



# GROUNDSWELL

Preparing for Internal Climate Migration

**POLICY NOTE #2**

## Internal Climate Migration in South Asia

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 South Asia, “internal climate migrants” could number over 40 million, representing up to 1.8 percent of the region’s total population. Climate migrants are projected to increase by a factor of six between 2020 and 2050, and the share of climate migrants in all internal migrants could reach as high as 25 percent in the subregion. 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 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 results also indicate that future trajectories of climate migration are not set in stone.

Climate migration in South Asia 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 #2 is the second in a series of three notes drawn from the Groundswell report. It provides an overview of results and their implications for South Asia, 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 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.

## SOUTH ASIA IS PARTICULARLY SENSITIVE TO CLIMATE VARIABILITY AND CHANGE

With 1.9 billion people in 2017, South Asia is the most populous of the three subregions of focus in this report. The population is projected to increase by 25 percent to about 2.3 billion by 2050, presenting challenges for both rural livelihoods and urban areas.

The high dependency on rainfed agriculture makes the population of South Asia particularly sensitive to climate variability and change. Late-onset or failed summer monsoons (the predominant feature of the climate system in South Asia) and other climate hazards have large impacts on farming households. An increasing number of households send at least one member to urban areas. Significant levels of rural to urban migration can be attributed to the impacts of droughts and floods on agricultural production. Some studies suggest that South Asia will have the largest numbers of food-insecure people by 2050.

In terms of future climate trends, there is medium confidence in an increase in summer monsoon precipitation in South Asia. More rainfall is also likely in higher latitudes, while rainfall variability both within the rainy season and between years is projected to increase.

The subregion also already experiences natural hazards such as glacial-lake outburst floods, storm surges, droughts, cyclones, and heavy precipitation. Associated disasters displace hundreds of thousands of people every year, regularly making South Asia one of regions with the largest numbers of people displaced in this way.

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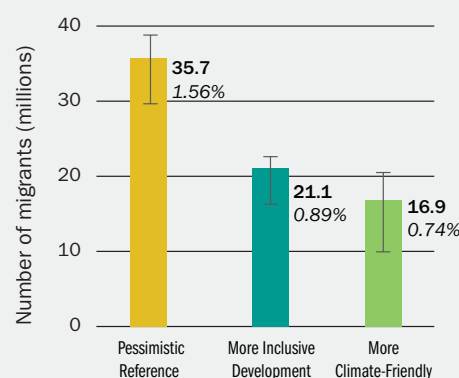
1 Kumari Rigaud, Kanta, Alex de Sherbinin, Bryan Jones, Jonas Bergmann, Viviane Clement, Kayly Ober, Jacob Schewe, Susana Adamo, Brent McCusker, Silke Heuser, and Amelia Midgley. 2018. *Groundswell: Preparing for Internal Climate Migration*. Washington, DC: The World Bank.

## THE SUBREGION COULD SEE UP TO 40.5 MILLION CLIMATE MIGRANTS BY 2050

Under all three scenarios, internal climate migration due to lower water availability and crop productivity alongside rising sea level and storm surges will increase in South Asia. By 2050, the projected total number of internal climate migrants could be as high as 40.5 million or 1.8 percent of the subregion's total population (Table 1). These highest numbers in the pessimistic reference scenario are cut down to 21.1 million and 16.9 million on average in the more inclusive development and more climate-friendly scenarios, respectively (Figure 1). These lower numbers suggest positive effects of better development policies and lower global emissions but are still significant nevertheless.

Climate migration will occur in a context of already high internal mobility and burgeoning populations. Bangladesh which is very densely populated, and is highly exposed to climate risks accounts for up to 13.3 million climate migrants in the pessimistic reference scenario, more than one-third of the sub-regional total.

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



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

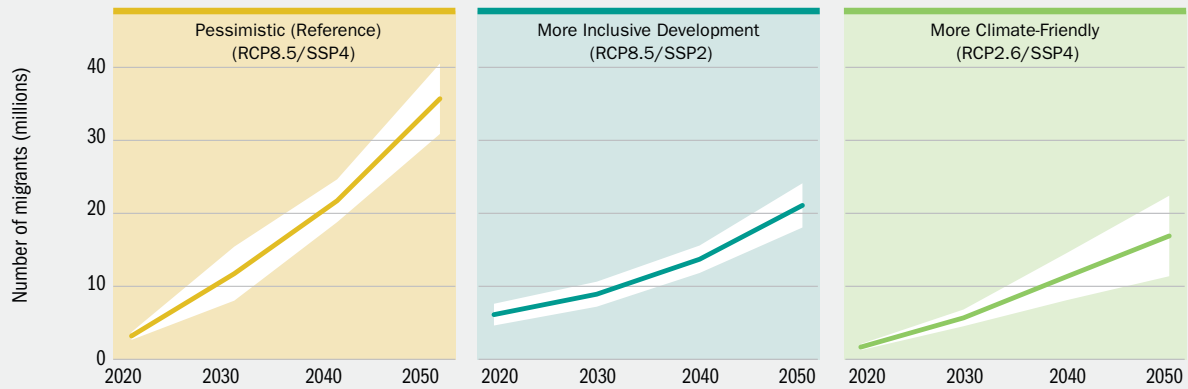
**Table 1: Projected numbers and shares of internal climate migrants by 2050 under three scenarios, South Asia**

Subregion	Scenario					
	Pessimistic reference		More inclusive development		More climate-friendly	
<i>South Asia</i>						
Average number of internal climate migrants by 2050 (million)	35.7 million		21.1 million		16.9 million	
Minimum (left) and Maximum (right)	30.9 mn	40.5 mn	18.1 mn	24.1 mn	11.4 mn	22.4 mn
Internal climate migrants as percent of population	1.56%		0.89%		0.74%	
Minimum (left) and Maximum (right)	1.35%	1.77%	0.76%	1.02%	0.50%	0.98%

## CLIMATE MIGRATION COULD RISE BY A FACTOR OF SIX BETWEEN 2020 AND 2050

The increase in the number of climate migrants over time is most pronounced in the pessimistic reference scenario. Here, climate migrants are projected to increase by a factor of six between 2020 and 2050 (Figure 2). The more inclusive development and the more climate-friendly scenarios show slower rates of increase. These findings indicate an opportunity to prepare for and address the potential scale and magnitude of climate migrants, particularly for a climate-vulnerable countries like Bangladesh. It also reinforces the idea that a low-emissions development pathway may help stabilize or at least slow increases in pressures on people's livelihoods and the ensuing rate of climate migration.

**Figure 2: Projected number of internal climate migrants in South Asia under three scenarios, 2020–50**



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.

Climate migration will not occur in isolation, and the subregion will also see a sharp rise in the number of other internal migrants driven by economic, social, or environmental reasons. The share of climate migrants in all internal migrants is projected to increase across all scenarios, with the largest shares occurring under the pessimistic reference scenario. In Bangladesh, this share is above 50 percent under this scenario, a reflection of its high climate vulnerability. The share of climate migrants under the more inclusive development and more climate-friendly scenarios are lower.

Internal climate migration may well intensify 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 South Asia, 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. Livelihood zones in South Asia are dominated by rainfed croplands. The subregion is likely to see strong climate in-migration to these areas, particularly under the pessimistic reference scenario. In contrast, dense settlements, irrigated areas, and rice-growing areas may see relatively strong climate out-migration. This will potentially lead to spatially concentrated climate migration hotspots in South Asia (Figure 3).

Climate out-migration hotspots occur in areas of deteriorating water availability and crop productivity. Climate out-migration often dampens overall population growth in these hotspots rather than causing the population to decrease. These include the northern part of the Gangetic Plain as well as some areas of the broader Gangetic Plain and the corridor from Delhi to Lahore. In Bangladesh, movement will come from the rice-growing areas of the northeast.

Out-migration hotspots also comprise low-lying lands and cities and coastlines vulnerable to sea level rise and storm surge impacts, though urban areas will continue to support large and growing numbers of people. This dampening effect may be seen in major coastal metropolitan areas, such as parts of Mumbai, Dhaka, Chittagong, and Chennai. For example, parts of Mumbai, a low-lying city vulnerable to cyclones and heavy flooding, may become less hospitable, especially under a high emissions pathway, which projects a two-meter sea level rise by 2050.

In contrast, other major South Asian cities may become hotspots of climate in-migration. Declining crop productivity coupled with existing rural to urban migration pathways means a high likelihood of movement toward non-climate-related sources of income and cities such as Hyderabad and parts of Karachi. Rural to urban migration will generally remain strong. The urban population is projected to grow from roughly 150 million in 2010 to 264 million under a more inclusive development pathway and 325 million under a more unequal development pathway.

Owing to improved water availability and crop productivity, many of India's regions, especially in the south, and the Gangetic plain in western Bangladesh, will also be in-migration hotspots.

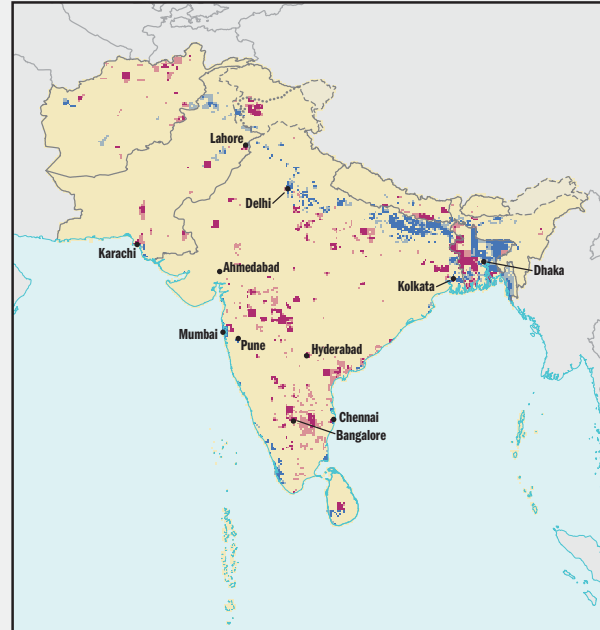
Several hotspots of climate in- and out-migration are in transboundary areas. They include parts of Nepal, as well as parts of western Bangladesh, along the border with India. Although this study does not focus on international movements, internal migration does not necessarily stop short at borders. The potential agglomerations around border areas must be explored for their opportunities and managed for their challenges.



**Figure 3: Hotspots projected to have high levels of climate in-migration and climate out-migration in South Asia, 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.



Photo Credit: Shutterstock

## 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 South Asia, under the more climate-friendly scenario, there would be up to 72 percent less climate migrants - with numbers reduced from a high of 40.5 million under the pessimistic reference scenario to 11.4–22.4 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 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. Consultations in Bangladesh show for example that education for girls is considered a premium investment yielding multiplier benefits. These transitions need to be accompanied by policies to absorb larger working-age populations into productive and climate-resilient labor markets—and to ensure that they have good access to health care, employment, and education.

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. Issues of mobility should be included in longer-term planning with an eye toward transformative end-points, such as Bangladesh's *Perspective Plan for 2041*.

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.

### 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.