

# GROUNDSWELL

Acting on Internal Climate Migration

**POLICY NOTE #5**

## Internal Climate Migration in East Asia and the Pacific

Climate change is emerging as a potent driver of mobility. The report *Groundswell Part II: Acting on Internal Climate Migration (2021)* projects that, by 2050, without concrete climate and development action, just over 216 million people—or around three percent of the population in Sub-Saharan Africa, East Asia and the Pacific, South Asia, North Africa, Latin America, and Eastern Europe and Central Asia—could be forced to move within their own countries due to the slow-onset impacts of climate change. In East Asia and the Pacific, “internal climate migrants” could number as many as 48.4 million, representing up to 2.5 percent of the region’s total population.

Climate migrants will move from less viable areas with lower water availability and crop productivity and from areas affected by rising sea level and storm surges. The poorest and most climate vulnerable areas will be hardest hit. These trends, alongside the emergence of “hotspots” of climate in- and out-migration, will have major implications for climate-sensitive sectors and for the adequacy of urban infrastructure and social support systems in both rural and urban areas. While some climate migration cannot be avoided due to the lock-in of climate effects of past emissions, the report results also indicate that future trajectories of climate migration are not set in stone.

Climate migration in East Asia and Pacific can have substantial development implications, and the stakes are high. Achieving a resilient society—where people can either adapt in place and thrive or migrate with dignity toward areas of higher opportunity—is an important part of meeting national development goals.

Policy decisions made today will shape the extent to which the effects of climate change will be positive for migrants and their families. Inaction would mean missing a window of opportunity to reconfigure where, when, and how climate resilient investments are made in support of robust economies.

*This Policy Note #5 is the fifth in a series of six notes drawn from the Groundswell reports. It provides an overview of results and their implications for East Asia and the Pacific, one of the six regions of focus.*

## CLIMATE CHANGE AND MIGRATION: SETTING THE CONTEXT

Climate change will intensify environmental degradation and natural hazards in many regions. Related impacts are already directly and indirectly shifting human mobility—both within countries and across borders—and will do so increasingly. Sometimes, ensuing migration can be an adaptation to climate change. At other times, climate change impacts increase the probability of migration under distress, creating growing challenges for human development. In some areas, the most vulnerable will be unable to move, “trapped” in at risk locations.

Recent compounding shocks are also increasing the complexity and interconnectedness of underlying drivers of mobility. The COVID-19 pandemic and its associated economic crisis, and the effects of fragility and conflict, have compounded the shocks already faced by vulnerable people, reversing hard-won gains in poverty reduction and shared prosperity, and adding to policy challenges.

The objective of the *Groundswell* reports, and the modeling applied, is to provide policymakers with a way to better understand and plan for the likely movement of people within their countries—over time and across different geographies—due to slow-onset climate change impacts. These include impacts on water availability, crop productivity, and sea-level rise. The focus on “internal” climate migration is driven by the consensus that migration within countries, rather than cross-border migration, will be by far the larger phenomenon—yet both require concerted action.

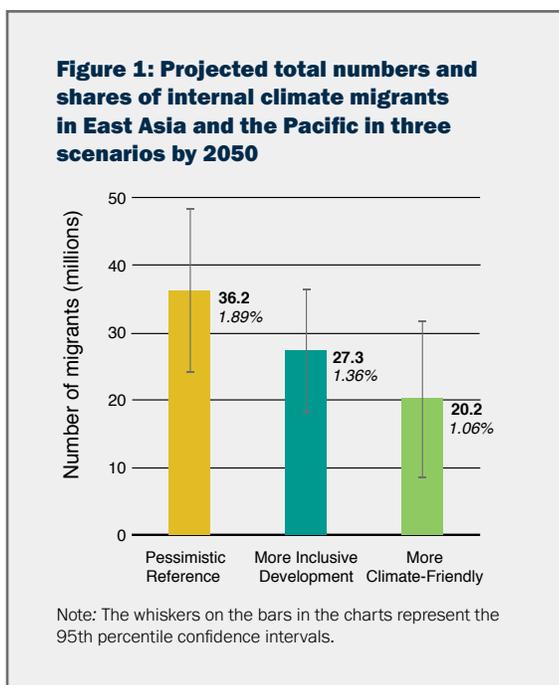
The reports model three internal climate migration scenarios. This helps to address the uncertainties of analyzing migration over the next 30 years. The scenario-based results should be seen as a plausible range of outcomes rather than precise forecasts. The three scenarios are:

- Pessimistic (the reference scenario for this report): high global greenhouse gas emissions combined with an unequal development pathway;
- More inclusive development: with equally high emissions, but a more equal development pathway; and
- More climate-friendly: with lower emissions, combined with an unequal development pathway.



## EAST ASIA AND THE PACIFIC COULD SEE UP TO 48.4 MILLION CLIMATE MIGRANTS BY 2050

Internal climate migration will increase in East Asia and the Pacific<sup>1</sup> in all three scenarios. The projected number of climate migrants could reach 48.4 million or 2.5 percent of the total population at the high end of the pessimistic reference scenario. The average for this scenario is 36.2 million climate migrants by 2050, or 1.9 percent of the region's total population (Figure 1). On average, in the more inclusive development scenario, the number of climate migrants drops by almost a quarter to 27.3 million (1.4 percent of the total population) and in the more climate-friendly scenario, it is cut by almost 45 percent to 20.2 million climate migrants (1.1 percent of the total population). Here, large gains in sustaining livelihoods that help people stay in place come from investing in stringent mitigation measures that reduce emissions globally, in addition to adaptation policies.



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Countries in the region are highly urban, with diversified economies. The projected scale of climate migration reflects vulnerability to impacts related to sea-level rise, augmented by storm surges, in densely populated low-lying coastal regions that host key livelihood systems and urban centers.

## SPOTLIGHT ON INTERNAL CLIMATE MIGRATION IN THE LOWER MEKONG AND VIETNAM

Climate migration in the Lower Mekong subregion is discussed in more detail below to illustrate specific spatial and temporal trends of climate migration within a local development context, using highlights from the example of Vietnam.

The population of the Lower Mekong is most heavily concentrated in the deltas of the Irrawaddy, Salween, Mekong, and Red River. Lower-density areas include the highlands, particularly in Lao PDR, northern and eastern Myanmar, and northwestern and western Thailand, as well as areas of northern and southern Cambodia. Urbanization is an important factor in the demographic dynamics of Lower Mekong countries. The entire subregion has seen increased urbanization in recent years, though the urban share of their respective populations varies significantly. Agriculture and natural resources from the Mekong River and its tributaries continue to play a dominant role in the economies and livelihoods of all Lower Mekong countries.

The Lower Mekong is vulnerable to climate change. Low-lying coastal areas particularly in the Vietnamese Mekong Delta could see heightened impacts from sea-level rise and flooding, especially when coinciding with extreme weather events and high tides. In addition, while it is challenging to predict the flow regime of the Mekong River, including due to upstream land use and water resource development, the variability and intensity of the Mekong flood pulse is set to increase with climate change.

<sup>1</sup> For East Asia and the Pacific, aggregated results are included from Southeast Asia (including the Lower Mekong) as well as China and Mongolia. The modeling approach could not be applied to Small Island Developing States (SIDS), and they are discussed in a qualitative narrative covering environmental and climate-induced mobility drivers, trends, and patterns in the report.

Climate trends show that average temperatures have steadily risen throughout the Lower Mekong. Extreme precipitation events have also become more frequent and intense, though this varies across the subregion. Total annual precipitation has also increased at an aggregate level, although it may also be declining in certain critical periods, as indicated by a downward trend during the rainy season along the western coastal regions. Future projections suggest that average temperatures will continue to increase, with the largest changes in the southeast of the Lower Mekong Basin, especially during the wet season. Annual precipitation is also projected to continue increasing, again especially during the wet season, as is peak daily precipitation, with implications for flash flooding, hillslope erosion, and downstream flooding. Some areas, however, could see substantial losses of annual rainfall. These trends can be linked to agricultural drought and water scarcity with major economic repercussions particularly in the south and east of the Lower Mekong Basin.

Rural to urban migration, which increasingly includes women migrants, is an important driver of urban growth in the subregion and tends to be longer-termed, although migration patterns are more complex and include circular migration. Environmental stressors such as floods and droughts are already recognized as important push factors for migration, both within and between countries in the Lower Mekong, alongside impediments to rural development including high rates of rural poverty, landlessness, and land-use change. Migration can represent one of several strategies to cope with periods of prolonged climatic stress and adapt to the seasonality of agricultural production, land pressure, and economic crises.

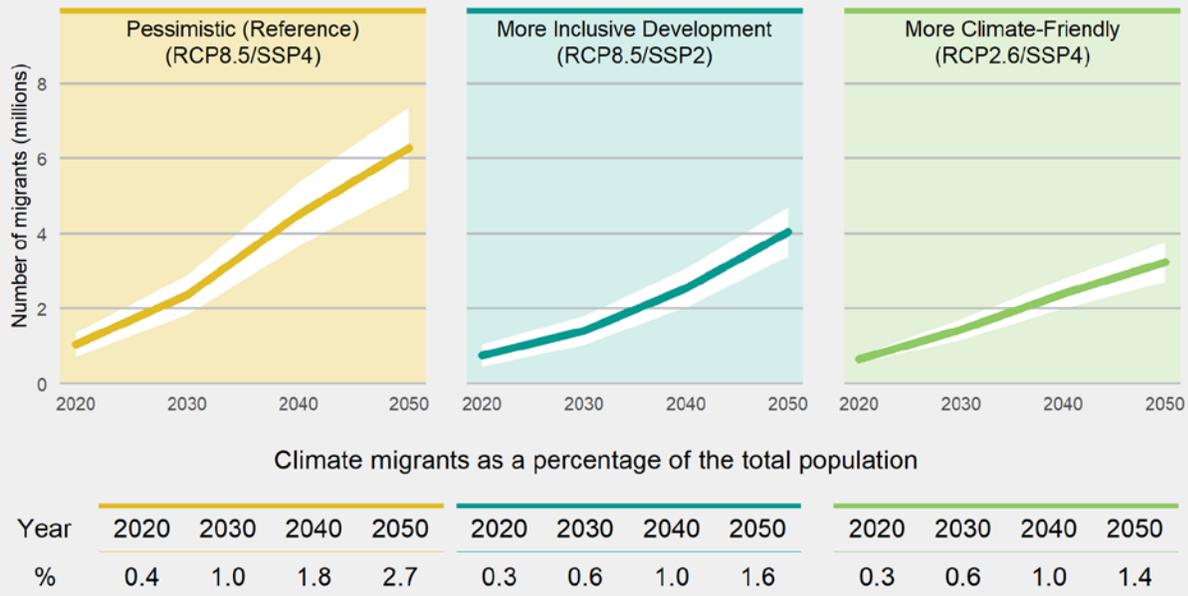
### Climate migration is set to ramp up in the coming decades and the Lower Mekong could see up to 6.3 million climate migrants by 2050

The number of climate migrants in the Lower Mekong is projected to increase over time reaching 3.3 to 6.3 million people by 2050 (1.4 to 2.7 percent of the total population) across scenarios (Table 1 and Figure 2).

**Table 1: Projected numbers and shares of internal climate migrants by 2050 in three scenarios, Lower Mekong**

Region	Scenario					
	Pessimistic reference		More inclusive development		More climate-friendly	
<i>Lower Mekong</i>						
<b>Average number of internal climate migrants by 2050 (million)</b>	<b>6.3</b>		<b>4.1</b>		<b>3.3</b>	
Minimum (left) and Maximum (right) (million)	4.1	8.5	2.7	5.4	2.3	4.2
<b>Internal climate migrants as percent of population</b>	<b>2.68</b>		<b>1.61</b>		<b>1.38</b>	
Minimum (left) and Maximum (right)	1.76	3.60	1.07	2.14	0.98	1.78

**Figure 2: Projected number of internal climate migrants in the Lower Mekong in three scenarios, 2020-2050**



Note: Dark lines represent the average runs for each scenario. Unshaded white areas represent the 95th percentile confidence intervals. The wide intervals are in part a reflection of the fact that climate and sectoral models were selected to represent the widest possible range of outcomes.

The pessimistic reference scenario sees the largest numbers with 6.3 million climate migrants (2.7 percent of the total population), followed by the more inclusive development scenario with 4.0 million (1.6 percent of the total population), and the more climate-friendly scenario with 3.2 million (1.4 percent of the total population). Climate migration will not occur in isolation, and the Lower Mekong will also see a marked increase in the number of other internal migrants driven by economic, social, or environmental reasons.

While the study did not model climate migrants beyond 2050, the results of the water and crop sectoral models, which are available through to 2100, show more extensive climate change impacts on water availability and crop productivity in general, which could have ramifications for population movements. Increased wetness is projected to prevail in the northern parts of the Lower Mekong out to 2050-2100 but with continued drying in the region’s interior. Crop productivity is projected to be mostly stable or slightly higher by 2050, except in parts of central Thailand, Lao PDR, northern Vietnam, and northern Myanmar that could experience declines. Projections for 2050-2100 show a slight accentuation of the impacts of the first half of the century. In addition, sea-level rise will continue to be of particular concern for the low-lying Mekong Delta.

**Hotspots of climate in- and out-migration reflect the vulnerabilities of ecosystems, livelihoods, and some urban centers**

Spatial development is climate-sensitive, and hotspots of climate in- and out-migration will matter critically in the future. Climate outmigration will occur in areas where livelihood systems are increasingly compromised by climate impacts, while climate in-migration will occur in areas with better livelihood opportunities.

Climate migration hotspots begin to emerge by 2030, and by 2050, these spread and intensify all over the subregion (Figure 3). Climate out-migration hotspots by 2050 are projected in the coastal portions of the Vietnam Mekong Delta, Ho Chi Minh City, coastal areas of northern Vietnam near Thanh Hoa and Vinh, as well as central Thailand and Myanmar. The out-migration hotspots in the Mekong Delta, Ho Chi Minh City, and south of Hanoi near Thanh Hoa are areas projected to be affected by sea-level rise. The out-migration hotspots

in central Thailand and Myanmar are areas expected to see declines in water availability and crop productivity, respectively. It is important to note that in climate out-migration hotspots in Vietnam, climate change impacts will slow projected population growth, but those areas will continue to support large populations.

Climate in-migration hotspots are expected in southern Thailand (Malay Peninsula), the inner portions of the Vietnam Mekong Delta (surrounding the out-migration hotspots), coastal areas of east Vietnam, the Red River Delta in northern Vietnam including Hanoi (downstream from the out-migration hotspot), a small area to the southeast of Phnom Penh in Cambodia along the Mekong River, as well as south Myanmar around Hinthada and patches along the Irrawaddy River upstream from the delta. Climate in-migration hotspots along the coast of Vietnam and in southernmost Thailand along the Gulf of Thailand coincide with areas projected to see increases in water availability across multiple models. Climate in-migration hotspots in Cambodia and Myanmar are areas that are expected to see increases in both water availability and crop productivity. Particularly for coastal areas, these in-migration hotspot patterns suggest that better water availability may attract people to areas that also face heightened risks from sea-level rise and extreme weather events, including tropical cyclones.

**Figure 3: Hotspots projected to have high levels of climate in-migration and climate out-migration in the Lower Mekong, 2030 and 2050**

a. 2030



b. 2050



**IN-MIGRATION**

- High certainty in high levels of climate in-migration
- Moderate certainty in high levels of climate in-migration

**OUT-MIGRATION**

- High certainty in high levels of climate out-migration
- Moderate certainty in high levels of climate out-migration

Note: High certainty reflects agreement across all three scenarios modeled, and moderate certainty reflects agreement across two scenarios.

### Climate Migration in Vietnam

In Vietnam, the scale of climate migration is projected to increase by 2050 in all three scenarios modeled in the report. The total number of climate migrants is largest in the pessimistic reference scenario where by 2050, Vietnam could see up to 3.1 million climate migrants (3.1 percent of the population). Environmental and climate-related mobility are already occurring in Vietnam and will add to well-established patterns of migration. Table 2 summarizes key results for Vietnam.

Concrete climate and development action are both needed to reduce the scale of internal climate migration. Lower global emissions pathways could lessen climate change impacts as a driver of internal migration by alleviating stressors related to sea-level rise, and changes in crop productivity and water availability. Understanding the scale and trajectory and differing vulnerabilities and attractiveness of hotspots can provide a stronger basis for proactive and inclusive planning in sending and receiving areas.

Major coastal urban centers will require climate-resilient planning, while early and concerted action will be needed to prepare key agricultural regions for climate change impacts, particularly low-lying areas facing sea-level rise and storm surge. Vietnam is already working to address climate change risks, and stepping up those efforts—including proactive, multisectoral planning and the adoption of transformative solutions—will be crucial to maintaining the country’s robust development trajectory. With good preparation in both sending and receiving areas, climate migration can be a positive adaptation strategy for those who cannot effectively adapt in place.

**Table 2: Key climate migration results for Vietnam**

<b>Projected number of climate migrants by 2050, pessimistic reference scenario (average)</b>	3.1 million (3.1 percent of total population)
<b>Climate in-migration hotspots</b>	Hanoi and the Red River Delta Coastal central region including Bin Dinh, Quang Ngai and Quang Tri provinces
<b>Climate out-migration hotspots</b>	Mekong Delta and Ho Chi Minh City
<b>Climate migration in/out of livelihood zones*</b>	Out-migration: dense settlements Wide confidence intervals for other livelihood zones

Note:

\* In general, projections display large confidence intervals across livelihood zones, ranging from positive to negative depending on the category.

## **IN THE PACIFIC, SMALL ISLAND DEVELOPING STATES ARE LEADING PROACTIVE POLICIES FOR ENVIRONMENTAL AND CLIMATE-RELATED MOBILITY**

The Pacific Small Island Developing States (SIDS), in particular low-lying islands, are vulnerable to the effects of sea-level rise through increased saltwater intrusion, flooding, erosion, and damage to critical infrastructure. Salinization of water supplies poses a threat to food and water security, while extreme sea-level events can risk lives and infrastructure. Island nations with economies that are highly dependent on agriculture, fisheries, and tourism are at particular risk. As climate change continues to put stress on terrestrial and marine ecosystems that are the backbone of key economic sectors, Pacific SIDS could face serious development challenges.

Historically, people have adjusted to social and environmental changes, and migration has been one of several coping strategies. Climate change now poses great risks to the habitability of some areas and could result in the loss of customary land, an integral part of individual and community identity in many Pacific SIDS. This sense of loss affects perceptions of environmental and climate-induced migration.

SIDS have been leaders in proactively integrating climate resilience and mobility in the context of climate change in regional and global dialogues. Pacific SIDS are also making headway on a range of options for building resilience at the nexus of climate, mobility, and development. SIDS are implementing national policy frameworks that explicitly address migration and relocation while also developing measures to enable people to adapt in place, as well as investing to strengthen the adaptive capacity of key economic sectors.

## USE THE WINDOW OF OPPORTUNITY TO ACT NOW

Internal climate migration may be a reality, but it does not have to be a crisis. Concerted action on climate change mitigation and adaptation together with inclusive development policies, and embedding climate migration into policy and planning, could help to substantially reduce the number of internal climate migrants by 2050. The *Groundswell* reports identify key policy recommendations to address the underlying drivers of internal climate migration and prepare for expected migration flows.

### 1. Cut global greenhouse gases now to reduce the climate pressures that drive internal climate migration.

Managing the scale of internal climate migration will require immediate collective action to get on lower global greenhouse gas emission trajectories with differentiated strategies across regions and countries. Five years after the Paris Agreement, the world is still headed for at least 3°C of warming by 2100. Ambitious action to curb global emissions is critical to reducing the burden of climate change impacts on key resources, livelihood systems, and urban centers that may drive people to migrate in distress.

In the lead-up to COP26 in Glasgow, countries are updating and enhancing their commitments under the Paris Agreement. This is a critical opportunity to ratchet up ambition to put the world on track for net-zero emissions by mid-century and have a chance at limiting global warming to 1.5°C. Adhering to the Paris Agreement, and staying close to the more climate-friendly scenario used in this report, would help substantially reduce internal climate migration. Urgent and aggressive action on inclusive, resilient, and sustainable development alongside global action on emissions reductions will also be needed.

### 2. Embed internal climate migration in far-sighted green, resilient, and inclusive development planning.

Integrating internal climate migration in development planning is critical to address the poverty factors that make people particularly vulnerable to climate change impacts, such as a lack of viable livelihood options and lower quality assets. This is particularly important as the most vulnerable groups tend to have the fewest opportunities to adapt locally or move away from risk—and when moving they tend to do so in adverse circumstances. Systematic planning at the nexus of climate, development, and migration can help broaden the opportunities for people to adapt where they live, or else enable them to move under better circumstances.

Far-sighted development planning can also enable countries to pursue green, resilient, and inclusive economic transformations. Notably, accounting for internal climate migration alongside broader demographic patterns can help fuel momentum towards the next generation of skills and jobs in both sending and receiving areas. Good management of demographic transitions is vital in this regard and will need to be accompanied by continuing investments to enable working-age populations to find opportunities in productive and climate-resilient labor markets, with good access to health care, education, and public services.

Climate-smart urban and rural transitions can also provide important win-win opportunities to drive economic transitions. Primary and secondary cities can be promoted as hubs of innovation and knowledge transfer, accelerators of the digital transformation, and centers of green technology and resilient infrastructure in key sectors, including energy, water, and transport. Cities have opportunities to leverage rural-urban migration and broader urbanization trends in many regions, capitalize on agglomeration effects, and develop economies of scale. In rural areas, nature-based solutions emphasizing the protection of ecosystem services can benefit agricultural productivity, provide buffers against floods and droughts, and enhance management of landscapes, forests, and watersheds on which livelihoods depend. More broadly, flexible social protection systems with robust and rapid delivery can significantly increase resilience to climate change and other shocks, particularly for the most vulnerable.

### 3. Plan for each phase of migration, so that internal climate migration as an adaptation strategy can result in positive development outcomes.

Planning for internal climate migration means accounting for all phases of migration—before, during, and after moving. Before migration, adapt-in-place solutions can help communities stay in place where local adaptation options are viable and sensible. During migration, policies and investments can enable mobility for people who need to move away from unavoidable climate risks. After migration, planning can ensure that both sending and receiving areas are well equipped to meet the needs and aspirations of their populations.

Policy makers will need to understand and account for differences in vulnerabilities across landscapes to provide a stronger basis for adaptive practices that would enable people to stay in viable livelihood systems. Integrated management of landscapes and natural resources, combined with resilient agri-food systems, will be central to ensuring livelihood sustainability and food security, particularly in densely populated localities or in productive areas that may already be stretched. Diversified livelihoods that are not tied to climate-sensitive sectors need to be available as options to adapt in place. Careful attention to the carrying capacity and reach of social, service delivery, economic, and livelihood systems is also key for spatial planning.

For people who need to move away from unavoidable climate risks, policy makers will need to enable mobility by creating supportive environments for planned and orderly migration into areas of low risk and high opportunity. Inclusion and sensitivity to migrants' needs will be crucial. In many regions, internal climate migration will have to be managed as an important part of a broader set of adaptation options and in the context of existing patterns of mobility. Targeted interventions can be deployed in the short and medium term to support migrants. For instance, informed decision-making can be facilitated for migrants through better access to financial resources and social services, increased financial literacy, secured legal status, and pre-departure training, skills, and orientation. Investments can also make social protection portable and scalable by easing registration and communication in receiving areas, particularly major urban centers; improving access to benefits through mobile money and digital identification systems; and allowing for social welfare systems to be adaptable to changing needs. Policy can also maximize the potential of financial and social remittances to bolster adaptation investments and income-generating activities and encourage knowledge transfer through diasporas and social networks.



In places where options to adapt in place have reached their limits, inclusive decision-making processes can help ensure that planned relocation and managed retreat enable movement in a safe and dignified manner. Planned relocation is a complex and multidimensional process to be adopted as a last resort and only when needed. It should involve the meaningful participation of affected people, and to be developed in a way that is specific to national and local contexts.

Policy makers will also need to ensure that both sending and receiving areas are adequately prepared to ensure the resilience of those who remain and to integrate additional flows of people. Many of the climate in-migration hotspots identified in the regions covered by this report are major urban areas. These cities will need to provide advanced public service provision, affordable housing programs, and employment opportunities for increasing numbers of people. Fostering integration and social cohesion can also help ensure that destination areas leverage the opportunities that migrants bring to fill labor and demographic gaps, diversify human capital, and bring new skills and knowledge.

National and city planning systems will need to account for important changes to existing settlement patterns. These will need to go hand in hand with climate-resilient infrastructure investments and improved connectivity networks, especially as cities continue to grow and draw migrants from rural areas. Even cities projected to be out-migration hotspots and thus see potentially slower population growth will still continue to support large numbers of people who may face escalating climate risks. Urban planning and land use management will need to be inclusive and address the needs of the most vulnerable, who often live in areas with inadequate services, including informal settlements, sometimes on marginal land exposed to floods and other hazards. Vulnerable people, including those that are lower-skilled, poorer, and older, may also be unable to move away from areas of high risk. Involuntary immobility in the context of climate change should therefore be equally considered in development planning.

#### 4. Continue to invest in improving understanding of internal climate migration to inform well-targeted policies.

More investments are needed in research at scale, including new, more granular data sources and differentiated climate change impacts, to better contextualize and understand internal climate migration at the regional and country level. The novel and transparent modeling presented in the Groundswell reports is a starting point, but decision-makers will need more spatially detailed projections to identify the most appropriate strategies in each location.

State-of-the-art models on the current and future trends of internal climate migration continue to be crucial to inform early action. Updated models using an array of climate change impacts and other biophysical, socioeconomic, and political indicators factors can help better inform decision-making at appropriate scales. These should also account for the inherent uncertainties in the way climate change impacts will play out in given locales that will affect the magnitude and pattern of climate change-induced movements. Important strides have been also made in new research to extend regional and national-scale modeling, and to gain further insights into how climate stressors impact individual decisions to move. The need to create a shared understanding of the scale, trajectory and spatial dimensions of internal climate migration remains critical to support development policy and planning.