement can emerge from *cumulative displacement* and *secondary displacement,* situations that are becoming more common in many contexts.

The scale of protracted displacement at the global level is not well documented and significant gaps in data exist. Reporting on displacement commonly is limited to the days during and immediately after disasters. Data collection often ends just a few days or weeks after a disaster event, limiting what we know about how many people may still be displaced, who or where they are, and what their needs and aspirations may be. The longer the recovery phase after a disaster lasts, the more likely it is that those displaced appear in other statistics as they access health care or education in destination areas, but it is difficult if not impossible to identify them in these.

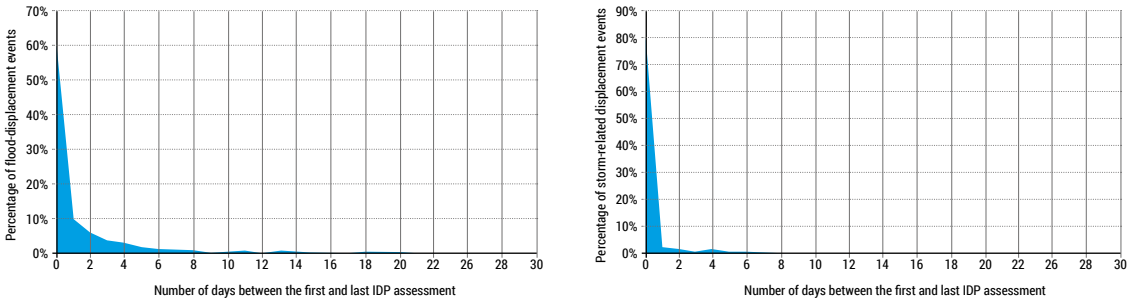
Analysis of IDMC data conducted in 2024 showed that most reporting on IDPs occurs shortly after an event and that the majority of weather-related displacement events assess the number of IDPs only once (see figure 1).

On average, reporting of IDPs for sudden-onset events like floods and storms lasts less than a week, whereas for slow-onset events like droughts, the reporting period averages 113 days, or nearly four months. Thus, an end of reporting does not equate to the end of displacement or the achievement of durable solutions.

A few exceptions exist, such as in Mozambique and Japan, where data on displaced populations is collected months and even years after the event.[5] Another example are the Philippines, where there is data on long-term disaster displacement and therefore on how new disasters hit areas where people are still displaced from previous events.

In the absence of reported numbers, housing damage and destruction are often used as a proxy for displacement, and in particular protracted displacement.[6] Further, repeated and secondary displacement, movements between displacement sites, shifts in the main triggers of displacement, and changes in monitoring coverage over time all add to the challenges of estimating the duration and scale of protracted displacement.

Figure 1: Reporting and assessment of IDPs after floods (left) and storms (right), 2023–2024



Source: IDMC. Note: The x-axis is limited to 30 days (one month) because 96% of flood-related and 98% of storm-related displacement events have a reporting gap within this timeframe.

5 See Japanese Reconstruction Agency: www.reconstruction.go.jp and Mozambique's National Institute for Disaster Management and Risk Reduction: www.facebook.com/INGD.Mocambique.

6 For more information on the global data landscape and country-specific challenges and opportunities, see Annex 2 "Data landscape".

4

Displacement pathways

Protracted disaster displacement is driven by property damage combined with individual and household vulnerabilities, often determined by structural inequalities, and system failures. The literature is not conclusive but suggests that while the scale of damage is a strong predictor of initial displacement, socio-economic factors and the policy environment determine how long that displacement lasts. Thus, physical damage is a necessary factor but not sufficient to explain different displacement outcomes.

In fact, negative loop dynamics are at play, in that the longer people remain in displacement after a disaster event, the higher the risk that their displacement becomes protracted and durable solutions cannot be found [IDMC 2025]. Thus, across the literature, the duration of displacement itself emerges as a strongly self-reinforcing risk factor for worsening outcomes [Paul et al. 2024; Gagné 2020]. In post-tsunami Aceh, Indonesia, each additional month of displacement was a significant predictor for accumulation of disadvantage, higher levels of psychological stress, and a lower likelihood of reaching durable solutions [Lee et al. 2014; Tanji et al. 2018; Del Missier et al. [2026]. As such, the accumulation of disadvantage the longer displacement continues may become the overriding factor hindering durable solutions across different hazard and social contexts.

Beyond hazard intensity, three interacting domains or levels shape displacement trajectories and outcomes.

At the *individual level,* lower socioeconomic status, female gender, loss of social networks, and stronger place attachment each predict worse or more prolonged displacement [Li et al. 2026]. However, the direction of socioeconomic effects is not necessarily linear in each case, and the very poorest among the displaced may face immobility traps due to prohibitive relocation costs [Li and Leppold 2025; Behnke et al. 2020].[7]

[7] In this study, relocation and resettlement are used interchangeably, implying the process or completed action of moving to a location outside of the area of origin with the intent to settle there for the long-term or permanently.

At the *household level,* homeownership is among the factors that are most consistently associated, across all disaster types and regions, with a reduction in the length of displacement with home owners facing a much lower risk of protracted displacement than tenants, particularly tenants with insecure rental agreements [McCann et al. 2023; Stojetz and Brück 2021; Paul et al. 2024].

Contextual factors, such as the timing of assistance, infrastructure recovery speed, neighborhood socioeconomic quality, and the strength of local and national institutions and policies, mediate how individual and household vulnerabilities translate into protracted displacement [Yabe et al 2020; Gagné 2020]. Across all disaster types, physical damage is necessary but insufficient to explain protracted displacement. Remoteness, poverty, and population density compound the effects of loss of housing and damage to infrastructure, increasing the likelihood of protracted displacement [Loos et al. 2021].

4.1 HAZARD AND EVENT CHARACTERISTICS

Different hazard types seem to show important divergences in displacement outcomes. For example, evidence suggests that slow-onset hazards such as drought and heat stress produce more persistent displacement than rapid-onset floods [Asaka 2026; Gray and Mueller 2012; Bohra-Mishra et al. 2014]. Conversely, rapid-onset hazards, such as earthquakes, floods and storms, that result in large-scale evacuations and displacement can, in certain contexts, be short-lived if relief and reconstruction are efficient and inclusive [Tafti 2015; Mukherji 2015; Seremet et al. 2024].

Slow-onset events, such as heat stress and drought can drive displacement that may be invisible, evolving slowly over years or decades and often characterized by short-distance moves. Such processes can eventually result in long-term out-migration and permanent displacement due to loss of land and livelihoods, accelerated by the negative impacts of climate change (see also section "A glimpse of the future" below) [Kaenzig and Piquet 2021; IDMC 2018].

Some studies suggest that the distinction between slow-onset and rapid-onset disasters matters substantially for the predictors of long-term migration and, in some cases, protracted displacement. Regular flooding in Pakistan, occurring as a rapid-onset event associated with established relief programs, has been shown to have only modest effects on mobility, while heat stress, a slow-onset condition with minimal relief infrastructure, drives long-term out-migration [Mueller et al. 2014]. One explanation is that the latter often see response from established relief programs, which may partially buffer longer-term displacement.

Similarly, in Indonesia climatic variations, particularly temperature above 25°C, appear to have greater effects on permanent out-migration than episodic disasters like floods or earthquakes [Bohra-Mishra et al. 2014]. In Bangladesh, drought-related crop failures have been shown to have larger and more significant effects on long-term mobility than flooding despite flooding attracting far more policy and research attention in the country [Gray and Mueller 2012].

While not all of these examples strictly relate to disaster displacement, they highlight the importance of policy responses regardless of hazard context. [Mueller et al. 2014; Nakayama et al. 2016]. Increasingly, the available evidence shows that across all hazards and regions, protracted displacement can occur, and that there is no conclusive evidence that specific hazard types trigger longer-term displacement in a direct manner, beyond those that result in immediate and permanent loss of land, such as sea level rise. Rather, the differentiated impact of disasters on livelihoods and degradation of environments, the extent and patterns of housing and infrastructure damage, and the capacity to restore essential services all play a pivotal role in determining the duration and possible protractedness of displacement. Further, remoteness, poverty, and population density compound the negative and downstream impacts of housing and infrastructure damage [Loos et al. 2021].

In multi-hazard contexts and where disasters intersect with conflict, findings from single-hazard studies may offer limited insights as the conditions under which tenure, land ownership, social capital and livelihoods operate can be categorically different. [Neef et al. 2023; Siddiqi et al. 2019; Lind et al. 2023]. Where disasters intersect with conflict, tenure, social capital, assistance and livelihood programs operate under entirely different conditions to contexts of single-hazard disasters, often changing the factors that increase the likelihood of long-term and protracted displacement.

Several examples highlight how displacement in contexts where natural hazards intersect with conflict create a qualitatively distinct displacement ecology [Korodimou and Thornton 2025]. Rohingya refugees in Bangladesh, already displaced by conflict and violence , face cascading climate hazard exposure in overcrowded camps, producing compounded vulnerability that is neither purely conflict-induced nor purely climate-induced [Neef et al. 2023]. In Colombia, conflict-displaced populations are forced into high-hazard locations precisely because of their exclusion from safer land, making disaster exposure a consequence rather than an independent cause of their vulnerability [Siddiqi et al. 2019]. In Nagelle Town, Ethiopia, recurrent communal-based land and water disputes are exacerbated, further entrenching displacement [Chandel and Kumar 2026]

In these contexts, homeownership or secure tenure may not protect against long-term displacement as both can be contested and access to secure housing is limited. Further, existing communal divisions and competition pre-disaster can erode social capital and fracture networks that then collapse in the case of a hazard event. Finally, when market access is controlled by armed actors, disaster assistance can be ineffective and reconstruction delayed or impossible [Lind et al. 2023; Sabates-Wheeler et al. 2025]. The conflict-climate nexus therefore constitutes a context in which the factors determining protracted displacement differ from single-hazard contexts, warranting separate analytical treatment and more in-depth research.

Importantly, if unsurprisingly, factors that correlate and may act as predictors of long-term and protracted displacement also overlap to a large extent with those that worsen outcomes for individuals and the impacts displacement has on their well-being. Finally, where studies that focus on displacement may be limited, research and findings on recovery from disasters can offer useful insights into determinants of displacement duration and outcomes.

4.2 INDIVIDUAL FACTORS

VULNERABILITY AS A PREDICTOR OF PROTRACTED DISPLACEMENT AND INCREASED NEGATIVE IMPACTS

Across studies, the duration of displacement itself emerges as a strongly self-reinforcing risk factor, i.e. the longer households remain displaced, the worse their outcomes become. In post-tsunami Aceh, Lee et al. [2014] found that each additional month of displacement significantly predicted lower attainment of durable solutions, while Tanji et al. [2018] demonstrated that residence in prefabricated temporary housing for more than four years increased the odds of severe psychological distress by a factor of four compared with those who resided there for fewer than three years. These findings are confirmed from studies of Italian earthquake survivors, where currently displaced individuals showed significantly higher post-traumatic stress disorder (PTSD) symptom memory scores than the formerly displaced, who in turn scored higher than the never-displaced, even five to twelve years after the event [Del Missier et al. 2026]. Prolonged residence in temporary housing has been shown to worsen outcomes, with residence exceeding four years increasing the odds of severe psychological distress [Li et al. 2023].

The relationship between socioeconomic status and displacement duration is complex and context dependent. Poor households may face prohibitive relocation costs or barriers to return when displaced, while the wealthiest can rebuild without relocating [Paul et al. 2024; Burrows et al. 2021]. In the Indonesian tsunami context, lower household expenditure

predicted displacement to camps, often short-term, rather than private homes [Gray et al. 2014]. In the Nigerian flood context, however, higher-income occupiers were displaced for longer periods than lower-income renters, partly because higher-income owner-occupiers had more resources to wait for appropriate reconstruction rather than improvising immediate return [Wahab and Falola 2022].

Gender effects are pervasive but not uniformly directional. Female gender was significantly associated with stronger propensity to permanently relocate from Japan's 2011 earthquake-affected areas [Lee and Sugiura 2014], as well as with higher PTSD memory scores in the Italian earthquake sample [Del Missier et al. 2026]. In Bangladesh, women and the poor were most affected by moderate flooding [Gray and Mueller 2012], while in rural Pakistan heat stress drove out-migration specifically among men, linked to negative effects on farm and non-farm income [Mueller et al. 2014].

Age and ability play an important role too. Individuals with disabilities and older adults face compounded barriers to recovery that are underrepresented in quantitative datasets. After Hurricane Katrina in the US, inaccessible trailers provided by the Federal Emergency Management Agency (FEMA), lack of adapted transportation, and disaster services unprepared for disability needs were found to be systemic barriers for those ageing and individuals with disabilities, and that recovery for this population was "typically more complex and lengthy" [Stough et al. 2010]. In Natori City, Japan, more than 40% of remaining temporary housing residents were aged over 65 and faced particular challenges in social reintegration [Gagné 2020]. Overall, pre-existing disability combined with asset loss and destroyed health infrastructure can trap households in protracted displacement years after the disaster, yet formal assistance programs consistently failed to reach them equitably [Mörchen et al. 2020; Wahab and Falola 2022].

Psychological factors, including place attachment, individual resilience, and risk awareness, also operate as significant individual-level predictors of both, the duration of displacement as well as how individuals experience displacement. Place attachment in particular appears to be a double-edged sword as it motivates return, but increases psychological burden when return is impossible or prolonged [Del Missier et al. 2026].

4.3 HOUSEHOLD LEVEL FACTORS

Homeownership and tenure status are among the most consistently identified household-level protective factors across disaster types and geographic contexts. Across 50 US states, homeownership was significantly associated with quicker return after initial displacement [Paul et al. 2024]. In post-tsunami Aceh, Indonesia, those that found durable solutions were predominantly homeowners before the disaster (97.6%) [Lee et al. 2014]. Renters consistently face higher barriers to return because they lack both the financial stake and the legal right to drive reconstruction decisions.

Household property damage constitutes the most robustly demonstrated risk factor for prolonged displacement. Paul et al. [2025] report that property damage alone explains approximately 40% of return predictions in the US household pulse data. Price et al. [2022] document a strong relationship between property, neighbourhood damage, and displacement duration after Katrina and Rita in the US.

Social support and family networks constitute a household-level protective factor across contexts as they can provide financial assistance and temporary housing [Price et al. 2022; Gin et al. 2019]. The dissolution of such networks after the disaster can itself prolong displacement. In Japan, loss of family and community networks was found to be the primary driver of intentions to permanently resettle outside of the village or origin after the 2011 tsunami and nuclear disaster, more powerful than home damage or income loss [Lee and Sugiura 2014]. In another study from China, resettlement programmes that involved moving only a short distance from the area of origin, were significantly associated with better

well-being outcomes, consistent with findings from multiple contexts that maintaining proximity to prior social and economic networks is protective [Zhu et al. 2025]. This important aspect shaping decision-making within displacement situations and relocation outcomes is often overlooked in purely damage-based assessments after disasters.

An important and counterintuitive finding from China concerns the distinction between voluntary and involuntary relocation. Zhu et al. [2025] found that voluntary relocation was associated with significantly lower sustainable household well-being compared to involuntary relocation across multiple quantile regressions. This may reflect that voluntary relocators chose to move in anticipation of problems but lacked the full institutional support that mandatory resettlement programs provided, resulting in worse livelihood reconstruction outcomes.

4.4 CONTEXTUAL FACTORS

INSTITUTIONS AND SYSTEMS OF SUPPORT OR MARGINALIZATION

Contextual and policy factors emerge as powerful moderators of how individual and household vulnerabilities translate into protracted displacement outcomes.

The process and speed of infrastructure recovery is a critical factor that plays out very differently across country contexts. Evidence from Japan, the US, and Puerto Rico shows that where power was restored rapidly, population recovery timescales were 3 to 8 days [Yabe et al. 2020]. In contrast, in Puerto Rico after Hurricane Maria it was more than 25 days on average, mainly due to delays in restoring critical infrastructure. Connectedness to large and wealthy cities was a significant predictor of faster recovery across all five disasters studied, further suggesting that geographic isolation substantially amplifies displacement duration independent of disaster type.

Beyond the observable scale and quality, the perception of the effectiveness and fairness of support provided is critical and government aid programs can have divergent effects depending on the perception of those receiving assistance. After the Fukushima disaster perceived inequality in benefit distribution, rather than the absolute level of compensation, was found to be correlated with long-term displacement in temporary housing for residents of Hirono Town [Bruch et al. 2017].

The timing of livelihood assistance, as for example documented in post-tsunami Indonesia, is particularly instructive. In Aceh, assistance received after one year from the disaster was associated with three times greater odds of maintaining the pre-disaster income (associated with a lower likelihood of long-term displacement), while assistance received within the first year was paradoxically associated with lower odds of income maintenance [Lee et al 2014]. This counterintuitive finding may suggest that very early livelihood assistance may crowd out or substitute for more productive economic reconstruction strategies, while later assistance targets households that have demonstrated recovery needs and are in a position to capitalize on support.

The above examples show that both immediate assistance as well as support to so-called “durable solutions” can be critical determinants of displacement outcomes and duration. The following section will therefore unpack further, what types of approaches, from policy frameworks to livelihood programmes and housing solutions, have been shown promise in resolving protracted disaster displacement. It also highlights which interventions lack sufficient empirical evidence regarding positive impact over the long-term.

5

Two steps forward, one step back

5.1

SOLUTIONS TO PROTRACTED DISASTER DISPLACEMENT

Post-disaster interventions and support provided to displaced populations at any point in time are of course not socially neutral. Instead, they systematically produce differential outcomes mediated by tenure status, income, gender, ethnicity, age, and household composition.

Tenure status is perhaps the most widely documented axis of potential exclusion from solutions to displacement. Renters and squatters face particular disadvantages in virtually every context studied. In Bhuj, India, the owner-driven reconstruction program provided limited pathways for renters, with less than one-third of impacted renters ultimately rehoused through the publicly funded homeownership program, while equity, land tenure, and affordability challenges for the poorest renters remained unresolved [Mukherji 2015]. In Bam and Bhuj, housing assistance distribution failed to provide timely and appropriate support to lower-income groups, tenants, and squatters, while homeowners recovered or even accumulated assets [Tafti et al. 2018]. In Turkey's Bozkurt flood resettlement, forced expropriation disproportionately harmed economically and socially disadvantaged property owners, particularly the elderly, low-income, and less educated. They, unlike renters, were immobilized by their ownership ties and faced debt-based housing arrangements with unclear costs [Atac-Studt 2025].

Land tenure also emerges as the most powerful structural predictor of long-term housing quality as well as of solutions to displacement. In Indonesia, land tenure was identified as the strongest predictor of housing quality in the Merapi recovery context, explaining nearly a fifth of the variance in outcomes [Paul et al. 2025]. In Sri Lanka, residents who abandoned tsunami-provided houses and returned to original locations often did so because tenure arrangements at relocation sites remained insecure [Abeysinghe and Manatunge 2019]. In the Philippines, many residents in Tacloban resettlement sites remained uncertain about

their land titles and rights nearly a decade after Typhoon Haiyan [Tran and Bermudez 2022].

Women's vulnerability is specifically highlighted in several studies that assess recovery efforts and solutions to displacement, and yet, gender-blind aid distribution presents a systematic policy failure in many contexts [Ahmed and Mandal 2025; Tran and Bermudez 2022]. In Turkey's Van earthquake recovery housing, women disproportionately shouldered familial responsibilities with limited resources, and the physical location and configuration of new residences worsened their social vulnerabilities years after relocation, operating through what the authors describe as a "patriarchal bargain" [Seremet et al. 2024].

Ethnic minorities and indigenous communities, too, face compounded disadvantages. In Taiwan, indigenous communities displaced by Typhoon Morakot faced a government that moved quickly and comprehensively but without adequate Indigenous participation, determining relocation sites and housing options before community consultation [Wu und Lu 2024]. The process created durable problems with livelihood and cultural preservation even as external funding was mobilized. In Nepal, the underprivileged Thami ethnic community experienced worse outcomes than Brahmin communities in ostensibly similar post-earthquake resettlement programs, with satisfaction declining substantially over two years compared to stability in the better-resourced community [Shresta et al. 2025].

Extended and multi-generational families are often poorly served by housing and other support policies designed for nuclear family units. In Bam, Iran, extended families who had relied on a complex social fabric based on proximity were adversely affected by housing policies that assigned them units in residential complexes in the city outskirts, disrupting the social architecture of their pre-disaster lives [Fayazi and Lizarralde 2018]. In Bangladesh, government-provided housing failed to accommodate traditional fishing community settlement layouts, leading to extensive self-modification by residents to recover a sense of belonging [Noman 2024].

Finally, the poorest and most marginalized are disproportionately excluded by programs nominally designed to help them. The one-policy-for-all approach in Bam benefited homeowners while adversely affecting tenants, squatters, and members of extended families [Fayazi and Lizarralde 2018]. In Nepal, top-up grants and subsidized loans remained unavailable to the most vulnerable households despite their explicit inclusion in policy documents [Rawal et al. 2021].

5.2 HOME, SWEET HOME

THE ROLE OF HOUSING PROGRAMMES IN ENDING PROTRACTED DISPLACEMENT

Common approaches to addressing disaster displacement range from temporary housing programs and government-built off-site resettlement to owner-driven reconstruction and community relocation schemes. Widely implemented across different hazard, geographical and socio-economic contexts, they differ substantially in detail but often fail to integrate livelihood support with housing provision. Indeed, the most regularly documented explanation for program failure across all contexts is the institutional separation of housing provision from livelihood support: people receive shelter but not the economic infrastructure to sustain themselves in it, producing abandonment, informal modification, or return to hazard-exposed sites [Wedawatta et al. 2018; Wu 2021; Daly et al. 2020; Ncube and Murray 2025].

Community-driven development approaches are broadly advocated, but in some contexts have shown limited durable impact, as in Aceh, where most participants in a community-led programme remained marginalized eight years after the disaster at higher risk of protracted displacement [Mccarthy 2013]. Top-up grants and subsidized loans for vulnerable households in Nepal exist as policy provisions but have not reached their intended beneficiaries, and no study identifies what modified delivery mechanism would succeed [Rawal et al. 2021]. As housing is repeatedly cited as the dominant factor in solutions to displacement, it is worth considering evidence

on the quality of housing, of housing support provided, and of the sustainability of housing available after a displacement event.

The literature documents three principal modalities of post-disaster housing: in-situ reconstruction at the original site, on-site relocation within the same community, and off-site relocation to entirely new settlements. These differ substantially in implementation complexity, livelihood disruption, and resident satisfaction.

Off-site relocation

Off-site contractor-driven resettlement is the most commonly implemented and extensively documented, but consistently produces poor long-term outcomes including housing abandonment, declining satisfaction, and reduced household adaptive capacity [Cuaton 2019; Shresta et al. 2025; Testori et al. 2021; Xu et al. 2022; Wu 2021; Ncube and Murray 2025]. This is shown to be the case particularly when sites are peripheral, tenure is insecure, and livelihoods cannot be replicated at the new location [Swarko et al. 2024; Birkmann et al. 2026; Chen et al. 2020; Arnall et al. 2013; Dias et al. 2016; Siddiq and Javernick-Will 2024].

The three housing reconstruction mechanisms studied after Typhoon Haiyan in the Philippines, ranging from owner-driven on-site reconstruction to community-driven off-site relocation and contractor-driven off-site relocation, all encountered significant delays and shortfalls. On-site reconstruction was hampered by insufficient materials and skills training, while off-site relocation suffered from prolonged land acquisition and subcontracting failures [Ong et al. 2016]. The Philippines experience is particularly instructive, showing that fast construction, full occupancy, and proximity to an economic and administrative centre were necessary conditions for overall liveability, but that government and NGO-developed sites reached liveability through distinctly different pathways [Palagi and Javernick-Will 2020].

Owner-driven reconstruction

Owner-driven and community-led reconstruction programs produce comparatively more favourable outcomes, though even these seem to fail to reach the most vulnerable, such as renters, squatters, the landless, ethnic minorities, and women, and where policies differentiate between target groups, they are rarely implemented as designed.

In Nepal, owner-led and government-supported reconstruction of housing resulted in remarkable achievements. Nearly 700,000 houses were built and homestead land ownership was provided to previously landless households [Rawal et al. 2021]. However, top-up grants and subsidized loans failed to reach the most vulnerable households despite explicit policy provisions.

In China, an owner-driven, self-reconstruction model gave survivors greater participation and freedom, making post-reconstruction adaptation easier [Kabilijian et al. 2025]. A comparative study comparing on-site self-constructed housing and relocated government-constructed housing across three Chinese towns found that the former generally produced higher resilience levels, while the government programmes achieved high-quality built environments in more developed areas but consistently produced low resilience in less developed settings [XI et al. 2022].

In-situ reconstruction

In-situ reconstruction is repeatedly framed as the preferable solution to prevent displacement as well as for countering the negative effects of protracted displacement by preserving social networks, livelihoods, and place attachment [Nagami et al. 2025]. However, long-term risks of future loss and new displacement can accumulate [Iuchi et al. 2015]. Further, even in-situ, temporary and transitional housing represents a chronic weakness and progression into permanent and secure housing a challenge [Miyasada and Maly 2021; Lines et al. 2022].

A recurring finding across contexts is that residents adapt, modify, and transform their

housing regardless of whether it is temporary or permanent, and regardless of policy prohibitions. In Aceh, within a few years of completion, residents extended, remodelled, and renovated aid-provided houses to meet social and functional needs [Ahmed and O'Brien 2012]. In Cagayan de Oro, Philippines, seven years after Typhoon Washi of 2011, residents had proactively modified their small government-provided units, raising concerns about construction safety and increased density [Carrasco and Egbelakin 2022]. In Bangladesh's Ashrayan project, fishing communities altered government-provided housing units using self-help approaches and locally available materials to create culturally meaningful spaces and a sense of belonging [Noman 2024]. In Chile and Peru it was found that even when families knew they must vacate shelters by a specific date, they invested time and resources in enlarging and customizing them, underscoring the psychological necessity of homemaking even in impermanent conditions [Wagemann 2017].

Beyond classic settlement programmes, in-situ or by relocation, alternative and organically developed strategies of circular or multi-site resettlement have received little policy attention and no rigorous evaluations exist. This despite them appearing as rational coping strategies across multiple country contexts and offering displaced households access to new locations while simultaneously maintaining their link to areas of origin to allow them to sustain their agrarian livelihoods [Ncube and Murray 2025; Shneidermann et al. 2026; Rahman et al. 2025].

5.3 THE TRICKY BUSINESS OF GOVERNANCE

INSTITUTIONAL DESIGN, COORDINATION AND COMMUNITY DECISION-MAKING

The quality and location of the receiving environment and domestic governance structures, such as insurance systems, zoning laws, or status and access to services of displaced populations, often govern displacement outcomes more than the magnitude of the climate hazard itself [Sterett 2021]. And yet, the policy landscape for responding to displacement and for protracted displacement resolution is fragmented across national, regional, and local levels. There are, at each level and between geographies even within same countries, significant variations in institutional design, coordination mechanisms, and the degree to which communities are included in decision-making.

Legal frameworks for displacement are a critical part of the solutions toolbox for addressing protracted displacement, yet they present a persistent gap. Many countries lack specific national legislation addressing internally displaced persons [Tran and Bermudez 2022; Nitsch 2020; Nurul et al. 2025]. National-level policy architectures vary enormously in their clarity and specificity. Japan established a dedicated ten-year Reconstruction Agency and committed approximately 25 trillion yen (US$250 billion) to recovery, providing an exceptionally well-resourced institutional framework [Iuchi et al. 2015]. The Philippines developed successive legal instruments, such as the Urban Development Housing Act of 1992, coastal no-dwelling zone ordinances and presidential acceleration orders. These are good examples of strong policy developments in support of addressing protracted displacement as well as preventing new displacements.

However, enforcement of no-build zones remains weak across all contexts, with houses continuing to be rebuilt in high-risk coastal areas. In Sri Lanka, the post-tsunami buffer zone was a major source of confusion and delay, with inconsistencies in its application creating land tenure disputes and reconstruction bottlenecks [Birkmann et al. 2025]. Twenty years later, Sri Lanka's buffer zone and relocation policies continued to affect residents' decisions to stay or leave relocation sites, with access to land, educational infrastructure, transport, and market access all remaining influential factors. In the Florida Keys of the US, a revised building code, designed to improve resilience, disproportionately imposed reconstruction costs on moderate-income mobile home residents while creating windfall opportunities for speculative real estate investment, thereby producing displacement that was a direct product of the preparedness initiative itself

[Shtob 2022]. Thus, building codes and zoning regulations can also increase the risk of long-term displacement, particularly for lower income communities.

Importantly, governance structure and stability are identified as critical mediating variables. In a cross-national comparison of Japan, Philippines, and Indonesia, relocation was shown to be managed primarily through pre-existing housing programs rather than newly established mechanisms, reflecting the fact that rapid reconfiguration of bureaucratic infrastructure and responsibilities is institutionally difficult [Iuchi and Mutter 2020]. Further, as many other studies have shown, community involvement was confirmed as essential for sustained investment in new sites. And governance stability has an impact on the stability of social networks, while overall, local culture shapes sentiments and approaches to responses to displacement and to relocation.

A real or perceived lack of time due to the pressure of reconstructing quickly, regularly limits meaningful efforts to engage those affected. Pre-impact recovery planning incorporating Indigenous communities in Taiwan could have prevented many of the problems encountered after Typhoon Morakot, where speed of implementation precluded meaningful participation and relocation sites were determined before communities could be consulted [Wu and Lu 2024].

However, the time it takes to rebuild can be used as an exclusionary principle, and access to decision-making based on social and economic status plays a critical role across contexts. In Nepal's post-earthquake resettlement, the Brahmin community in Jillu that was able to lead its own reconstruction process maintained stable satisfaction scores over two years, while the underprivileged Thami community in Panipokhari was subjected to top-down government-led resettlement and experienced declining satisfaction [Shresta et al. 2025].

5.4 LIVELIHOODS

THE CRITICAL ROLE OF ECONOMIC RECOVERY

Livelihood recovery is nearly universally cited as the most neglected dimension of post-disaster reconstruction programs and those concerned with ending protracted displacement. This gap persists across timescales, with little progress made, as well as across geographies, political systems and socio-economic contexts. Physical housing provision consistently outpaces livelihood restoration, producing a situation in which people have shelter but inadequate means to sustain themselves in or near it.

Even where livelihood support programs are employed as an explicit strategy to support recovery and prevent protracted displacement in post-disaster contexts, these have shown mixed effectiveness. There is clear evidence that they can stabilize finances and partially restore pre-disaster activities, but also that they are significantly less able to establish new sustainable livelihoods.

Studies of post-tsunami livelihood support in Aceh, Indonesia, found that aid helped beneficiaries stabilize household finances and partially restore prior livelihoods, and could support part-time participation in new activities [Daly et al. 2020]. However, the support did not result in sustainable new livelihoods for those lacking pre-disaster experience, primarily because of time pressures and institutional constraints. Community-led livelihood interventions in Aceh, including livestock programs, revolving funds, and micro-hydro projects, showed some durable impacts eight years later, but most failed to address underlying drivers of vulnerability among the most marginalized [Mccarthy 2013].

As mentioned above, the timing and coordination of livelihood support is critical. Evidence from post-tsunami relocation sites in Indonesia identified early recovery income support, physical and mental health support, the ability to transfer skills, the timeliness of livelihood assistance, cultural sensitivity, and governance structure as the most important

factors for livelihood resilience among relocated communities [Sina et al. 2019].

Vocational training and skills development are referenced in multiple programs but rarely evaluated rigorously. Bangladesh's Ashrayan-2 project provided vocational training for informal employment and microcredit through NGOs, but challenges in monetizing skills persisted due to a lack of supply chains for handmade goods and insufficient nearby employment [Rahman et al. 2025]. Guatemala's Nueva Reforma program included carpentry and masonry training alongside cash and voucher systems for shelter support, but long-term resilience challenges remained, particularly in updating shelters and expanding social investment capacity [Dailey 2025].

Livelihood and housing linkages are consistently underappreciated by policymakers. In Sri Lanka's post-disaster housing projects, the main source of dissatisfaction after ten years was not the physical quality of houses but the inability of occupants to use their homes for income generation (see also section "Home, sweet home" above)

Finally, access to land and agricultural livelihoods is the most fundamental livelihood determinant identified across rural contexts. In China, the availability of farmland, regardless of its size, made major differences in post-disaster recovery outcomes because it provided both a livelihood and a cultural anchor for maintaining rural identity and lifestyle [Chen et al. 2020]. In Mozambique, displaced populations and re-settlers who could not secure viable livelihoods elsewhere returned to flood-prone river valleys despite the risks of repeated displacement [Arnall et al. 2013]. Such dynamics are found across the globe and yet not fully appreciated in reconstruction and recovery policies and programmes after major disasters, contributing to protracted displacement.

5.5 REFLECTING ON SOLUTIONS

When it comes to solutions to protracted displacement, there is still a lack of evidence of what really works in practice. Lessons from failures of the past are not systematically assessed and translated into concrete guidance on how barriers can be navigated successfully.

One of these barriers is that displacement is still treated as a category as well as an exceptional and timebound crisis situation, whereas governance institutions and programmes are organized by sectors and operate within annual or multi-year planning and budgetary cycles [Cheung 2026]. When displacement becomes protracted these institutions and programmes are often not equipped and able to respond. Legal status of individuals, sectoral vs humanitarian budgets, and territorial jurisdictions can all act as significant barriers to solutions.

Conceptually, there is broad agreement that protracted displacement is a development issue, and numerous studies and reports have confirmed the need for integrated development approaches and to address displacement through education, health, housing and employment [OCHA 2017; IDMC 2018]. Further, growing evidence confirms that policies and investments directly targeting those living in protracted displacement need to go past restoring pre-displacement precarity and instead support IDPs in achieving a "higher" level of resilience. Aking to the "building back better" concept in disaster risk reduction, such a focus would require long-term investment in building more equitable and stable societies alongside providing direct support to displaced and host communities.

Finally, durable solutions cannot be effectively planned or monitored without information on who remains displaced and for how long, and on the barriers preventing sustainable solutions. Strengthening national displacement data systems, including longitudinal monitoring and integration with administrative and sectoral datasets, can therefore be considered key investment alongside support for housing and livelihoods, and strengthening relevant governance arrangements.

6

Digging deeper

6.1

UNDERSTANDING THE COMPLEXITY AND SPECIFICITY OF PROTRACTED DISPLACEMENT FOR TAILORED SOLUTIONS

Factors influencing household decisions and experiences of displacement change over the course of time. The longer and more protracted displacement becomes, the more effort should be undertaken to better understand what is most important to those displaced and to the communities in areas of origin and destination areas. Each national context is specific, and in each country, each displacement event, hazard and socio-economic set-up provides further specificity. Therefore, digging deeper into particular settings and understanding how protracted displacement evolves within them, provides valuable insights for future action.

Three country contexts have been chosen here for further analysis. They illustrate some of the key issues discussed above, i.e. land tenure insecurity and governance failures in Somalia, recurrent hazard exposure and compound risk in the Philippines, and a challenging institutional set-up in the face of protracted flood-related displacement in Colombia.

6.2

FLOODS AND FAILURES

AN EXAMPLE OF PROTRACTED DISPLACEMENT IN COLOMBIA

On the night of November 30, 2010, the Canal del Dique breached its levee near the municipality of Santa Lucía, in the south of Colombia's department of Atlántico. Water poured from the colonial-era waterway connecting the Magdalena River to the Caribbean coast across the lowland plain with almost no warning. Within days, tens of thousands of people had abandoned their homes, and farms, roads, and entire villages disappeared beneath floodwater that in some places did not recede for months. The event was the worst single rupture of an extended hydroclimatic crisis triggered by the La Niña

phenomenon of 2010–2011 that displaced approximately 2.35 million people from their homes across Colombia and inflicting over $7.8 billion in damages, an equivalent of roughly two percent of the country's GDP that year [Vargas et al 2018].

Atlántico bore a disproportionate share of the impact. Evidence confirms that the disaster was compounded by decades of accumulated failures, from deforestation that accelerated runoff to infrastructure designed without adequate hydraulic margins, urban expansion into floodplains, and an institutional system for disaster prevention plagued by opacity and corruption [Sedano-Cruz et al 2013]. The La Niña of 2010–2011 was severe, but the flood was not an act of nature alone, but of a fractured and fragile institutional environment.

For the families expelled from the southern municipalities of Atlántico, such as Santa Lucía, Campo de la Cruz and Manatí, the physical damage wrought by the floods was immense, but so was the social rupture brought on by displacement [Amar-Amar et al 2019]. Displacement fractured the networks of households and individuals with neighbours, extended kin and informal support systems on which they depended on to manage an already challenging life. The floods had wiped out agricultural production, livestock, and the small-scale commerce that sustained incomes, compounding food insecurity for people who had little margin to absorb additional shocks.

Children were particularly affected. Evidence from the 1999 Coffee Region earthquake, one of the most studied Colombian disaster events for long-term household effects, found strong negative impacts on child nutrition and school enrolment that persisted years after the disaster. Relocation and associated school disruptions, and the economic pressure on displaced households combined to push dropout rates higher [Contreras et al. 2024].

In the aftermath of the event, people moved to shelters, to relatives in Barranquilla, or to makeshift settlements on higher ground. The intention, initially, was to wait out the waters and return, but many waited for years not primarily because of the physical damage, but because of the reduced efficiency and institutional gaps in the relief strategy [Sanchez-Jabba 2011]. Resources allocated through the government's emergency program moved slowly and the coordination between national entities and local operators was poor. Compared to another department with a similar number of affected people, Valle del Cauca, the contrast showed that protracted displacement and recovery in Atlántico were not a product of greater devastation but of institutional challenges.

The 2010 floods showed that despite Colombia's comparatively developed legal framework for disaster response and experience with conflict-driven displacement, the country was fundamentally unprepared to protect people displaced by floods beyond the acute phase [Brickel and Thomas 2014]. The infrastructure for emergency food distribution and temporary shelter existed but the systems for accompanying people through reconstruction, for restoring livelihoods, for addressing the legal and economic dimensions of housing loss, did not function at the required scale.

The Colombian government's response did eventually take institutional form. By decree, the national government created Colombia Humanitaria, a special-purpose fund tasked with coordinating habitat recovery, sociocultural reactivation, and livelihood reconstruction for the roughly 1.15 million families, or about six percent of the population, affected by La Niña across the country. A qualitative evaluation of Colombia Humanitaria's programs found that the agency succeeded in organizing an intervention of unprecedented scope [Núñez et al. 2013].

Existing research and policy analysis of the Atlántico case converges on a common set of recommendations. These include the establishment of technical and operational standards, i.e. clear protocols that designated operators could follow before a disaster struck, rather than improvising during one [Sánchez-Jabba 2011]. Further, a deeper shift in how Colombia approaches flood risk altogether is required, away from reactive engineering interventions and toward an integrated management philosophy that treated watersheds, land use, and community resilience as a single system [Sedano-Cruz et al. 2013]. Building on existing positive

examples, recommendations from research concentrates on combining climate adaptation and risk reduction with supporting community leadership. [8]

Recent policy developments provide a strong basis to advance from. Colombia has one of the most advanced IDP protection frameworks in the world, but until recently this was only available for conflict-related displacement. In 2024, however, the Constitutional Court ordered the government to enact a law on disaster displacement. Passed in May 2026, this landmark law recognizes displacement from climate change, environmental degradation and natural disasters as a distinct legal and humanitarian category. It is the first law to do so in Latin America and one of the first national legally binding policies of this kind in the world.[9]

6.3
A CRISIS COMPOUNDED

PROTRACTED DISPLACEMENT IN THE PHILIPPINES

The Philippines is among the most disaster-prone countries in the world, sitting at the intersection of the Pacific typhoon belt, the Pacific Ring of Fire, and a complex seismic zone. The cumulative result is one of the highest rates of disaster-induced internal displacement globally [IDMC 2026]. In addition to the frequency of displacement events, several structural conditions convert acute, crisis-driven evacuations into chronic, protracted situations lasting years or decades.

First, the country's topography and settlement history have concentrated the poorest urban populations in informal settlements along riverbanks, coastal flood plains, and steep hillsides – precisely the areas designated as No-Build Zones after major disasters. These are the populations most exposed to every typhoon and most likely to be displaced by government clearance operations long after the initial event subsides. Second, the Philippines' rapid urbanization has meant that post-disaster reconstruction cannot simply return communities to their pre-disaster footprint. There is often no safe land available in the vicinity of origin communities, pushing relocation programs toward distant sites that sever displaced persons' connection to their livelihoods and social networks. Third, governance fragmentation – overlapping mandates among the National Housing Authority (NHA), the Department of Human Settlements and Urban Development (DHSUD), local government units (LGUs), and multiple line agencies – produces implementation delays that keep displaced families in transitional arrangements for long periods of time.

The scale of protracted displacement has been documented across several landmark disasters. Typhoon Haiyan (locally named Yolanda) struck the central Philippines in November 2013, displacing approximately four million people at its peak and leaving hundreds of thousands in transitional or permanent resettlement sites years after the event. The number of people still living in displacement today is not confirmed, however.[10]

Tropical Storm Washi (Sendong) displaced tens of thousands in Cagayan de Oro and Iligan City in 2011, and more than a decade later, resettled families continued to fall below minimum poverty thresholds with employment remaining scarce at distant relocation sites [Carrasco and Egbelakin 2022]. The evidence from the Philippines highlights the challenges of supporting successful resettlement. Relocated residents in Tacloban, Cagayan de Oro, Catbalogan, and Metro Manila all reported persistent unemployment, unaffordable transport to employment centers, and disruption to the social networks that had buffered economic shocks before displacement. The lower land cost and relative hazard protection at more distant sites can be priority for governments even where evidence shows that relocation distance is a key determinant in the success of a resettlement programme.

8 See Annex 2 Data landscape for more information on existing data and research gaps in Colombia.

9 For more information on the order and its rationale, see bit.ly/4yP3AkM and bit.ly/4hZpNFF.

10 For more information on data availability in the Philippines and its implications, see Annex 2 Data landscape.

Governance fragmentation is a structural barrier that few individual programs can overcome. No unified post-disaster housing law exists in the Philippines and overlapping or uneven mandates among national agencies and local governments produce coordination failures, delays, and accountability gaps [Ballano 2017; Alegado 2021; Arroyo and Astrand 2019]. Task forces created for specific disasters, such as the Task Force Yolanda or Task Force Bangon Marawi, reproduced rather than resolved this fragmentation [Cunanan et al. 2022; Iuchi et al. 2020; Sarangani 2021, Lumna 2024]. This challenge is not unique to the Philippines, however, and the same dynamic can be found across all regions and disaster contexts.

Livelihood disruption is the most persistent unmet need across all displacement contexts and timeframes studied in the country. Nearly half of all resettled Metro Manila households experienced income reductions after relocation. More than a decade after Tropical Storm Washi, Iligan and Cagayan de Oro resettlers remained below minimum poverty thresholds. Cash transfer programs demonstrated meaningful short-term multiplier effects, and agricultural rehabilitation projects such as BReSA in Leyte generated quantifiable income gains but these interventions were rarely integrated into resettlement programs at scale.

Against these barriers, several approaches demonstrate positive outcomes. In-city or near-site resettlement combined with community-led planning is the pathway with the strongest evidence of positive impact. The People's Plan model in Metro Manila, allowed informal settler communities to self-select and develop relocation sites within the capital and surrounding areas, resulting in the successful resettlement of over 90% of the targeted population from dangerous areas and in high satisfaction rates across [Palagi Bodine et al. 2022]. The WeEffect housing project in Ormoc, Leyte, which involved displaced households at multiple stages of design and construction, produced safer housing outcomes and measurably enhanced community capacity for self-repair [Arroyo 2019]. The Barangay Disaster Risk-Sensitive Shelter Plans in Iligan City, using participatory situational analysis, relocated approximately 70% of households to safe settlements while embedding disaster preparedness into the resettlement process itself [Terejo et al. 2021].

Importantly, multi-hazard site assessments before relocation, including communities and service providers, are a measure that could be implemented relatively easily.[11] Several post-disaster relocation sites in the Philippines were subsequently shown to be themselves flood-prone, with relocated households forced to evacuate during flood events, trading storm surge exposure for flood and landslide risk. The evidence indicates that incremental improvements to existing programmes are unlikely to be sufficient. Instead, a unified post-disaster housing law could help consolidate the mandates currently dispersed across the NHA, DHSUD, and LGUs, to establish clear lines of accountability, and to obviate the recurrent reliance on ad hoc task forces.

Further, investing in more options of in-city and near-site resettlement can be developed, based on the experience from past resettlement in Manila, Ormoc and Barangay. As in other contexts across the globe, evidence also highlights the need to more strongly embed livelihood restoration within resettlement programming from the outset, combining cash-transfer instruments, agricultural or enterprise rehabilitation, and subsidised transport to employment centres.

6.4 CHRONIC RISK PERPETUATED

ONGOING AND PROTRACTED DISPLACEMENT IN SOMALIA

One of the world's most severe and enduring displacement crises unfolds in Somalia and has been doing so for decades. The collapse of pastoral livelihoods is one of the key drivers of displacement in the country. For agropastoral communities in southern Somalia, displacement is compounded by elite capture of fertile riverine agricultural land

[11] See Annex 2 Data landscape for more information on future research needs in the Philippines.

and livelihood recovery requires resolving land disputes before agricultural rehabilitation is even possible [Osman and Abebe 2023; Abdullahi Ahmed 2026].

Drought hazard adds to this structural dimension and pastoralists are particularly affected, often forced into urban IDP settlements where they end up in a circular trap. For them, return is not viable and the majority of those displaced have no intention to return because there was no productive asset base to which they could return.

Local integration is further blocked by insecure tenure and clan-mediated exclusion in towns and cities of destination. The most consistently identified barrier in the literature is the absence of security preconditions for return in conflict-affected areas. In south-central Somalia, return-oriented policies have failed systematically because security conditions at origin are not restored. Insecure land tenure and lack of civil documentation are additional barriers to return, relocation and, to some extent, local integration. Housing and land tenure security and livelihood support (rather than broader service provision) have been shown to have the most significant impact on integration trajectories in Somalia's urban IDP context.[12]

Somalia' National Durable Solutions Strategy 2020–2024 and ratification of the Kampala Convention provide strong governing frameworks. Implementation, however, is slow and there is a chronic underfunding of response [Maina 2025; UNICEF 2025]. Legal fragmentation at the regional level adds another layer of constraint. IGAD's regional durable solutions declarations remain non-binding, with varying political commitment among member states limiting consistent implementation. Municipal authorities also face limited financial autonomy, presenting a significant challenge to them when trying to invest in durable solutions for IDPs who are often spatially distributed and with differentiated needs across a city, negatively affecting implementation even where strong policies exist. This governance dimension is poorly represented in both the research literature and operational data collection.

Finally, the way that humanitarian aid is provided (or not) plays a role in shaping displacement patterns, and perhaps in prolonging it. Aid presence that is not accompanied by solutions programming can inadvertently make IDP sites more tolerable than conflict-affected origin areas, anchoring protracted displacement rather than enabling transitions [IOM 2023; Blair 2026]. Much of the assistance in disaster response in Somalia is channelled into live-saving measures such as the provision of temporary shelters rather than long-term housing [Sabates-Wheeler et al. 2025]. In addition, the location at which aid is provided is not always determined by need but by donor priorities and institutional capacities, not necessarily taking into consideration the mobility implications for already displaced populations [Horst and Nur 2016¨].

There is also evidence of a political marketplace around keeping those displaced in precarity, where certain actors, including local business and aid organisations, share an interest in a stable IDP population that may enable cheap labour, a customer base, or continued humanitarian funding [Bryld et al. 2020; Jaspars et al 2023]. While some may argue for aid reductions in view of such challenges, more investment in durable solutions oriented and tailored support are needed, rather than less assistance. Such approaches can mitigate the risk of such dynamics taking root, protecting IDPs from becoming dependant and locked into permanent displacement, or from being pushed in involuntary returns [Horst and Nur 2016].

These dynamics are not unique to Somalia, however, as similar patterns recur in other displacement situations, particularly where they are large-scale. Displaced people leave areas that have been rendered uninhabitable by conflict, drought, or both, and cluster at sites where humanitarian assistance is concentrated. These may be informal urban settlements, UN-protected compound or

12 www.regionaldss.org/danwadaag.

government-designated camps, where life-saving relief keeps them alive but is not paired with durable-solutions programming that would either make return viable or convert the site into somewhere a household can plausibly integrate. Over time, the site becomes marginally more tolerable than the origin area, and displacement hardens into a status.

Against these barriers, several promising approaches have emerged. The most sophisticated effort in Somalia may be the Danwadaag consortium, founded by more than 15 local, national and international organisations and operating in Mogadishu/Banadir, Kismayo, Afgooye, and Baidoa. The programming areas are focused on land access and tenure security, livelihoods, and access to documentation. A decongestion activity in five IDP sites in Mogadishu improved tenure security for almost 5,000 individuals, and supported the relocation of displaced families facing eviction in Baidoa to a permanent publicly allocated site.

Evidence shows that hybrid settlements where returnees, IDPs, and host communities live together can function as practical integration mechanisms, suggesting that well-sited, inclusion-focused area-based approaches can catalyse integration dynamics beyond directly targeted households. The broad lesson across the literature is that livelihood programmes combining basic needs provision with economic opportunity generation, paired with secure land tenure and documentation access, constitute the most promising pathway toward local integration in protracted urban displacement settings. In drought-affected contexts, microfinance and cooperative economic models show evidence of building resilience, but they require sustained funding beyond current humanitarian cycles. In all contexts, meaningfully enhancing the financial autonomy of city-level authorities and ensuring community participation in intervention design are structural preconditions for effectiveness.

Future efforts in developing durable solutions to protracted displacement in Somalia and in reducing disaster displacement risk need to be based on a better understanding of the duration of displacement and of the effectiveness of current interventions from the many humanitarian and national actors in the different regions of the country. The central question of which interventions reduce displacement duration and by how much cannot yet be empirically answered.[13]

[13] See Annex 2 "Data landscape" for more information on the data gaps and future research needs in Somalia.

7

A glimpse of the future

7.1

ASSESSING THE RISK OF PROTRACTED DISPLACEMENT AND UNDERSTANDING UNINHABITABILITY

The growing impact of climate change and of shifting socio-environmental dynamics shape the scale and pattern of displacement risk and of people's ability to return to or remain in areas of origin [Desai et al 2021]. Recognising this, the past two decades have seen a growing interest in modelling displacement risk and assessing the implications of climate change for habitability. More recently, there has been a notable shift from deterministic risk assessments based on historical data only or statistical correlation approaches using proxy data and globally available indices to state-of-the-art probabilistic modelling used by the insurance industry. This presents a significant advance as a range of possible hazard, climate change, and development scenarios can be modelled for their implications for displacement risk, and the potential social and economic costs of displacement can be assessed according to more rigorous methods.

In fact, while a relatively new sub-discipline in academia, the field of modelling disaster displacement risk is rapidly evolving. The most more recent and mature models use the probabilistic risk assessment approaches mainly in the context of sudden-onset hazards. IDMC's original global model, developed in 2017, was the first to employ this approach, with further iterations and improvements to its basic methodology published in 2021, 2023 and 2025.[14] The original model takes building damage as a proxy for displacement and thus does not account directly for socioeconomic and environmental factors or the political and institutional context. Such factors may, however, come into play through the exposure layers used, for example reflected in the quality of housing and infrastructure, which defines building damage thresholds and uses them as an indicator for displacement likelihood (see figure 2).

[14] For more details on the evolution of the IDMC model, see: www.internal-displacement.org/displacement-risk.

Figure 2: The displacement risk model function

Source: IDMC.



The latest assessment of this kind and at the global level, estimates an average of almost 32 million displacements per year linked to floods, storms, and droughts and expects climate change to increase this risk by 100% under the now very likely plus 1.5 degree Celsius scenario.[15] This presents a conservative figure, as mandatory and pre-emptive evacuations are not represented, and it only captures initial movement. Further iterations of the original model have been deployed at regional and national levels to include displacement risk associated with loss of employment linked to infrastructure damage and disruption to essential services (see Figure 3).

A further, recent study adapted the existing displacement risk model by incorporating social vulnerability factors based on proxies on human development and government effectiveness [Bachmann 2025]. The approach sought to assess whether lower socioeconomic development and government effectiveness result in significantly lower building damage thresholds, i.e. in higher likelihood of displacement. While the damage thresholds that would trigger displacement were indeed significantly lower in this new model (27% compared to 55% for IDMC's original model), it showed limited improvement in aligning the modelled displacement better to reported estimates. Thus, more granular data and better modelling of the displacement drivers, beyond housing damage, are needed to understand which factors drive human displacement and what potential patterns emerge.

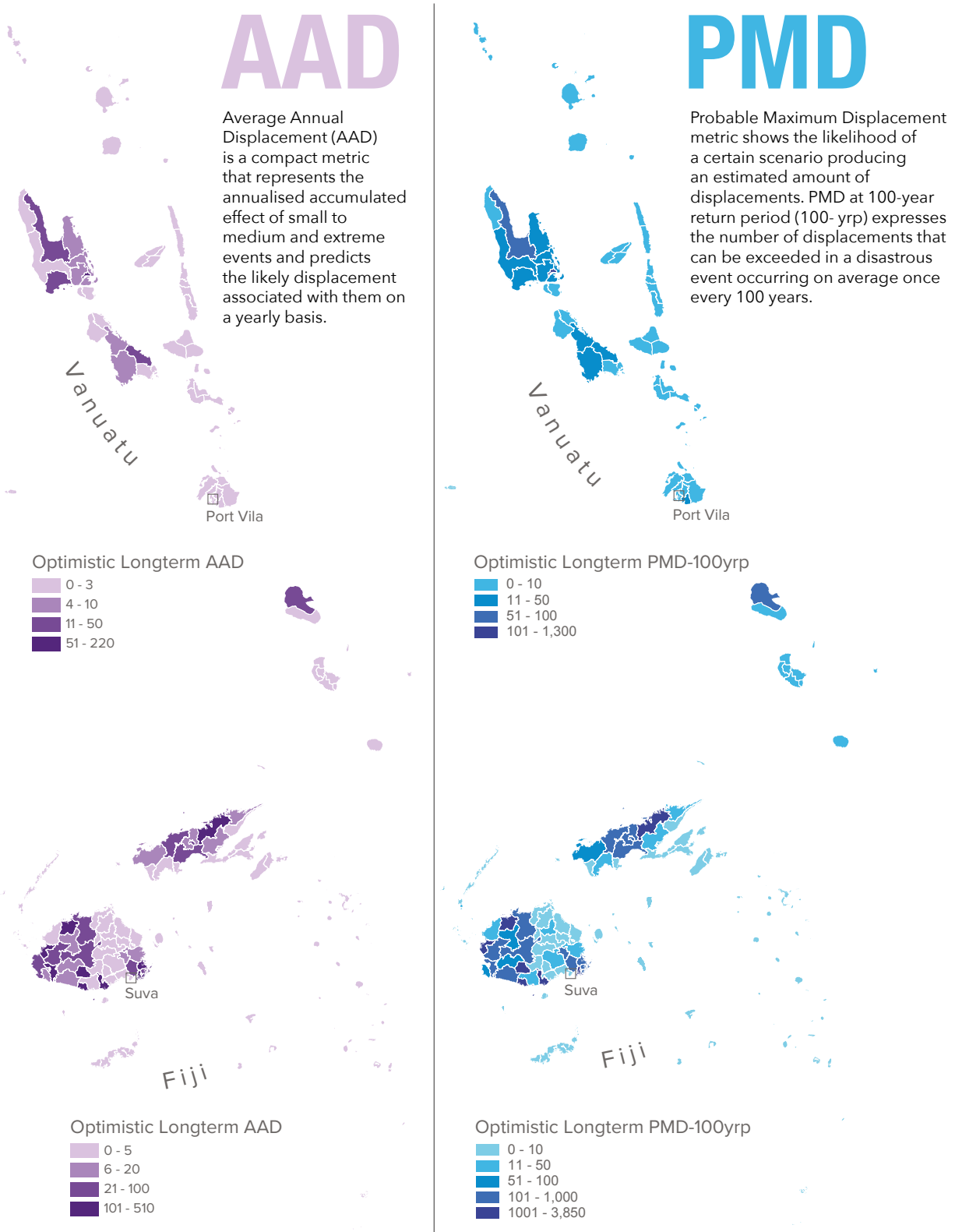
Other models seek to assess future regional migration flows in the context of climate change, such as the World Bank's Groundswell series of reports [World Bank 2018; Clement et al. 2021]. Using a gravity-based internal migration model, it projects migration outcomes for water scarcity, crop productivity loss, and sea-level rise under three scenarios. A pessimistic scenario of high emissions and unequal development, under which there would be up to 216 million internal climate migrants across six regions by 2050; an inclusive development scenario with substantially fewer movements, and a climate-friendly scenario that would reduce internal migration by as much as 80%. While broadly cited by policymakers, the approach used and particularly the communication of results has also been heavily critiqued [Beyer et al. 2023; Turner et al. 2025]. Groundswell uses statistical methods to estimate internal migration from slow-onset drivers including crop yields, water supplies, and sea level rise, but the state of knowledge only permits rough estimates for other forms and drivers, and the approach fails to capture temporal dynamics [Beyer et al. 2022]. Further, the reports do not clearly communicate for what types of movements the model provides estimates, mixing migration and displacement concepts with problematic associations of risk and negative impacts of human mobility and negative implications for policy development [Milan et al. 2024].

Further, several index-based models and dashboards exist, which rank countries according to their vulnerability to climate change or visualize hotspots of so-called "climate mobility", such as those published by UNU, the EU and IOM. Several short-term forecasting tools have been developed over the past decade, too. The DRC's Global Displacement Forecast produces near-term projections, often for specific locations or discrete regions.[16] A different approach, using

[15] bit.ly/47au7wO

[16] See bit.ly/47gaROo.

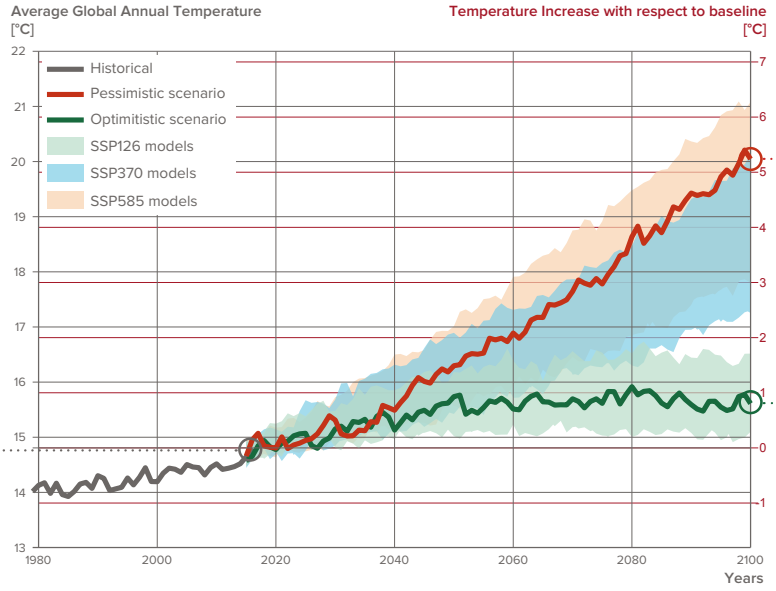
Figure 3: Enhanced model of displacement risk, including infrastructure damage related loss of services and employment



Source: IDMC.

PESSIMISTIC
PMD-100yrp
Fiji: 25,900
Vanuatu: 1,700

AAD
Fiji: 3,400
Vanuatu: 380



CURRENT
PMD-100yrp
Fiji: 9,500
Vanuatu: 500

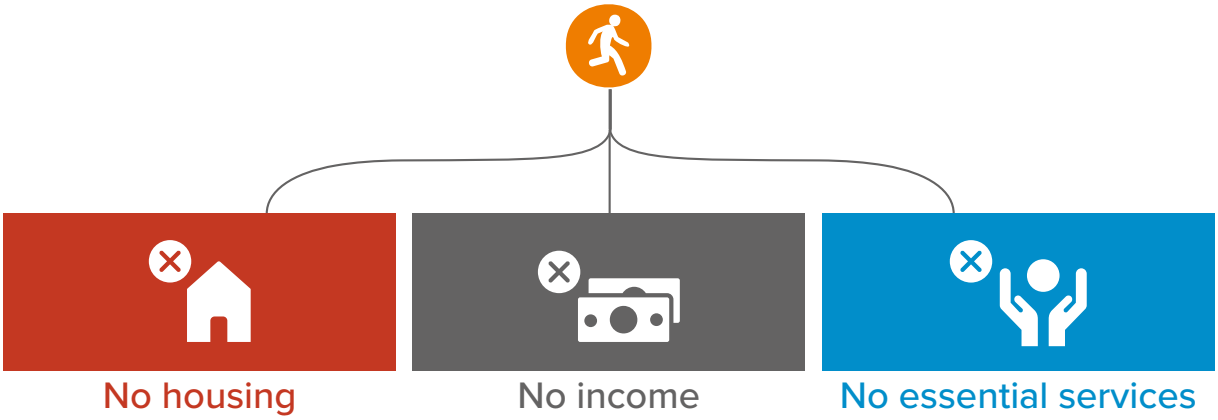
AAD
Fiji: 1,100
Vanuatu: 90

OPTIMISTIC
PMD-100yrp
Fiji: 18,800
Vanuatu: 900

AAD
Fiji: 2,300
Vanuatu: 195

Applying different climate scenarios - To investigate how climate change may alter the future frequency and intensity of extreme events, two different scenarios are explored as reference:

- **OPTIMISTIC** - the scenario closest to the 20th percentile, corresponding to an average temperature rise of about +1°C by 2100
- **PESSIMISTIC** - the scenario closest to the 80th percentile, corresponding to an average temperature rise of over +5°C by 2100



EVALUATION OF INDIVIDUAL CONTRIBUTIONS

Population is assigned to residential buildings

Impacts on houses are evaluated considering a damage threshold for identifying the displacement

Employed population (per sector) is assigned to different land use classes

Impacts on the different land classes are evaluated; a damage threshold - which may vary according to the social fabric - is defined for identifying need displacement

Residential population is assigned to different services (e.g. education facilities, health facilities, transportation network, water supply, etc.) through the definition of a catchment area.

Impacts on the single elements of the "network of service" are evaluated, as well as the loss of functionality of the overall service; a double threshold is defined for identifying the displacement.



statistical regressions, highlighted that within broader socioeconomic factors, measures of human development and location (rural vs urban) had more explanatory value regarding vulnerability to displacement than income levels measured by GDP [Mester et al 2025].

However, evidence is mounting that with increasing climate change, both sudden and slow onset disasters can render land uninhabitable, keeping displaced populations suspended for years or decades as they are not able to return to their areas of origin. Several advances in modelling the risk of such a future are noteworthy.

7.2 A POINT OF NO RETURN

WHAT DETERMINES UNINHABITABILITY

Global and regional integrated assessments mainly model coastal land loss and inundation from sea-level rise as well as from land degradation and desertification. None of them present a single number of how many people are expected to be displaced due to climate change, but wide ranges that come with significant qualifiers.

The most cited estimates of physical land loss from sea level rise are no exception [Lincke and Hinkel 2021; Ballesteros et al. 2025]. Usually, lower displacement estimates assume large-scale protection, such as building sea walls, coupled with low sea level rise. High-end estimates often assume high sea-level rise with limited adaptation. Generally, the range of projections is so wide because of the differences in assumptions and scenarios for adaptation capacity, rather than due to uncertainty about sea-level rise.

Estimates that link sea-level rise and coastal erosion to "coastal migration" estimate the movement of 17-72 million people from cumulative land loss of 60,000 – 415,000 km² over the 21st century [Lincke and Hinkel 2021]. Big countries with long uninhabited coastlines account for most of the absolute land loss, while small island nations dominate in relative terms. A more recent study based on the IPCC AR6 scenarios provides an estimate of 4-72 million migrants associated with a net land loss of 2,800 – 490,000 km² up to 2100 [Ballesteros et al. 2025], with India and Vietnam expected to drive net migration figures but small island developing states (SIDS) experience the highest relative losses of land. Notably, the model estimates that climate stabilization at 1.9 degrees (SSP1) or 2.6 degrees (SSP2) does not avoid coastal impacts and sea levels are expected to keep rising, just more slowly. Further, sea-level rise is not the only hazard, and subsidence has been shown to dominate inundation risk in parts of Asia, particularly in Vietnam, Bangladesh, the Philippines and Indonesia [Li et al. 2026]. In coastal areas of the United States, too, subsidence is estimated to threaten more than 1,000 km² of additional land by 2050, exposing 55,000–273,000 people and 31,000–171,000 properties [Ohenhen et al. 2024].

Most studies show that socioeconomic pathways matter as much as the climate scenarios. Pathways that result in larger populations and lower GDP produce higher migration even in the case of lower sea-level rise [Ballesteros et al. 2025]. Population growth and distribution drive exposure and some estimates put the global population at risk of coastal inundation at around 543.6 million by 2050 [Li et al. 2026].

It is important to note that none of these studies talk about migration or displacement as an inevitable consequence across all regions but highlight the role that adaptation choices play in mitigating risk. Thus, the projected impact of climate change should always be understood as mediated by assumptions about policy choices and investment levels. For example, a model of sea-level rise across the Mediterranean uses three adaptation policy archetypes ("build with nature," "hold the line," "save yourself") [Reimann et al. 2023]. It projects 10-16 million migrants from sea level rise by 2100 without any investment in adaptation ("save yourself") and up to 6 million (or around 50%) less with protective infrastructure such as dikes ("hold the line"). Global studies also present similar impacts of adaptation, e.g. estimating that total costs from sea level rise globally can be lowered by a factor of 2-4 if environmental/physical protection is prioritised, and also if planned migration is treated as an adaptation option [Lincke and Hinkel 2021].

However, while the latter scenario may reduce overall numbers, it also shows that residual risk further concentrates in unprotected regions and where physical protection fails. Again, SIDS are particularly at risk. A global SIDS-specific flood risk assessment estimates direct economic damage from coastal flooding to grow more than 14-fold by the end of the century [Vousdoukas et al. 2023]. Other studies use the concept of island stability, for example in a multitemporal vulnerability assessment for the Marshall Islands, which projects that temporary flood events degrade groundwater and agroforests, and combined with sea-level rise results in permanent island instability [Kane and Fletcher 2020]. Another assessment of a small coral island of the Maldives projects that in 2100 it will have lost more than half to more than 70% of its surface area due to sea level rise, potentially reaching full inundation by 2150 [Lee 2026].

Thus, for atoll nations, the question is not whether individual villages will need to move but whether the country itself remains habitable. Boshoff and Surbun [2025] argue that for Kiribati and the Marshall Islands 'extinction' (or 'uninhabitability') could materialize within this century due to sea level rise. However, others push back on simplified narratives of inevitable mass migration and instead model habitability in Kiribati from a systems perspective, finding that water insecurity, intensified under extreme climate scenarios, and other resource constraints may be a driving factor in habitability loss. From such a perspective, SIDS are not threatened as one entity but will face regional disparities, which can lead to high internal migration rates rather than international outmigration [Nabong et al. 2026]. Uninhabitability in these settings is a slow, compounding degradation of water, food, and land – exactly the profile that produces long displacement horizons rather than a single evacuation.

In the United States, projections amount to up to 13.1 million Americans exposed to sea level rise alone by 2100, concentrated in Florida, Louisiana, Texas, North Carolina, and California [NDRC 2026]. Displacement risk in these regions is compounded by coastal erosion, saltwater intrusion and cascading economic impacts from damaged infrastructure, unaffordable housing and reduced property values. At the same time, the conditions for the departure of people at risk are not necessarily in place with funding, replacement housing and other support lacking in many contexts.

Scientific evidence on loss of habitats associated with land degradation and desertification is less extensive, less coherent and generally estimates changes in land use rather than loss per se. In the absence of an agreed and globally integrated framework for dryland habitability loss, most studies do not estimate the amount of newly desertified land but provide projections of vulnerability and risk. For example, Huang et al. [2020] construct a global desertification vulnerability index and project that a high emissions and low adaptation capacity scenario, the area at moderate-to-very-high desertification risk grows by 23% by end-century, concentrated in Africa, North America, and northern China and India. This is a vulnerability projection, not a projection of newly desertified land, however, and the community lacks an integrated vulnerability model for globally integrated dryland habitability loss, comparable to those available for sea-level rise.

Heat becomes an increasingly important hazard that presents challenges for habitability in both rural and urban contexts. Three billion people are projected to live outside the historical human temperature niche, mainly driven by inland tropical heat, under climate scenarios that result from a business-as-usual approach [Xu et al. 2020]. In these projections, one third of those at risk would experience mean annual temperatures of more than 29 degrees Celsius, a condition currently found only in a few parts of the world, mostly the Sahara.

7.3 WHO DEFINES HABITABILITY?

A recent and growing methodological literature argues that "uninhabitable" is a socio-political label, not a physical threshold, and that treating model outputs as verdicts overstates what these models are designed to do. Moreover, usually uninhabitability is a slow, compounding condition, not a one-off event. Thus, there is an increasing push back on the term "uninhabitability" in the literature, challenging how the modelling literature

is commonly interpreted [Boas et al. 2025]. Habitability is not determined by climate alone but emerges from environmental, political, economic, and cultural dynamics. Therefore, top-down declarations of "uninhabitability", which are often derived from physical climate models, risk undermining in-situ adaptation and treating large-scale displacement as inevitable. Instead, it may be more useful to understand model-based projections as futures that are possible, not pre-determined, and thoroughly dependant on context and policy action.

Alternative approaches to the concept of habitability highlight the role that land, freshwater, food, infrastructure and housing, and economic activities play and argue for place- and people-based habitability assessments that are organized around thresholds, cascading effects, and irreversibility [Spencer et al. 2024]. These would be more useful than global syntheses of climate hot spots, particularly for local investments and national policy and planning.

Examples from the US show that prolonged and unequal displacement situations emerge where the physical hazard may already be resolved (i.e., the land is unusable or lost) but the social, legal and financial infrastructure to complete the move of communities is not sufficient [NDRC 2026]. In Newtok, Isle de Jean Charles in Louisiana, is a case in point, with the planned relocation of an entire community failing to protect from severe storms and sea level rise, has resulted in precarious housing and a sense of instability for those that moved.

In light of recent climate scenarios, projections for socio-economic development, and adaptation capacity assessments, policies that may have been considered "last resort" options, such as planned relocation, come to the fore.

Fiji may be the most-studied national testing ground for planned relocation and has useful lessons to offer. The case of Vunidogoloa, an iTaukei village relocated to higher ground in 2014, continues to serve as a paradigmatic example. Nearly a decade of longitudinal research documents substantive gains, including reduced hazard exposure and improved access to potable water, sanitation, and schooling [McMichael et al. 2025]. A range of unanticipated adverse outcomes are also recorded, however, such as elevated consumption of packaged foods and alcohol, disruption of social structures and traditional values, and reduced place attachment with consequences for mental well-being [Charan et al. 2017]. A second case, Narikoso, which underwent partial relocation in 2020, exhibits an analogous ambivalence [Bertana 2019]. Relocation reconfigures the forms of capital underpinning sustainable livelihoods, yielding both benefits and new challenges, and is contingent upon the preservation of local ecosystems, cultural continuity, and diversified livelihood assets [Yee et al. 2024]. These examples show how the physical move may be complete, but livelihoods, well-being and health, and cultural dimensions remain unresolved.

Bangladesh's char islands and coastal belt are another example of areas where a combination of environmental, political and socio-economic factors drive people from their lands or make a return after disaster displacement impossible [Alam et al. 2020]. While flooding, riverbank erosion, and crop loss are the principal drivers of displacement or permanent relocation, chronic food insecurity, unemployment, inadequate housing, and landlessness are the principal barriers to durable solutions and to long-term adaptation [Kaiser 2023, Zaman 2024]. In Bangladesh, this combination means that low-income households face both, the risk of involuntary immobility due to constrained choices and of repeated displacement due to precarious safety conditions and opportunities [Freihardt 2025; Ayeb-Karlsson et al. 2020; Smith et al. 2026].

Recent literature has recognized the complexities involved and developed the concept of "trapped populations" further. People who cannot move, particularly in Asia and Africa, have often been cast as victims in need of rescuing as well as a security threat [Ayeb-Karlsson, Baldwin, and Kniveton 2022]. This framing can justify their relocation as a protective measure, while avoiding addressing the conditions that produced their trapped situation.

08

Beyond the usual suspects

8.1 RECOMMENDATIONS FOR FUTURE RESEARCH

Several specific, actionable research priorities emerge from the evidence to date. A first area is improving methods and focus to better understand how displaced households can move beyond to their often precarious, pre-displacement conditions to reach a higher level of resilience, akin to the "building back better" principle in disaster risk reduction. Future analysis of durable solutions needs to focus on the factors shaping household decisions. Therefore, research design must ensure the qualitative or quantitative data captures how experiences evolve, rather than treating displacement as a static state.

The vast majority of evidence on how to respond to displacement and support durable solutions is produced by predominantly qualitative or mixed methods. Truly quantitative studies are relatively rare, and the majority of studies rely on semi-structured interviews, focus group discussions, ethnographic observation, and document review, which limits comparability across contexts but provides depth on lived experience.

Further, most studies are concentrated in Asia, and Sri Lanka, the Philippines, Indonesia, and Nepal together account for more than half the studies reviewed. This presents a limitation for a global review and resulting recommendations as findings from these settings are unlikely to transfer easily to sub-Saharan Africa, Latin America, or high-income island states. Also, several studies are conducted only a few years post-disaster, while others assess outcomes a decade or more later, creating asymmetries in what can be observed about long-term outcomes.

The integration of housing and livelihood interventions represent the most urgent gap in responses to displacement across the globe. The institutional separation between housing and livelihood programmes is among the primary mechanisms driving poor long-term outcomes. Coordinated delivery mechanisms that address shelter and economic sustainability simultaneously, including

housing reconstruction paired with agricultural land access, skills training, and market linkages, have rarely been formally designed, let alone rigorously tested. Financing models that support both physical reconstruction and livelihood restoration in tandem remain underdeveloped, and under researched.

A second priority area are more rigorous assessments of impact for widely implemented but under-evaluated interventions, such as skills training and vocational programmes, community-driven approaches, subsidised loans for vulnerable households, and land use regulations creating buffer zones constitute a second priority. In the same vein, there is a severe evidence-base deficit on populations in greatest need: renters, squatters, ethnic minorities, women-headed households, the landless, and the extremely poor. Research should focus on understanding why existing provisions consistently fail these groups and on developing and testing modified delivery mechanisms that can actually reach them.

As shown above, circular movements and multi-site resettlement have emerged organically as rational coping strategies of displaced households across multiple country contexts. Existing approaches do not yet account for situations in which displaced households simultaneously maintain access to both original and new locations to sustain agrarian livelihoods. Despite its apparent prevalence and practical logic, this approach has received virtually no formal policy attention or evaluation. Systematic documentation, followed by assessment of the conditions under which it provides durable solutions versus perpetuating vulnerability, would substantially advance the evidence base.

Further, longitudinal study designs are needed to redress the current skew toward short-term assessments. The most reliable findings in the existing literature come from multi-year studies as they can uncover dynamics, vulnerabilities and opportunities for solutions that immediate post-disaster or one-off household needs or individual satisfaction surveys do not detect. Multi-year tracking of satisfaction, adaptive capacity, and livelihood outcomes across intervention types and beyond the typical two-to-three-year project cycle would fill existing knowledge gaps and generate the information needed for evidence-based policies and programmes.

Beyond these thematic priorities, the future research agenda on protracted displacement would benefit from investment in stronger mixed-methods and multi-scale designs. For example, combining macro-level analysis of cross-country patterns that can identify proxies for modelling with in-depth country case studies, which uncover causal mechanisms, community and household-level primary data collection, and remote sensing and geospatial analysis to overlay results with information on land cover change or hazard exposure.

These approaches should be considered iterative and mutually informing. Qualitative findings from case studies can refine quantitative indicators, and quantitative patterns should guide further case study selection. In the near term, where solid administrative data are absent, individual and household surveys that track displaced populations and their recovery trajectories over time would be especially valuable.

Two further gaps in the existing literature also deserve attention. The first is geographic. A large number of relevant studies are focused on high-income countries, notably the US, Japan and New Zealand. Further, Asia dominates, with Sri Lanka, the Philippines, Indonesia, and Nepal together accounting for more than half the studies reviewed. Findings from these settings do not transfer easily to sub-Saharan Africa, Latin America, or high-income island states. Peer-reviewed publications are also disproportionately concentrated on physical damage and immediate displacement rather than the evolution and duration of displacement.

The second imbalance is conceptual. The literature frames displacement almost exclusively in terms of loss and vulnerability, whereas people who have survived a disaster and moved toward better conditions are also acting on aspirations and capabilities. A research agenda that foregrounds opportunity and seeks to understand where people go, why, and what supports their intentions would more accurately reflect displaced persons' actual decision-making and better inform

durable solutions policy. For this, community participation in research design remains a documented gap. Displaced persons are rarely involved in generating the evidence that shapes responses to their situations. Addressing this is not only a methodological improvement; it is a prerequisite for producing findings that are relevant to the populations they are meant to serve.

Finally, the concepts of displacement risk and of uninhabitability need to be further nuanced, differentiating between the "risk" (or rather, "opportunity") of life-saving evacuations on the one hand and the risk of remaining displaced on the other [Guadagno and Yonetani 2022]. Insights that current risk models provide for early warning as well as long-term planning would benefit from such a distinction, as would the broader effort to inform implementation of long-term frameworks for sustainable development and disaster risk reduction at the national and global levels.

Current modelling approaches are also limited in their ability to account for decision-making processes at the time of displacement and of the changing needs, aspirations and preferences, over time, of those displaced. Agent-based models can offer some insight here as they have made conceptual progress in modelling the conditions under which disaster-displaced households fail to return. Such approaches move beyond housing damage as the sole predictor to incorporate socioeconomic vulnerability, neighbourhood dynamics, place attachment, financing access, and livelihood impacts. However, there are some limitations to their application in low-income or fragile contexts as granular data is required, which may not be available. Therefore, most examples currently focus on high income contexts and do not yet provide a framework that could be transferred to protracted displacement risk suitable for global modelling or application in low- and middle-income countries.[17]

In addition, scenario development at the local level and storyline approaches offer alternatives to rigid quantitative assessments and are emerging as promising tools for bridging science and policy for decision-making. These approaches have made significant advances in assessing the risk of displacements, i.e. movements or instances of people being displaced, and can inform preparedness and early warning. However, so far they are not able to model the duration of displacement, and in particular estimate the scale and patterns of protracted displacement. The causal pathways from, for example temperature increases to people remaining in displacement after an initial movement are difficult to map out and model as they may involve a multitude of factors as discussed in the sections above. As a result, there is no model currently that can provide assessments based on specific hazard, exposure and vulnerability assumptions that state something like the following: given these conditions, X% of displaced people are likely to remain displaced after 12 months / 3 years / indefinitely.

A major gap in making progress in this area is the lack of data on the duration of displacement, also discussed above. As return or local integration are hard to observe and the drivers of protracted displacement, such as tenure insecurity, livelihood loss, neighbourhood abandonment, or political exclusion are multi-dimensional, they do not translate easily into physical damage metrics. The core tension in assessing future risk of long-term displacement is that it stacks three layers of uncertainty: hazard projection (what disasters will occur, where, with what intensity), displacement likelihood (who gets displaced given a disaster), and duration (who stays displaced, and why).

[17] One example is the STORM model developed for displacement risk linked to volcanic eruption in Aotearoa New Zealand, which try to account for context, impacts and demographics on displacement outcomes. For more information on STORM, see https://www.sciencedirect.com/science/article/pii/S2212420926000713.

9

References

Abdullahi Ahmed, Mohamed (2026). *Land, Elite Capture, and the Erosion of Indigenous Peace Mechanisms in Southern Somalia: A Community-Level Analysis of Hybrid Governance.* Journal Article, ahead of print, January 17. doi.org/10.5281/zenodo.18276148.

Abeysinghe, U., and J. Manatunge (2019). *Identification of Policy and Regulation Gaps with Reference to Environmental and Social Satisfaction and Dissatisfaction of Beneficiaries of Tsunami Involuntary Resettlement in Sri Lanka.* bit.ly/4dxe3J3.

Ahmed, Abdul Hai, and Ram Krishna Mandal (2026). *Evictions and Rural Economic Vulnerability: Post – Displacement Impact in Assam.* Saudi Journal of Economics and Finance 10 (01): 31–34. doi.org/10.36348/sjef.2026.v10i01.003.

Ahmed, Iftekhar, and David O'Brien (2012). *Self-Initiatives and Transformations: Post-Tsunami Housing in Aceh, Indonesia.* The International Journal of the Constructed Environment 1 (4). bit.ly/4hEn0CS.

Alam, G. M. Monirul, Khorshed Alam, Shahbaz Mushtaq, Md Nazirul Islam Sarker, and Moazzem Hossain (2020). *Hazards, Food Insecurity and Human Displacement in Rural Riverine Bangladesh: Implications for Policy.* International Journal of Disaster Risk Reduction 43 (February): 101364. doi.org/10.1016/j.ijdrr.2019.101364.

Alegado, Joseph Edward B. (2022). *Post-Haiyan: Alternatives for Disaster Management Law and Governance in the Philippines'.* In Post-Disaster Governance in Southeast Asia: Response, Recovery, and Resilient Societies, edited by Andri N. R. Mardiah, Robert B. Olshansky, and Mizan B. F. Bisri. Springer. doi.org/10.1007/978-981-16-7401-3_3.

Arnall, Alex, David S. G. Thomas, Chasca Twyman, and Diana Liverman (2013). *Flooding, Resettlement, and Change in Livelihoods: Evidence from Rural Mozambique.* Disasters 37 (3): 468–88. doi.org/10.1111/disa.12003.

Arroyo, Ivette (2019). *User Involvement in Housing Recovery : Cases from Haiyan Affected Areas in the Philippines.* In Thesis. no. 12. Thesis/ doccomp, Lund University. (12). bit.ly/4zqjUs7.

Arroyo, Ivette, and Johnny Åstrand (2019). *User Involvement in Housing Recovery after Typhoon Haiyan from a Capability Perspective.* International Journal of Disaster Risk Reduction 38 (August): 101158. doi.org/10.1016/j.ijdrr.2019.101158.

Asaka, Jeremiah Ogonda (2026). *Dynamics of Sudden On-Set Hydrometeorological and Geophysical Disaster-Driven Internal Displacement in High-Income Country Context: Insights from the Global Internal Displacement Database.* Journal of Internal Displacement 16 (1): 12–37. doi.org/10.4314/jid.v16i1.2.

Ataç-Studt, B. Ayça (2025). *Balancing Effectiveness and Legitimacy: Resettlement of Property Owners in Flooded Areas.* Natural Hazards: Journal of the International Society for the Prevention and Mitigation of Natural Hazards 121 (16): 19163–87. doi.org/10.1007/s11069-025-07565-w.

Ayeb-Karlsson, Sonja, Andrew W. Baldwin, and Dominic Kniveton (2022). *Who Is the Climate-Induced Trapped Figure?* WIREs Climate Change 13 (6): e803. doi.org/10.1002/wcc.803.

Ayeb-Karlsson, Sonja, Dominic Kniveton, and Terry Cannon (2020). *Trapped in the Prison of the Mind: Notions of Climate-Induced (Im) Mobility Decision-Making and Wellbeing from an Urban Informal Settlement in Bangladesh.* Palgrave Communications 6 (1): 62. doi.org/10.1057/s41599-020-0443-2.

Bachmann, Lisa (2025). *Integrating Social Vulnerability into Human Displacement Risk Models: An Event-Based Approach for Weather-Related Hazards.* n.d. Accessed 15 July 2026. bit.ly/47gde3K.

Ballano, Vivencio O. (2017). *Normative Pluralism in Philippine Housing and Relocation System.* In Law, Normative Pluralism, and Post-Disaster Recovery: Evaluating the Post-Disaster Relocation and Housing Project of Typhoon Ketsana Victims in the Philippines, edited by Vivencio O. Ballano. Springer. doi.org/10.1007/978-981-10-5074-9_4.

Ballesteros, Caridad, Daniel Lincke, Robert J. James Nicholls, et al. (2025). *Migration, Land Loss and Costs to 2100 Due to Coastal Flooding under the IPCC AR6 Sea-Level Rise Scenarios and Plausible Adaptation Choices.* Frontiers in Marine Science 12 (March). doi.org/10.3389/fmars.2025.1505633.

Behnke, Nikki L., Ryan Cronk, Brandie Banner Shackelford, et al. (2020). *Environmental Health Conditions in Protracted Displacement: A Systematic Scoping Review.* Science of The Total Environment 726 (July): 138234. doi.org/10.1016/j.scitotenv.2020.138234.

Bertana, Amanda (2019). *Relocation as an Adaptation to Sea-Level Rise: Valuable Lessons from the Narikoso Village Relocation Project in Fiji.* Case Studies in the Environment 3 (1): 1–7. doi.org/10.1525/cse.2018.001701.

Beyer, Robert M., Jacob Schewe, and Guy J. Abel (2023). *Modeling Climate Migration: Dead Ends and New Avenues.* Frontiers in Climate 5 (August). doi.org/10.3389/fclim.2023.1212649.

Beyer, Robert M., Jacob Schewe, and Hermann Lotze-Campen (2022). *Gravity Models Do Not Explain, and Cannot Predict, International Migration Dynamics.* Humanities and Social Sciences Communications 9 (1): 56. doi.org/10.1057/s41599-022-01067-x.

Birkmann, Joern, Nishara Fernando, Ali Jamshed, Hannes Lauer, and Riyanti Djalante (2026). *Short- and Long-Term Impacts of Relocation and Buffer Zones: The Indian Ocean Tsunami 2004 to 2024.* International Journal of Disaster Risk Reduction 132 (January): 105974. https://doi.org/10.1016/j.ijdrr.2025.105974.

Blair, Christopher W. (2026). *Dynamics of Internal Displacement and Conflict in Somalia.* Journal of Ethnic and Migration Studies 52 (4): 1011–45. doi.org/10.1080/1369183X.2025.2595818.

Boas, Ingrid, Harald Sterly, Carol Farbotko, et al. (2025). *Climate-Induced Redistribution of People Is Not Inevitable.* Environmental Research Letters 20 (10): 101001. doi.org/10.1088/1748-9326/adfdfd.

Bodine, Shaye Palagi, Andrew Tracy, and Amy Javernick-Will (2022). *Questioning the Effectiveness of Risk Reduction via Post-Disaster Relocation.* International Journal of Disaster Risk Reduction 71 (March): 102834. doi.org/10.1016/j.ijdrr.2022.102834.

Bohra-Mishra, Pratikshya, Michael Oppenheimer, and Solomon M. Hsiang (2014). *Nonlinear Permanent Migration Response to Climatic Variations but Minimal Response to Disasters.* Proceedings of the National Academy of Sciences 111 (27): 9780–85. doi.org/10.1073/pnas.1317166111.

Boshoff, Kyra, and Vishal Surbun (2025). *A Threat of State Extinction: The Plight of Small Island Developing States Amid a Changing Climate and Sea-Level Rise.* Comparative and International Law Journal of Southern Africa 58 (1): 34 pages-34 pages. doi.org/10.25159/2522-3062/16371.

Brickle, L., and A. Thomas (2014). *Rising Waters, Displaced Lives.* Forced Migration Review 45. bit.ly/4s37T9J.

Bruch, Carl, Syafruddin Karimi, Jagath Manatunge, and Mikiyasu Nakayama (2017). *Barriers to Long-Term Return after the Great East Japan Earthquake: Lessons from Hirono Town.* Journal of Asian Development 3 (February): 23. doi.org/10.5296/jad.v3i1.10650.

Bryner, Nicholas, Marisa Garcia-Lozano, and Carl Bruch (2017). *Washed Out: Policy and Practical Considerations Affecting Return after Hurricane Katrina and Superstorm Sandy.* Journal of Asian Development 3 (February): 73. doi.org/10.5296/jad.v3i1.10590.

Carrasco, Sandra, and Temitope Egbelakin (2022). *Unravelling the Challenges for Long-Term Planning Post-Disaster Resettlement in Cagayan de Oro, Philippines.* IOP Conference Series: Earth and Environmental Science 1101 (2): 022038. doi.org/10.1088/1755-1315/1101/2/022038.

Chandel, Ajitesh Singh, and Rajesh Kumar (2026). *Spatial Politics of Displacement: Ethnic Conflict, Governance Fragility, and Livelihood Resilience in Southern Ethiopia.* Cogent Social Sciences 12 (1): 2635164. doi.org/10.1080/23311886.2026.2635164.

Charan, Dhrishna, Manpreet Kaur, and Priyatma Singh (2017). *Customary Land and Climate Change Induced Relocation—A Case Study of Vunidogoloa Village, Vanua Levu, Fiji.* In Climate Change Adaptation in Pacific Countries: Fostering Resilience and Improving the Quality of Life, edited by Walter Leal Filho. Springer International Publishing. doi.org/10.1007/978-3-319-50094-2_2.

Chen, Yong, Lulu He, and Dan Zhou (2020). *Consequences of Post-Disaster Policies and Relocation Approaches: Two Communities from Rural China.* Disaster Prevention and Management 30 (3): 340–53. doi.org/10.1108/DPM-11-2019-0347.

Cheung, Samuel (2026). *Governance by Design: The Displacement Continuum and Sustainable Inclusion in Southeast Asia.* April.

Clement, Viviane; Rigaud, Kanta Kumari; de Sherbinin, Alex; Jones, Bryan; Adamo, Susana; Schewe, Jacob; Sadiq, Nian; Shabahat, Elham (2021). *Groundswell Part 2: Acting on Internal Climate Migration.* World Bank, Open Knowledge Repository. n.d. Accessed 15 July 2026. https://bit.ly/3TWNIxs.

Cuaton, Ginbert Permejo (2019). *Post-Disaster Relocation of Urban Coastal Communities in the Philippines.* Andalas Journal of International Studies (AJIS) 8 (2): 143–53. doi.org/10.25077/ajis.8.2.141-151.2019.

Cunanan, Aira Lynn Mariano, Stacey Anne Martinez Panergo, Marian Leigh Coloma Pua, Shanley Carmela Reyes Sandoval, and Amanda Sharmaine Ong Soliven (2022). *Where Is the Force?: Mismatches and Contradictions with Post-Disaster Recovery and Rehabilitation Task Forces.* International Journal of Disaster Management 5 (2): 109–30. doi.org/10.24815/ijdm.v5i2.26065.

Dailey, Madalene (2025). Nueva Reforma - Designing for Rural Latin America. bit.ly/4ykwhoK.

Daly, Patrick, Saiful Mahdi, Jamie McCaughey, et al. (2020). *Rethinking Relief, Reconstruction and Development: Evaluating the Effectiveness and Sustainability of Post-Disaster Livelihood Aid.* International Journal of Disaster Risk Reduction 49 (October): 101650. doi.org/10.1016/j.ijdrr.2020.101650.

Del Missier, Fabio, Lucia Savadori, Alessandro Galvagni, et al. (2026). *Echoes of the Earthquake: Evidence-Based Suggestions for the Management of Psychological Consequences of Earthquakes.* Journal of Risk Research 29 (1): 41–51. doi.org/10.1080/13669877.2025.2611957.

Desai, B. et al. (2021). *Addressing the Human Cost in a Changing Climate.* n.d. Science. Accessed 15 July 2026. bit.ly/4zw5PcP.

Dias, Nuwan Tharanga, Kaushal Keraminiyage, and Kushani Kulasthri Desilva (2016). *Long-Term Satisfaction of Post Disaster Resettled Communities: The Case of Post Tsunami – Sri Lanka'.* Disaster Prevention and Management 25 (5): 581–94. doi.org/10.1108/DPM-11-2015-0264.

Fayazi, Mahmood, and Gonzalo Lizarralde (2019). *The Impact of Post-Disaster Housing Reconstruction Policies on Different Beneficiary Groups: The Case of Bam, Iran.* In Resettlement Challenges for Displaced Populations and Refugees, edited by Ali Asgary. Springer International Publishing. doi.org/10.1007/978-3-319-92498-4_9.

Ferris, Elizabeth, and Donald Kerwin (2023). *Durable Displacement and the Protracted Search for Solutions: Promising Programs and Strategies.* Journal on Migration and Human Security 11 (1): 3–22. doi.org/10.1177/23315024231160454.

Freihardt, Jan (2025). *Trapped by Climate Change? (In)Voluntary Immobility in Bangladesh.* Regional Environmental Change 25 (4): 117. doi.org/10.1007/s10113-025-02452-3.

Gagné, Isaac (2020). *Dislocation, Social Isolation, and the Politics of Recovery in Post-Disaster Japan.* Transcultural Psychiatry 57 (5): 710–23. doi.org/10.1177/1363461520920348.

Gin, June L., Claudia Der-Martirosian, Christine Stanik, and Aram Dobalian (2019). *Roadblocks to Housing after Disaster: Homeless Veterans' Experiences after Hurricane Sandy.* Natural Hazards Review 20 (3): 04019005. doi.org/10.1061/(ASCE)NH.1527-6996.0000330.

Gray, Clark, Elizabeth Frankenberg, Thomas Gillespie, Cecep Sumantri, and Duncan Thomas (2014). *Studying Displacement After a Disaster Using Large Scale Survey Methods: Sumatra After the 2004 Tsunami.* Annals of the Association of American Geographers. Association of American Geographers 104 (3): 594–612. doi.org/10.1080/00045608.2014.892351.

Gray, Clark L., and Valerie Mueller (2012). *Natural Disasters and Population Mobility in Bangladesh.* Proceedings of the National Academy of Sciences 109 (16): 6000–6005. doi.org/10.1073/pnas.1115944109.

Horst, Cindy, and Anab Ibrahim Nur (2016). *Governing Mobility through Humanitarianism in Somalia: Compromising Protection for the Sake of Return.* Development and Change 47 (3): 542–62. doi.org/10.1111/dech.12233.

Huang, Jianping, Guolong Zhang, Yanting Zhang, Xiaodan Guan, Yun Wei, and Ruixia Guo (2020). *Global Desertification Vulnerability to Climate Change and Human Activities.* Land Degradation & Development 31 (11): 1380–91. doi.org/10.1002/ldr.3556.

IDMC (2018). *Global Report on Internal Displacement 2018.* n.d. Accessed 15 July 2026. bit.ly/4e8iqdL.

IDMC (2018). *No Matter of Choice: Displacement in a Changing Climate.* Accessed 14 July 2026. bit.ly/4icsAfT.

IDMC (2025). *The Duration of Disaster Displacement: A Review of the State of Knowledge.* Accessed 13 July 2026. bit.ly/4dAOruS.

Internal Displacement Monitoring Centre (2026). *2026 Global Report on Internal Displacement.* doi.org/10.55363/IDMC.ETWG8973.

Iuchi, Kanako, Yasuhito Jibiki, and Beth Tamayose (2020). *Learning from a Post-Typhoon Haiyan/Yolanda Recovery Institution (OPARR): A New Research Agenda for Recovery Governance.* Journal of Disaster Research 15 (7): 845–54. doi.org/10.20965/jdr.2020.p0845.

Iuchi, Kanako, Elizabeth Maly, and Laurie Johnson (2015). *Three Years After a Mega-Disaster: Recovery Policies, Programs and Implementation After the Great East Japan Earthquake.* In Post-Tsunami Hazard: Reconstruction and Restoration, edited by V. Santiago-Fandiño, Y. A. Kontar, and Y. Kaneda. Springer International Publishing. doi.org/10.1007/978-3-319-10202-3_3.

Iuchi, Kanako, and John Mutter (2020). *Governing Community Relocation after Major Disasters: An Analysis of Three Different Approaches and Its Outcomes in Asia.* Progress in Disaster Science 6 (April): 100071. doi.org/10.1016/j.pdisas.2020.100071.

Jaspars, Susanne, Nisar Majid, and Guhad Adan (2023). *Somalia's Evolving Political Market Place: From Famine and Humanitarian Crisis to Permanent Precarity.* The Journal of Modern African Studies 61 (3). doi.org/10.1017/S0022278X23000071.

Kabilijiang, Wumair, Wang Changjiu, Takaaki Kato, et al. (2025). *Research on Postearthquake Rural Housing Reconstruction and Subsequent Evaluation in Dujiangyan on the 15th Anniversary of the Wenchuan Earthquake.* Natural Hazards Review 26 (3): 05025004. doi.org/10.1061/NHREFO.NHENG-2227.

Kabir, Mohammad Ehsanul, Silvia Serrao-Neumann, Peter Davey, Moazzem Hossain, and Md Touhidul Alam (2018). *Drivers and Temporality of Internal Migration in the Context of Slow-Onset Natural Hazards: Insights from North-West Rural Bangladesh.* International Journal of Disaster Risk Reduction 31 (October): 617–26. doi.org/10.1016/j.ijdrr.2018.06.010.

Kaenzig, Raoul, and Etienne Piguet (2021). *Toward a Typology of Displacements in the Context of Slow-Onset Environmental Degradation. An Analysis of Hazards, Policies, and Mobility Patterns.* Sustainability 13 (18): 10235. doi.org/10.3390/su131810235.

Kaiser, Z. R. M. Abdullah (2023). *Analysis of the Livelihood and Health of Internally Displaced Persons Due to Riverbank Erosion in Bangladesh.* Journal of Migration and Health 7 (January): 100157. doi.org/10.1016/j.jmh.2023.100157.

Kane, Haunani H., and Charles H. Fletcher (2020). *Rethinking Reef Island Stability in Relation to Anthropogenic Sea Level Rise.* Earth's Future 8 (10): e2020EF001525. doi.org/10.1029/2020EF001525.

Korodimou, Michaela, and Thomas F. Thornton (2025). *Displacement Ecologies: An Alternative Conceptual Framework for Navigating How to Reorient to a Changing World.* World Development 192 (August): 107030. doi.org/10.1016/j.worlddev.2025.107030.

Lee, Christopher, Shannon Doocy, Anwar Deli, Thomas Kirsch, William Weiss, and Courtland Robinson (2014). *Measuring Impact: A Cross-Sectional Multi-Stage Cluster Survey to Assess the Attainment of Durable Solutions in Post-Tsunami Aceh, Indonesia.* BMC Public Health 14 (November): 1168. doi.org/10.1186/1471-2458-14-1168.

Lee, Sungwoo (2026). *Impact Analysis of Sea Level Rise on the Future Fate of Small Coral Islands: The Case of Hurasdhoo Island in the Maldives.* GIScience & Remote Sensing 63 (1): 2617738. doi.org/10.1080/15481603.2026.2617738.

Lee, Young-Jun, and Hiroaki Sugiura (2014). *Impact of the Great East Japan Earthquake on Intentions to Relocate.* IDRiM Journal 4 (2). doi.org/10.5595/001c.11689.

Li, Ang, and Claire Leppold (2025). *Long-Term Mental Health Trajectories across Multiple Exposures to Climate Disasters in Australia: A Population-Based Cohort Study.* The Lancet Public Health 10 (5): e391–400. doi.org/10.1016/S2468-2667(25)00068-4.

Li, Hui, Le li, Shuangmei Tong, and Fengkai Li (2026). *Mapping Global Future Coastal Inundation Risk and Demographic Vulnerability Using Multi-Sensor Remote Sensing Data and Socioeconomic Scenarios.* Ecological Indicators 182 (January): 114598. doi.org/10.1016/j.ecolind.2025.114598.

Lincke, Daniel, and Jochen Hinkel (2021). *Coastal Migration Due to 21st Century Sea-Level Rise.* Earth's Future 9 (5): e2020EF001965. doi.org/10.1029/2020EF001965.

Lind, J.; Sabates-Wheeler, R. and Szyp, C. (2023). *Cash-Plus Programming in Protracted Crises: A Review of Programmes in Contexts of Overlapping Conflict, Forced Displacement and Climate-Related Shocks,* BASIC Research Working Paper 19, Brighton: Institute of Development Studies, DOI: 10.19088/BASIC.2023.001

Lines, R., J. P. Faure Walker, and R. Yore (2022). *Progression through Emergency and Temporary Shelter, Transitional Housing and Permanent Housing: A Longitudinal Case Study from the 2018 Lombok Earthquake, Indonesia.* International Journal of Disaster Risk Reduction 75 (June): 102959. doi.org/10.1016/j.ijdrr.2022.102959.

Loos, Sabine, David Lallemant, Feroz Khan, et al. (2021). *Beyond Building Damage: Estimating and Understanding Non-Recovery Following Disasters.* February 25. doi.org/10.21203/rs.3.rs-275410/v1.

Lumna, Johary B. (2024). *Factors That Hinder the Return of the IDPs to Their Homes at Marawi's Most Affected Areas.* Randwick International of Social Science Journal 5 (4): 517–21. doi.org/10.47175/rissj.v5i4.1076.

Maina, Andrew (2025). *Mainstreaming IDP Solutions: Insights from Somalia's Durable Solutions Landscape Assessment.* ReDSS, April 17. bit.ly/4s3adgX.

McCann, Katherine, Fouad M. Fouad, Arturo Harker Roa, and Monette Zard (2023). *Integration Through Health During Protracted Displacement: Case Studies From Colombia and Jordan.* Journal on Migration and Human Security 11 (1): 155–71. doi.org/10.1177/23315024231160770.

Mccarthy, John (2013). *Community Led Development and Vulnerability in a Post-disaster Context: Caught in a Sad Romance.* AAS Working Papers in Social Anthropology 26 (January): 1–22. doi.org/10.1553/wpsa26s1.

McMichael, Celia, Teresia Powell, Annah E. Piggott-McKellar, and Merewalesi Yee (2025). *Climate Change and the Planned Relocation of People: A Longitudinal Analysis of Vunidogoloa, Fiji.* Ambio 54 (6): 1043–56. doi.org/10.1007/s13280-024-02120-6.

Mester, Benedikt, Katja Frieler, Oliver Korup, Bina Desai, and Jacob Schewe (2025). *Socioeconomic Predictors of Vulnerability to Flood-Induced Displacement.* Nature Communications 16 (1): 8296. doi.org/10.1038/s41467-025-64015-8.

Miyasada, Akira, and Elizabeth Maly (2021). *Impacts of Collective Housing Relocation in the Ogatsu Area of Ishinomaki City after the 2011 Great East Japan Earthquake and Tsunami.* IOP Conference Series: Earth and Environmental Science 630 (1): 012014. doi.org/10.1088/1755-1315/630/1/012014.

Mörchen, Manfred, Erly Ocasiones, Rebie Relator, and David Lewis (2021). *Climate Change, Vulnerability, and Disability: Do We "Leave No One Behind"?* Disaster Medicine and Public Health Preparedness 15 (5): 537–38. doi.org/10.1017/dmp.2020.79.

Mueller, V., C. Gray, and K. Kosec (2014). *Heat Stress Increases Long-Term Human Migration in Rural Pakistan.* Nature Climate Change 4 (3): 182–85. doi.org/10.1038/nclimate2103.

Mukherji, Anuradha (2015). *From Tenants to Homeowners: Housing Renters After Disaster in Bhuj, India.* Housing Studies 30 (7): 1135–57. doi.org/10.1080/02673037.2015.1008423.

Nabong, Authorship: Emily C., Aaron Opdyke, and Jeffrey P. Walters (2026). *Understanding Drivers and Trends of Habitability in Kiribati from a Systems Perspective.* Environmental Science & Technology 60 (5): 4058–71. doi.org/10.1021/acs.est.5c10548.

Nagami, Kozo, Tomoki Miyano, and Mohammad Naser Sediqi (2025). *Medium to Long-Term Impacts from in-Situ Housing Reconstruction: Insights from Post-Disaster Surveys of the Indian Ocean Tsunami and Nepal Earthquake.* International Journal of Disaster Risk Reduction 117 (February): 105175. doi.org/10.1016/j.ijdrr.2024.105175.

Nakayama, Mikiyasu, Nagisa Yoshioka, Hirotaka Fujibayashi, and Carl Bruch (2016). *Factors Affecting Livelihood Re-Establishment of Climate Change Induced Transboundary Displaced Persons.* International Journal of Social Science Studies 4 (July). doi.org/10.11114/ijsss.v4i9.1744.

Ncube, Tomy, and Una Murray (2025). *Managing Two Locations: Relocation, Resettlement and Negotiated Immobility of Climate-Displaced Communities in Zimbabwe.* World Development Perspectives 38 (June): 100676. doi.org/10.1016/j.wdp.2025.100676.

Neef, Katja, Evan Jones, and Jay Marlowe (2023). *The Conflict, Climate Change, and Displacement Nexus Revisited: The Protracted Rohingya Refugee Crisis in Bangladesh.* Journal of Peacebuilding & Development 18 (3): 231–47. doi.org/10.1177/15423166231190040.

Nitsch, Cynthia (2020). *Environmental Displacement in Thailand's Disaster Policy and Practice: A Case Study of Samut Chin.* Chulalongkorn University Theses and Dissertations (Chula ETD), ahead of print, January 1. doi.org/10.58837/CHULA.THE.2020.264.

Noman, Abdullah Al (2024). *Autonomous Vernacular Transformation in the Resettlements of Fishing Communities: Insights from Nakna Ashrayan in Bangladesh.* International Society for the Study of Vernacular Settlements 11 (7): 82–95. doi.org/10.61275/isvsej-2024-11-07-06.

Nurul, Rufaida, Saut Sagala, Abimanyu Arya, Eri Krismiyaningsih, and Ulima Nabila Adinta (2025). *Between Adaptation or Retreat in the Face of Slow-Onset Disasters: Lessons Learned of Indonesia's National and Local Adaptation Strategies to Manage Displacement Risks.* IOP Conference Series: Earth and Environmental Science 1479 (1): 012050. doi.org/10.1088/1755-1315/1479/1/012050.

OCHA (2017). *Breaking the Impasse: Reducing Protracted Internal Displacement as a Collective Outcome.* bit.ly/4yJDeR1.

Ohenhen, Leonard O., Manoochehr Shirzaei, Chandrakanta Ojha, Sonam F. Sherpa, and Robert J. Nicholls (2024). *Disappearing Cities on US Coasts.* Nature 627 (8002): 108–15. doi.org/10.1038/s41586-024-07038-3.

Ong, James Michael, Ma. Laurice Jamero, Miguel Esteban, Riki Honda, and Motoharu Onuki (2016). *Challenges in Build-Back-Better Housing Reconstruction Programs for Coastal Disaster Management: Case of Tacloban City, Philippines.* Coastal Engineering Journal 58 (1): 1640010–11. doi.org/10.1142/S0578563416400106.

'Open Knowledge Repository'. n.d. Accessed 15 July 2026. bit.ly/4hlhBe6.

Osman, Alinor Abdi, and Gumataw Kifle Abebe (2023). *Rural Displacement and Its Implications on Livelihoods and Food Insecurity: The Case of Inter-Riverine Communities in Somalia.* Agriculture 13 (7): 1444. doi.org/10.3390/agriculture13071444.

Palagi, Shaye, and Amy Javernick-Will (2020). *Pathways to Livable Relocation Settlements Following Disaster.* Sustainability 12 (8): 3474. doi.org/10.3390/su12083474.

Paul, Nicole, Carmine Galasso, and Jack Baker (2024). *Household Displacement and Return in Disasters: A Review.* Natural Hazards Review 25 (1): 03123006. doi.org/10.1061/NHREFO.NHENG-1930.

Price, James, Alok Bohara, and Wendy Hansen (2022). *Determinants of Displacement and Displacement Duration Following Hurricanes Katrina and Rita: A Hurdle Model Approach.* GeoHazards 3 (August): 412–27. doi.org/10.3390/geohazards3030021.

Rahman, Md Mushfiqur, Shuhanur Rahman, and Abdullah Eusuf Shishir (2025). *Challenges of Internally Displaced Persons (IDPs) and the Interventions in the Ashrayan-2 Project.* Journal of Bangladesh Institute of Planners 17 (1): 101–18. doi.org/10.3329/jbip.v17i1.80905.

Rawal, Vivek, Jitendra Bothara, Pragya Pradhan, Ramraj Narasimhan, and Vijaya Singh (2021). *Inclusion of the Poor and Vulnerable: Learning from Post-Earthquake Housing Reconstruction in Nepal.* Progress in Disaster Science 10 (April): 100162. doi.org/10.1016/j.pdisas.2021.100162.

Reimann, Lena, Bryan Jones, Nora Bieker, Claudia Wolff, Jeroen C. J. H. Aerts, and Athanasios T. Vafeidis (2023). *Exploring Spatial Feedbacks between Adaptation Policies and Internal Migration Patterns Due to Sea-Level Rise.* Nature Communications 14 (1): 2630. doi.org/10.1038/s41467-023-38278-y.

Sabates-Wheeler, Rachel, Jeremy Lind, and Carolina Holland-Szyp (2025). *The Limits to Cash-plus Provision in Protracted Crises.* Development Policy Review 43 (4): e70020. doi.org/10.1111/dpr.70020.

Sanchez-Jabba, Andres (2011). *Después de La Inundación.* January 1.

Sarangani, Abdul Fatah (2021). *An Assessment on the Reconstruction and Rehabilitation of Marawi as Perceived by Agency Representatives and IDPs.* Journal of Humanities and Social Sciences Studies 3 (2): 01–10. doi.org/10.32996/jhsss.2021.3.2.1.

Schewel, Kerilyn, Sarah Dickerson, B. Madson, and Gabriela Nagle Alverio (2024). *How Well Can We Predict Climate Migration? A Review of Forecasting Models.* Frontiers in Climate 5 (January). doi.org/10.3389/fclim.2023.1189125.

Sedano-Cruz, Karime, Yesid Carvajal-Escobar, and Álvaro Javier Ávila Díaz (2013). *Análisis de Aspectos que Incrementan el Riesgo de Inundaciones en Colombia.* Luna Azul, no. 37 (December): 219–38. bit.ly/3TSUyDZ.

Şeremet, Mehmet, Voon Chin Phua, Emine Cihangir, Ezgi Bayram-Öz, Ramazan Okudum, and Faruk Alaeddinoğlu (2024). *Precarity and Patriarchal Bargain: Women's Experiences in Post-Disaster Recovery Housing after the 2011 Van Earthquake.* Gender, Place & Culture 31 (7): 954–78. doi.org/10.1080/0966369X.2023.2229063.

Shneiderman, Sara, Amy Leigh Johnson, Jeevan Baniya, et al. (2026). *Circular Resettlement and Ongoing Risk: Earthquakes, Landslides, and the Challenges of "Integrated" Reconstruction in Nepal.* World Development 202 (C). doi.org/10.1016/j.worlddev.2025.107261.

Shrestha, Barsha, Sanjaya Uprety, and Martina Keitsch (2025). *A Longitudinal Study of Post-Disaster Resettlement in Nepal: Insights into Building Back Better.* Architecture 5 (February): 17. doi.org/10.3390/architecture5010017.

Shtob, Daniel A. (2022). *Readiness at What Cost? Trauma, Displacement and Opportunism in the Florida Keys.* Frontiers in Sustainable Cities 4 (August). doi.org/10.3389/frsc.2022.936809.

Siddiq, Ilham, and Amy Javernick-Will (2024). *Should I Stay or Should I Go?: Reasons Beneficiaries Decide to Stay or Leave Aid-Provided in-Situ Housing.* International Journal of Disaster Risk Reduction 106 (May): 104454. doi.org/10.1016/j.ijdrr.2024.104454.

Siddiqi, Ayesha, Katie Peters, and Julia Zulver (2019). *'Doble Afectación': Living with Disasters and Conflict in Colombia.* September 1. doi.org/10.17863/CAM.50182.

Skwarko, Tatiana, Ivy He, Sarah Cross, et al. (2024). *The Long-Term Impact of Humanitarian Housing Interventions Following the 2010 Merapi Eruption.* International Journal of Disaster Risk Reduction 100 (January): 104076. doi.org/10.1016/j.ijdrr.2023.104076.

Smith, Roland D., Robert J. Nicholls, Mark G. L. Tebboth, and Avidan Kent (2026). *Persistent Vulnerability and Precarious Futures: The Limits of Adaptation in "Climate Migrant" Informal Settlements of Coastal Bangladesh.* Climate and Development 0 (0): 1–18. doi.org/10.1080/17565529.2026.2619446.

Somalia: Funding Cuts Impact Assistance to Millions Affected by Drought, UN News'. 2025. December 22. news.un.org/en/story/2025/12/1166654.

Sterett, Susan (2021). *Domestic Structures, Misalignment, and Defining the Climate Displacement Problem.* Social Sciences 10 (November): 425. doi.org/10.3390/socsci10110425.

Stockholm Environment Institute, Minh Tran, Reinna Bermudez, and Commission on Human Rights of the Philippines (2022). *Durable Solutions for People Displaced by Typhoon Haiyan in Tacloban, Philippines.* Stockholm Environment Institute. doi.org/10.51414/sei2022.050.

Stojetz, Wolfgang, and Tilman Brück. n.d. *The Double Burden of Female Protracted Displacement.*

Stough, Laura M., Amy N. Sharp, Curt Decker, and Nachama Wilker (2010). *Disaster Case Management and Individuals with Disabilities.* Rehabilitation Psychology (US) 55 (3): 211–20. doi.org/10.1037/a0020079.

Tafti, Mojgan Taheri (2015). *Housing Assistance Distribution after Disasters: Does It Enable Affected Households to Recover?* Environmental Hazards 14 (4): 361–77. doi.org/10.1080/17477891.2015.1080655.

Tanji, Fumiya, Yasutake Tomata, Takuya Sekiguchi, and Ichiro Tsuji (2018). *Period of Residence in Prefabricated Temporary Housing and Psychological Distress after the Great East Japan Earthquake: A Longitudinal Study.* BMJ Open 8 (5): e018211. doi.org/10.1136/bmjopen-2017-018211.

Testori, Giulia, Michael Janoschka, Alejandra Bonilla Mena, and Ornella Iuorio (2021). *Ecuadorian Housing Resettlements Five Years after the 2016 Earthquake: A Critical Analysis.* Habitat International 117 (November): 102433. doi.org/10.1016/j.habitatint.2021.102433.

Tran, Minh (2022). *Durable Solutions for People Displaced by Typhoon Haiyan in Tacloban, Philippines.* December 1. doi.org/10.51414/sei2022.050.

Turner, Matthew, Anika M. Rice, Emily Fornof, and Jesse Ribot (2025). *Putting Migration in Context: A Review of How Theory and Methods Shape Climate-Induced Migration Research Findings.* Frontiers in Climate 7 (April). doi.org/10.3389/fclim.2025.1549686.

United Nations Network on Migration (2018). *Groundswell: Preparing for Internal Climate Migration.* January 1. bit.ly/4B0ZBD3.

Using an Adaptive Approach to Making Gatekeepers Accountable to Internally Displaced Persons in Mogadishu, Somalia - Somalia | ReliefWeb (2020). June 16. https://bit.ly/4yhxOvF.

Vousdoukas, Michalis I., Panagiotis Athanasiou, Alessio Giardino, et al. (2023). *Small Island Developing States under Threat by Rising Seas Even in a 1.5 °C Warming World.* Nature Sustainability 6 (12): 1552–64. doi.org/10.1038/s41893-023-01230-5.

Wagemann, Elizabeth (2017). *From Shelter to Home: Flexibility in Post-Disaster Accommodation.* January 28. doi.org/10.17863/CAM.43234.

Wahab, Bolanle, and Olusegun Falola (2022). *Vulnerable Households in Flood-prone Communities in Ibadan: Measures to Improve their Status within the Inclusive Ibadan City Framework.* Journal of Inclusive Cities and Built Environment, February 7, 21–27. doi.org/10.54030/2788-564X/2022/cp1v2a6.

Wedawatta, Gayan, Bingunath Ingirige, and Kishan Sugathapala (2018). *Long-Term Sustainability and Performance of Post-Disaster Housing Projects: CIOB Bowen Jenkins Legacy Research Fund Research Report.* Birmingham.

Wu, Haorui (2021). *When Housing and Communities Were Delivered: A Case Study of Post-Wenchuan Earthquake Rural Reconstruction and Recovery.* Sustainability 13 (14): 7629. doi.org/10.3390/su13147629.

Wu, Jie-Ying, and Jing-Chein Lu (2024). *Housing Recovery and Community Relocation: Lessons Learned from Indigenous Community Recovery after Typhoon Morakot in Taiwan.* International Journal of Disaster Risk Reduction 103 (March): 104337. doi.org/10.1016/j.ijdrr.2024.104337.

Xi, Jiaoru, Jiangbo Wang, and Zhikai Gu (2022). *Effects of the Planning and Implementation of Housing Reconstruction on Community Resilience in China.* International Journal of Disaster Risk Reduction 83 (December): 103406. doi.org/10.1016/j.ijdrr.2022.103406.

Xu, Chi, Timothy A. Kohler, Timothy M. Lenton, Jens-Christian Svenning, and Marten Scheffer (2020). *Future of the Human Climate Niche.* Proceedings of the National Academy of Sciences 117 (21): 11350–55. doi.org/10.1073/pnas.1910114117.

Yabe, Takahiro, Kota Tsubouchi, Naoya Fujiwara, Yoshihide Sekimoto, and Satish V. Ukkusuri (2020). *Understanding Post-Disaster Population Recovery Patterns.* Journal of The Royal Society Interface 17 (163): 20190532. doi.org/10.1098/rsif.2019.0532.

Yee, Merewalesi, Celia McMichael, Karen E. McNamara, and Annah Piggott-McKellar (2024). *Partial Planned Relocation and Livelihoods: Learnings from Narikoso, Fiji.* Asia Pacific Viewpoint 65 (3): 290–307. doi.org/10.1111/apv.12409.

Zaman, Sadia Binta (2024). *Socio-Economic Impacts of Disaster-Induced Displacement on Coastal Populations in Bangladesh.* Asian Review of Social Sciences 13 (2): 63–74. doi.org/10.70112/arss-2024.13.2.4250.

Zhu, Qiantao, Xinhong Luo, Shanshan Zhao, Yuting Duan, and Wei Liu (2025). *Unraveling Sustainable Household Well-Being in Disaster Resettled Areas: Multidimensional Measurement and Determinants.* Frontiers in Sustainable Food Systems 9 (December): 1653946. doi.org/10.3389/fsufs.2025.1653946.

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Annexes

ANNEX 1
STUDY METHODOLOGY

The study was conducted through a review of academic, peer reviewed articles, relevant monographs and grey literature published by international organisations and local and national entities. Further, a review of global and relevant national datasets was undertaken to present a more comprehensive picture of the key data gaps and priorities for future investments in data infrastructure and systems. Existing displacement risk models were also reviewed, including new approaches to estimating the duration of displacement.

The literature review is based on searches across several academic databases (e.g., Web of Science, Scopus, Google Scholar) and grey literature repositories (e.g., ReliefWeb, IDMC, UNHCR, World Bank documents), using strings of key words and aligned with the PRISMA (Preferred Reporting Items for Systematic review and Meta-Analysis) protocol. Key word strings were built tailored to the chosen database. It further applies semantic searches for specific topics, supported by a Large Language Model (LLM).[18]

The data reviewed was sourced from openly accessible databases publishing displacement figures such as IDMC, IOM, UNHCR, EM-DAT, and national disaster loss databases, and from event-specific impact assessments, e.g. from Impact-REACH, Forced Displacement Data Centre, IOM, IDMC, and risk assessments.

Finally, interviews were held with eight experts for additional perspectives, literature and data references.

[18] The LLM tool used to identify literature and support the screening exercise and data extraction for the review was Elicit (elicit.com).

LITERATURE SEARCH AND SCREENING

A semantic search was performed using the following query: "What individual, household, and contextual factors are associated with protracted displacement (lasting more than one year) among disaster-displaced persons?" The search returned results that were capped at 1,000 entries and which were deemed most relevant to the query for screening.

Abstract screening was performed by identifying the following categories:

- **Population and Disaster Type:** Does this study either focus on populations displaced by hydrometeorological disasters (floods, droughts, hurricanes, cyclones, storms, etc.) or mention relevant lessons?
- **Displacement Duration:** Does this study examine displacement lasting one year or longer, or provide data that allows identification of protracted displacement cases?
- **Factor Analysis:** Does this study examine individual-level factors (demographics, health, education), household-level factors (income, assets, family composition), or contextual factors (policy, infrastructure, social networks) associated with displacement duration?
- **Disaster Type Exclusion:** Is this study NOT focused solely on conflict-related displacement?
- **Solutions:** Does the paper provide analysis or recommendations for solutions to displacement?

Papers that failed any strict criterion were automatically excluded. For the remaining papers, screening questions were applied to come to a judgement on whether to include a paper in the data extraction and review process or not:

- **Population and Disaster Type:** Does this study either focus on populations displaced by hydrometeorological disasters (floods, droughts, hurricanes, cyclones, storms, etc.) or mention relevant lessons?
- **Displacement Duration:** Does this study examine displacement lasting one year or longer, or provide data that allows identification of protracted displacement cases?
- **Factor Analysis:** Does this study examine individual-level factors (demographics, health, education), household-level factors (income, assets, family composition), or contextual factors (policy, infrastructure, social networks) associated with displacement duration?
- **Disaster Type Exclusion:** Is this study NOT focused solely on conflict-related displacement?
- **Solutions:** Does the paper provide analysis or recommendations for solutions to displacement?

Papers that failed any strict criterion were automatically excluded. 210 papers passed abstract screening and moved to full-text review.

ANNEX 2

THE DATA LANDSCAPE ON PROTRACTED DISASTER DISPLACEMENT

THE GLOBAL PICTURE

There is no single global system that tracks how long people displaced by disasters remain displaced. The Internal Displacement Monitoring Centre (IDMC) is the closest thing to a baseline: each year it reconstructs global figures from a mosaic of sources (IOM country operations, national government data, media reports, humanitarian agencies, and satellite imagery of housing destruction), which every other international organisation then reuses. Because those figures are stitched together through painstaking triangulation of imperfect inputs, they are not easily replicable, and their coverage of the *duration* of displacement is inherently indirect. Since 2019, IDMC's Global Internal Displacement Database (GIDD) has reported annual stock figures separately from flows, and separated disaster from conflict displacement, which is a real improvement

for assessing protractedness. Even so, the numbers cannot say how long any individual has been displaced, whether they have tried to return, whether they are integrating locally, or how they live when they are outside formal camps.

Several complementary datasets fill parts of this gap, but none provide a full picture.

IOM's Displacement Tracking Matrix (DTM), operating in more than 53 countries, revisits the same sites through repeated rounds, sometimes annually, sometimes quarterly, sometimes more frequently, so comparing rounds gives an approximation of how long particular populations remain in place. The Platform on Disaster Displacement's dataset of more than 400 planned-relocation cases functions as a useful proxy for where displacement has become genuinely protracted, on the reasoning that planned relocation typically signals that return to the original site is no longer viable. However, it does not provide figures on the total number of people relocated. EM-DAT, the most widely used global disaster event database, has a well-known limitation for this purpose: its start and end dates describe the event, not the homelessness that follows, and the median event duration recorded is just two days, with no follow-up measurement and no demographic breakdown. Coverage also varies considerably from country to country.

The World Bank–UNHCR Joint Data Center's Forced Displacement Microdata Dashboard pulls together household surveys from 53 countries between 1995 and 2022 and does allow researchers to look at *conditions* during displacement, but its coverage of disaster-displaced populations is thin because most datasets in it concern conflict displacement. REACH/IMPACT's Multi-Sector Needs Assessments, produced annually in 15–20 countries, provide rich disaggregated data on shelter, food security and vulnerability, but they too are dominated by conflict-affected contexts and are cross-sectional rather than longitudinal, so they cannot measure duration directly.

The deeper problem sits underneath all of these datasets. Displacement duration is ultimately driven by housing recovery, and there is no global system that links housing destruction and reconstruction data to displacement records. The most granular evidence in the literature comes from single-country longitudinal studies rather than from any global database. In practice, the working method for global analysis is to combine IDMC stock figures across consecutive years with DTM rounds, and to treat the result as an approximation rather than a direct measurement.

Taken together, the global data infrastructure is well-suited to answering how many new displacements occurred in a given year and reasonably suited to describing conditions in formal displacement sites for conflict-affected populations. It cannot answer the question that matters most for durable solutions: how many of the people displaced by a specific disaster event five or ten years ago are still displaced, and why.

National level data can be equally patchy, but advances have been made over the years and a few of these are presented (including remaining challenges) aligned with the country examples featured in the Global Review.

COLOMBIA

Colombia illustrates what happens when a country builds a sophisticated displacement data system around a different problem. Its disaster displacement data is substantially thinner than its conflict displacement data, and protracted disaster displacement is the least documented layer of all. The Registro Único de Víctimas (RUV), the national victim registry, tracks conflict displacement in considerable depth, but no equivalent system exists for people displaced by disasters. The available datasets capture the immediate emergency phase and, as elsewhere, no one systematically tracks who remains displaced months or years later, whether they returned, or in what conditions.

The most severe gap is the absence of longitudinal tracking. The most granular evidence on the duration of displacement comes from single-event studies, such as the 1999 Coffee Region earthquake, the 2010 floods in Atlántico, rather than from any

systematic monitoring system. For research purposes, combining IDMC stock data across consecutive years with IOM DTM rounds remains the practical workaround, with the caveat that the result is an approximation. However, in some years, including 2025, IDMC has not been able to confirm the number of IDPs living in displacement in Colombia. As a result, Colombia lacks the infrastructure to know how many people remain displaced from any given disaster event five years after it occurred. This is a gap the country itself has recognised as a barrier to implementing durable solutions.

The demographic composition of displaced populations is a further blind spot. No global database provides age, gender, disability or ethnicity breakdowns for disaster-displaced populations, yet the Colombian evidence consistently shows that Indigenous communities, Afro-descendants, and people already displaced by conflict bear a disproportionate share of disaster exposure and face the highest barriers to durable solutions. Aggregate displacement counts therefore obscure the stratified nature of who actually bears these risks. The opportunity that Colombia has now opened up is to extend the system that already work for conflict to disaster-displaced populations, and to invest in the longitudinal follow-up and disaggregation that would let solutions policy be evaluated against evidence rather than assumption.

PHILIPPINES

The Philippines sits at the other end of the maturity spectrum: it has, by regional standards, a relatively developed humanitarian data infrastructure, and yet the same structural gaps around protracted displacement remain. The government's Disaster Response Operations Monitoring and Information Center (DSWD-DROMIC) provides granular sub-national data on evacuation-centre populations and has adopted the DTM site-assessment methodology. IDMC, drawing on DROMIC together with media, national and international sources, publishes annual stock estimates that are the closest available approximation of how many people remain displaced over time. IOM's DTM has been deployed in the country since Typhoon Ketsana in 2009 and has since been used for Typhoons Washi, Bopha and Haiyan, the Bohol earthquake, and the Zamboanga and Marawi crises, producing a dataset of considerable historical depth. EM-DAT and AidData's geocoded Philippine disaster database offer historical trend data across 421 disaster records between 1980 and 2012, and the Humanitarian Data Exchange portal maintained by OCHA Philippines aggregates more than twenty of these datasets in one place.

The dominant datasets are built to capture flows (the number of new displacements triggered by a specific event), rather than stocks (the number of people who remain displaced a year later). This reflects a conceptual orientation toward emergency response rather than durable solutions, which persists even in a country with a well-developed displacement solutions policy framework. A second gap is the absence of disaggregated data on almost every dimension that matters for equity analysis. Gender, indigenous status, pre-displacement tenure, sexual and gender minority identity, disability status are not captured in displacement tracking systems. Qualitative studies fill some of the void with some the large household and multi-year studies conducted. Slow-onset contexts fare worst of all: gradual land subsidence in Metro Manila, sea-level rise on coastal communities, incremental saltwater intrusion into agricultural land, are all poorly served by systems structured around acute events with identifiable onset dates, and the displacement they drive is likely to be significantly undercounted.

The priorities for investing in future data systems are concrete. First, a linked longitudinal tracking system, connecting DSWD-DROMIC event data, DTM site assessments, National Housing Authority beneficiary records, and periodic household follow-up surveys, would let government and humanitarian actors distinguish programme completion from genuine resolution, and identify cohorts at risk of secondary displacement. Long-term trajectories diverge substantially from short-term assessments, which underscores the value of investing in

such methodologies. Second, disaggregated data on gender, age, disability, indigenous identity, pre-displacement tenure status, and income need to be embedded at the point of data collection and recording, so that the disadvantages currently visible only in qualitative studies become visible to national-level programme design and accountability. Third, slow-onset and climate-related displacement will require dedicated measurement frameworks; the combination of land subsidence, sea-level rise, saltwater intrusion and intensifying typhoon seasons produces displacement patterns that do not fit the acute-event structure of current systems. Fourth, cost-effectiveness and comparative evaluation research remains thin, which is a gap that leaves the institutional inertia toward the off-city model largely unchallenged by evidence.

SOMALIA

Somalia is, by the standards of fragile low-income states, unusually well-served by displacement data infrastructure; the challenge is not the absence of data but the structural limits of what the existing data can say about protracted displacement specifically. The most granular Somalia-specific source is UNHCR's Protection and Return Monitoring Network (PRMN), whose predecessors have existed since 2006 and which has operated in consolidated form since 2014. PRMN records both the point of departure and the reason for departure (including disaster-specific causes such as drought and flood) through a standardised form implemented by 39 local partners across South Central Somalia, Puntland and Somaliland, with monthly public dashboards and an underlying dataset disaggregated by month, reason and region and released under a Creative Commons license. The result is a monthly, cause-disaggregated displacement flow dataset spanning roughly a decade, which is a rare example of rich and comparable national data.

DTM Somalia complements this and is one of the most active DTM operations in the world, having mapped approximately 1.5 million IDPs, 73,000 returnees and 4.8 million residents across more than 6,500 assessed locations, with natural disaster identified as the primary reason for displacement in 59% of cases. It combines baseline assessments (now in a third round), Emergency Trends Tracking for specific shock events, and site assessments. REACH's Multi-Sector Needs Assessment adds six consecutive years of household-level data across 54 accessible districts, covering shelter, food security, WASH, health, protection and displacement drivers.

The UNDP/World Bank Drought Impact and Needs Assessments (DINAs) provide detailed damage and needs estimates for specific events, notably 2017 and 2021–2023, and FSNAU and FEWS NET produce integrated seasonal analyses linking drought severity to displacement drivers, which are particularly valuable for understanding the slow-onset, cumulative dynamics that flow-based monitoring tends to undercount. Layered on top, IDMC's GIDD provides disaster and conflict-related annual estimates for global benchmarking. In combination, PRMN monthly flows, IDMC annual stocks, DTM baseline rounds and REACH annual MSNAs make a multi-year time series of disaster displacement flows from roughly 2014 to the present feasible, along with annual snapshots of IDP stock and conditions from 2017 onward, a year in which 1.2 million people were already recorded as living in protracted displacement, before the full weight of the subsequent drought cycles.

The most significant recent development is the 2024–2025 Durable Solutions Progress (DSP) Survey, led by Somalia's Ministry of Planning, Investment and Economic Development (MoPIED) and implemented with IOM DTM, Danwadaag and the Saameynta Joint Programme. The DSP Survey applies the eight IASC Durable Solutions Criteria as a national measurement framework, covered roughly 60% of Somalia's IDP caseload in its first phase across Benadir, South-West State and Jubaland between April and June 2024, and is planned to expand to Galmudug, Hirshabelle and Puntland in 2025. The first phase confirmed that a majority of IDPs in covered areas prefer local integration over return – consistent with evidence across the literature on pastoralist and agropastoral populations – and identified significant inequalities in how solutions interventions are targeted within and between cities.

The remaining gaps are nonetheless substantial. Across 15 reviewed studies spanning nearly four decades of programming, none directly measured changes in displacement duration as a quantifiable outcome, and none produced baseline-to-post-intervention duration data or statistical tests of duration reduction. As an added complication, Somalia's disaster and conflict displacement are so deeply intertwined that isolating "disaster-only" displacement remains analytically difficult even with this data; drought in particular drives slow, cumulative displacement that is hard to separate cleanly from structural poverty-induced migration, and return is rarely complete or verifiable.



PLATFORM ON DISASTER DISPLACEMENT
FOLLOW-UP TO THE NANSEN INITIATIVE

disasterdisplacement.org

iDMC internal displacement monitoring centre

internal-displacement.org