

# GROUNDSWELL

Preparing for Internal Climate Migration

## POLICY NOTE #3

### Internal Climate Migration in Latin America

Climate change is emerging as a potent driver of internal migration. The report *Groundswell: Preparing for Internal Climate Migration (2018)* projects that, by 2050, without concrete climate and development action, just over 143 million people—or around 3 percent of the population across Sub-Saharan Africa, Latin America and South Asia—could be forced to move within their own countries to escape the slow-onset impacts of climate change. In Latin America, “internal climate migrants” could number over 17 million, representing up to 2.6 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 Latin America 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.

Internal climate migration may be a reality but it doesn’t 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. 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 #3 is the third in a series of three notes drawn from the Groundswell report. It provides an overview of results and their implications for Latin America, one of the three 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 movements—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 impacts increase the probability of migration under distress, creating growing challenges for human development. The most vulnerable will be unable to move, “trapped” in at risk areas.

Development implications will be substantial for those affected. Understanding the scale of internal climate migration and the patterns of people’s movements is critical to countries so they can plan and prepare. 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 objective of the *Groundswell report*<sup>1</sup>, 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.

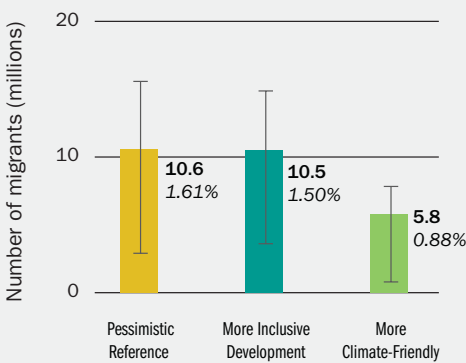
A novel approach using three plausible scenarios is used to model internal climate migration in this report. This helps to address the uncertainties of analyzing migration over the next 30 years. The pessimistic reference scenario combines high greenhouse gas emissions with unequal development pathways. This is compared with a more inclusive development scenario that combines similarly high emissions with improved development pathways. The more climate-friendly scenario combines lower global emissions with unequal development. The scenario-based results should be seen as a plausible range of outcomes rather than precise forecasts.

## LATIN AMERICA COULD SEE UP TO 10.6 MILLION CLIMATE MIGRANTS BY 2050

Latin America will be severely impacted by climate change, but on average less so than the other two regions of focus in the *Groundswell* report, Sub-Saharan Africa and South Asia. Two factors may be driving this. First, while still high, agricultural employment is on average much lower in Latin America than in the other two regions. Second, Latin America also has generally stronger economies, higher adaptive capacity, and financial resources to target the most vulnerable areas and groups.

Nonetheless, several million internal climate migrants in Latin America could be moving from less viable areas with lower water availability and crop productivity and from areas affected by rising sea level and storm surges. They

**Figure 1: Projected total numbers and shares of internal climate migrants in Latin America under three scenarios by 2050**



Note: The whiskers on the bars in the charts represent the 95th percentile confidence intervals.

1. Kumari Rigaud, Kanta, Alex de Sherbinin, Bryan Jones, Jonas Bergmann, Viviane Clement, Kayly Ober, Jacob Schewe, Susana Adamo, Brent McCusker, Silke Heuser, and Amelia Midgley. 2018. *Groundswell: Preparing for Internal Climate Migration*. Washington, DC: The World Bank.

could add up to a high of 17.1 million by 2050 under the pessimistic reference scenario, or 2.6 percent of the region's total population (Figure 1).

Under the more inclusive development scenario, there will be up to 16.2 million internal climate migrants—0.9 million fewer migrants compared to the pessimistic reference scenario. In the more climate-friendly scenario, there will be up to 9.4 million climate migrants. 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.

The example of the Mexico and Central America subregion is discussed in more detail below to illustrate specific spatial and temporal trends within a local development context, using highlights from the example of Mexico.

## **SPOTLIGHT ON MEXICO AND CENTRAL AMERICA**

The general pattern of population distribution change in Mexico and Central America has historically been a story of rapid population growth, driven by high fertility rates in the highlands of Guatemala and urbanization in Mexico's Central Plateau and other urban centers. The degree of urbanization is high, with nearly three-quarters of the subregion's population living in urban areas. It will also see some population growth in the coming decades.

The subregion's climate is characterized by extremes, including drought and tropical storms, with attendant heavy rainfall and high winds. The frequency and intensity of extremes have already increased. Summer rainfall has been starting later and become more irregular in space and time, and the intensity of rainfall has been increasing during the onset season.

In terms of future climate trends, there is medium confidence that the subregion will experience a decrease in precipitation over the coming century. Ensemble mean projections indicate a decrease in precipitation between October and March in northern Central America, and parts of Mexico, by the end of the century. In addition, there is some evidence for more extreme El Niño events in the future.<sup>2</sup> This would bring drier conditions in the southern part of the region and wetter conditions in the northern part.

In Mexico and Central America, dependence on agriculture varies within the subregion, suggesting sensitivity to climate variability and change. Agricultural employment ranges from 13 percent in Mexico to more than 30 percent in Guatemala, Honduras, and Nicaragua. The food system is heavily dependent on maize and bean production. Long-term climate change and variability will significantly affect the productivity of these crops in Honduras, El Salvador, and Nicaragua, with less dramatic effects expected in Guatemala. Climate change effects will translate into significant economic losses for smallholder farmers, including farmers involved in market crops like coffee.

Climate change impacts will likely also affect rates of both internal and international migration. Studies indicate that migration in the subregion already fluctuates in response to climate variability. Households dependent on rainfed agriculture are particularly sensitive to drought events and to cyclone impacts, forcing family members to seek alternative livelihoods in cities and abroad.

### **Climate migration will ramp up in the coming decades and the subregion could see up to 3.9 million climate migrants by 2050**

In Mexico and Central America, between 2020 and 2050, the number of internal climate migrants is projected to increase by a factor of two (Table 1). Projections of the number of climate migrants for Mexico

---

<sup>2</sup> The El Niño Southern Oscillation (ENSO) is the main driver of interannual climate variability in the subregion. La Niña has the opposite pattern.

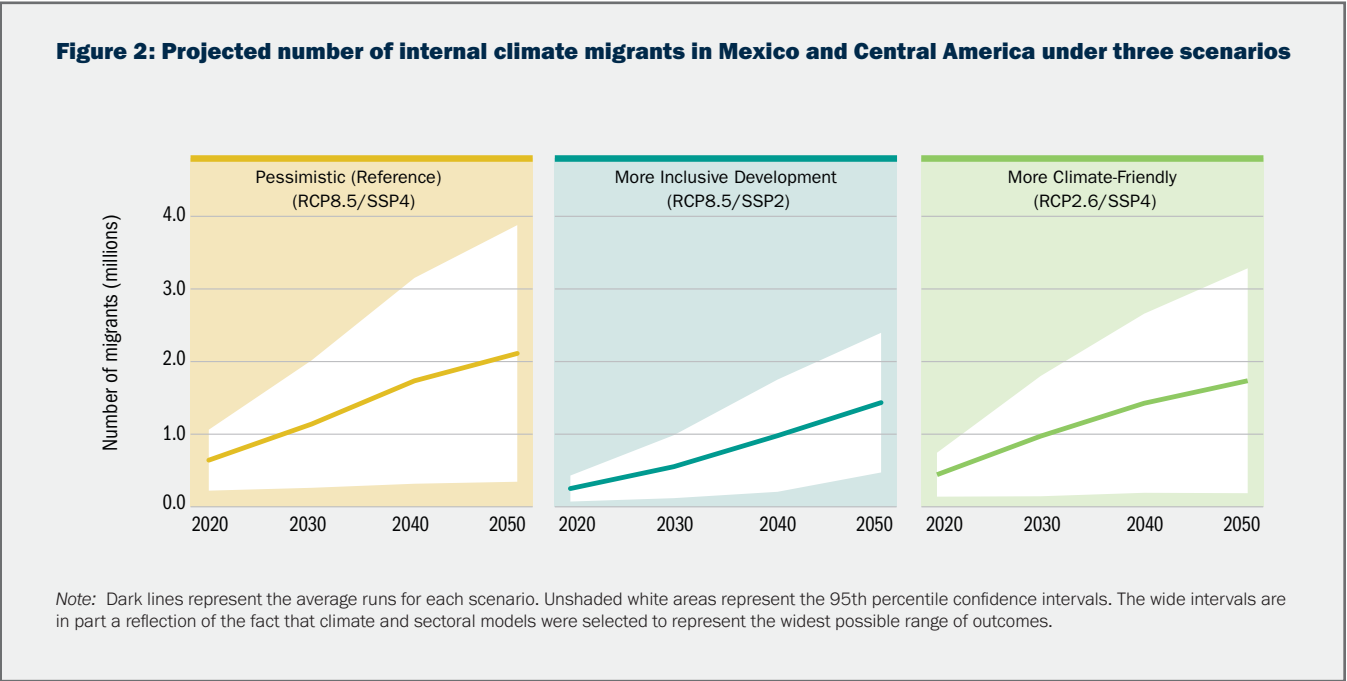
**Table 1: Projected numbers and shares of internal climate migrants by 2050 under three scenarios, Mexico and Central America**

| Scenario  |                       |       |                            |       |                       |       |
|---|-----------------------|-------|----------------------------|-------|-----------------------|-------|
| Subregion   | Pessimistic reference |       | More inclusive development |       | More climate-friendly |       |
| Mexico and Central America                                    |                       |       |                            |       |                       |       |
| Average number of internal climate migrants by 2050 (million) | 2.1                   |       | 1.4                        |       | 1.7                   |       |
| Minimum (left) and Maximum (right) (million)                  | 0.3                   | 3.9   | 0.5                        | 2.4   | 0.2                   | 3.3   |
| Internal climate migrants as percent of population            | 1.03%                 |       | 0.68%                      |       | 0.85%                 |       |
| Minimum (left) and Maximum (right)                            | 0.17%                 | 1.90% | 0.22%                      | 1.14% | 0.09%                 | 1.61% |

and Central America are expected to reach an average of 1.4–2.1 million by 2050 (Figure 2). Numbers are highest under the pessimistic reference scenario, reaching up to 3.9 million and accounting for about 1.9 percent of the subregion’s population by 2050. Under the more climate-friendly scenario, numbers are cut down to 1.7 million on average, while under the more inclusive development scenario, they are reduced to 1.4 million on average. There is a significant range around the average estimates in Mexico and Central America—from a low of 0.2 million to a high of 3.9 million—because of the heterogeneity in development levels between Mexico and the rest of the subregion.

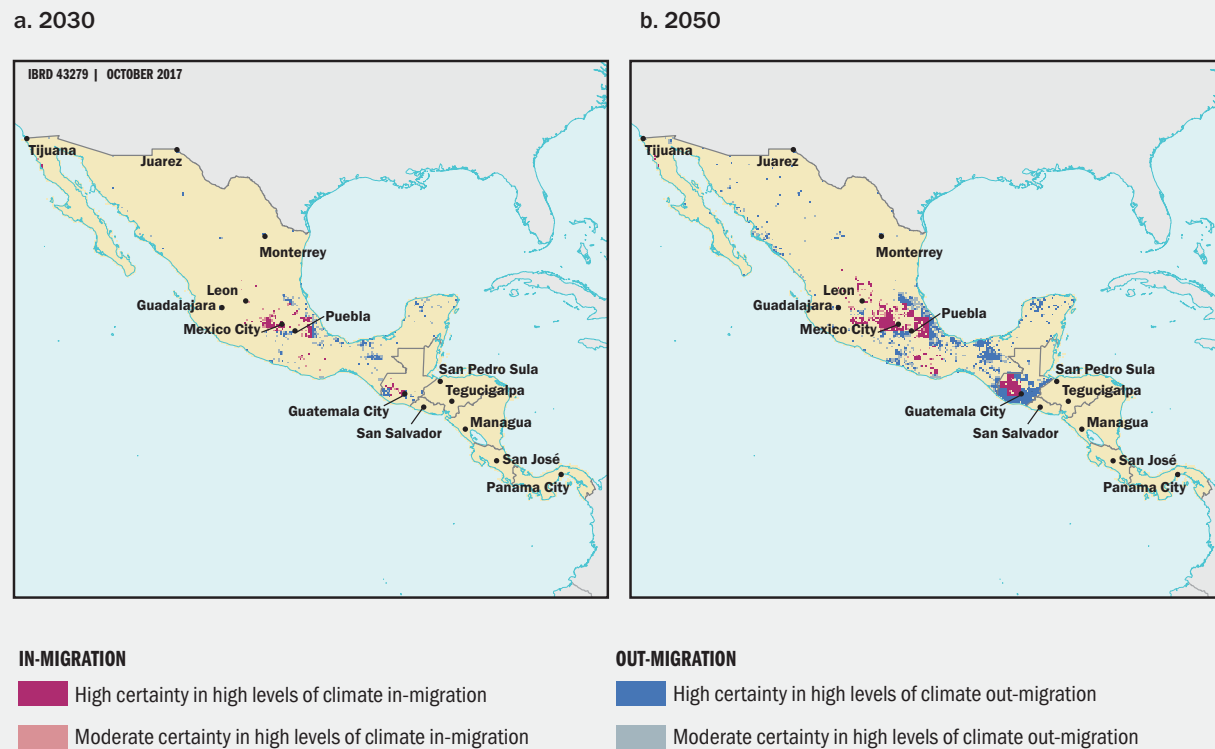
Climate migration will not occur in isolation, and the subregion will also see a marked increase in the number of other internal migrants driven by economic, social, or environmental reasons. Climate migrants as a share of all internal migrants are projected to increase across all scenarios.

**Figure 2: Projected number of internal climate migrants in Mexico and Central America under three scenarios**



Internal climate migration may well ramp up in the second half of the century under the pessimistic reference scenario due to stronger climate impacts combined with steep population growth. 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 and extreme climate impacts on water availability and crop productivity in general, which will have significant ramifications for population movements. In Mexico

**Figure 3: Hotspots projected to have high levels of climate in-migration and climate out-migration in Mexico and Central America, 2030 and 2050**



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

and Central America, for instance, the viability of landscapes to sustain certain crops and livelihoods is projected to fall steeply in large areas under high emissions pathways.

The report's results represent conservative estimates of the likely overall impact of climate change on migration. As noted earlier, the analysis is limited to climate migration within countries in three regions and has a focus on slow-onset climate impacts.

### Hotspots of climate in- and out-migration reflect the vulnerabilities of ecosystems and livelihoods

Spatial development is climate-sensitive, and its location will matter critically in the future. Climate out-migration 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. In Mexico and Central America, rainfed croplands are likely to see climate out-migration, especially under the pessimistic reference scenario. This may be due to the increasing agricultural marginality of these areas, particularly in mountainous zones. In contrast, dense settlements and pastoral and rangeland areas may see climate in-migration. This will potentially lead to spatially concentrated climate migration hotspots (Figure 3).

Climate out-migration hotspots occur in areas of deteriorating water availability and crop productivity and, in some cases, low-lying coastal lands and cities vulnerable to sea level rise. Climate out-migration often dampens overall population growth in these hotspots rather than causing the population to decrease. Such hotspots include lowland areas along the Gulf of Mexico and the Pacific coast of Guatemala. Even some cities, such as Monterrey and Guadalajara in Mexico, will be out-migration hotspots.

Climate in-migration hotspots will develop in the Central Plateau of Mexico and the highlands of Guatemala. People will leave hotter, lower-lying areas in these two countries and move toward climatically more favorable highland areas.

Major cities located in these highland areas, including Mexico City and Guatemala City, will correspondingly be hotspots of climate in-migration. In Latin America, the urban transition is already in full swing and most movement is thus likely to be urban to urban or urban to peri-urban.

## **USE THE WINDOW OF OPPORTUNITY TO ACT NOW**

Unless concerted climate and development action is taken now, the scale of climate migration will ramp up by 2050, and hotspots of climate in- and out-migration will spread and intensify. These trends will likely accelerate beyond 2050 with worsening climate change.

Action across four major areas could help reduce the number of people forced to move in distress due to climate change:

### **1. Cut greenhouse gases now to reduce climate pressure on people's livelihoods and the associated scale of climate migration**

Rapid reductions in global emissions can reduce the scale of climate migration and movements under distress. Lower global emissions reduce climate pressure on ecosystems and livelihoods and broaden the opportunities for people to stay in place or move under better circumstances. In Latin America, under the more climate-friendly scenario, there would be up to 87 percent less climate migrants—with numbers reduced from a high of 17.1 million under the pessimistic reference scenario to 2.2–9.4 million under this scenario.

Stringent global climate action would be needed to adhere to the UN's Paris Agreement and limit future temperature increases to less than 2°C by the end of this century, close to the more climate-friendly scenario in this report. Comprehensive mitigation policies to reduce emissions should include carbon pricing, urban and land use planning, and innovations in performance standards. Mitigation policies must be inclusive and pro-poor—building on co-benefits and no-regrets options, while also guarding against potential blowback of mitigation measures.

### **2. Pursue inclusive and climate-resilient development policies together with targeted investments to manage the reality of climate migration**

Climate migration demands anticipatory development policies that respond to the scale of the issue over the medium to long term. In an upper-middle-income country like Mexico, sustained development gains and a stronger economy can mean higher adaptive capacity and financial resources to target the most vulnerable areas and groups. In some cases, an economic transition toward sectors that are less sensitive to climate change need to be part of the longer-term solution. These shifts can provide alternative job opportunities for climate migrants and growing populations and help strengthen the resilience of economies. Good management of demographic transitions and investment in human capital can also reduce climate vulnerability.

Targeted interventions can also be deployed in the short and medium term to support migrants. Good practices include facilitating informed migration decisions, making social protection portable and scalable, and tapping the potential of financial and social remittances.

### 3. Embed climate migration in development planning

There is an urgent need for countries to integrate climate migration into national development plans and all facets of policy. Most regions have poorly prepared laws, policies, and strategies to deal with people moving from areas of increasing climate risk into areas that may already be heavily populated.

Development frameworks will also need to consider migration along each phase of its life cycle (before, during, and after moving). Securing resilience means:

- *Adapt in place - help communities stay in place where local adaptation options are viable and sensible.* Components of successful local adaptation include: investing in climate-smart infrastructure, diversifying income-generating activities, and building responsive financial protection systems for vulnerable groups, including women.
- *Enable mobility - for people who need to move away from unavoidable climate risks.* When the limits of local adaptation and viability of ecosystems are reached, governments should facilitate safe, orderly, and dignified migration (or, as a last resort, planned relocation) toward areas of lower risk and higher opportunity by providing skills training, information, and legal support.
- *After migration - ensure that sending and receiving areas, and their people, are well connected and adequately prepared.* Policy makers should develop and implement migration preparedness plans for the immediate and longer-term population growth from migration. Such plans should include viable livelihood opportunities, skills training, critical infrastructure and services, registration systems for migrants (to access services and labor markets), and the inclusion of migrants in planning and decision making. Growing peri-urban and suburban areas in Mexico and Central America for example, will need to increase the provision of housing, transportation, social services, and employment opportunities.

### 4. Invest now to improve understanding of internal climate migration

More investment is needed to better contextualize and understand climate migration, particularly at scales ranging from regional to local, where climate impacts may deviate from the broader trends identified in a global-scale analysis. In many cases, a richer, more detailed set of climate, biophysical, socioeconomic, and political indicators is available at regional, national, and local levels. There are inherent uncertainties in the way climate impacts will play out in a given locale and this will affect the magnitude and pattern of climate change-induced movements. Over time, as more data become available on climate change and its likely impacts on water availability, crop productivity, and sea level rise, the scenarios and models would need to be updated. Increasing the modeling resolution and improving data inputs to produce more spatially-detailed projections are among the possible future applications of the approach used in this report.

Building country-level capacity to collect and monitor relevant data can increase understanding of the interactions among climate impacts, ecosystems, livelihoods, and mobility and help countries tailor policy, planning, and investment decisions. Including climate-related and migration questions in national census and existing surveys is a cost-effective way to advance understanding. Decision-making techniques under deep uncertainty need to be further developed and applied for policy making and development planning. Evidence-based research, complemented by country-level modeling is vital. In support of this, new data sources—including from satellite imagery and mobile phones—combined with advances in climate information can be beneficial to improving the quality of information about internal migration. In all of these efforts, the privacy of personal data needs to be protected.



## CONCLUSION

The *Groundswell* report helps to put a human face on the growing development issue of people being forced to move under distress to escape the long-term impacts of climate change. Internal climate migration may be a reality, but it does not have to become a crisis, if concerted and targeted action is taken now to better predict and prepare for its likely effects and to harness its potential as an adaptation strategy. All actors—global, national, and local, in the private sector, civil society, and international organizations—should use the window of opportunity to invest in knowledge, mitigation, and adaptation and take steps now to secure resilience for all.

