



GROUNDSWELL

Preparing for Internal Climate Migration

POLICY NOTE #1

Internal Climate Migration in Sub-Saharan Africa

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 three 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 Sub-Saharan Africa, “internal climate migrants” could number over 85 million, representing up to four 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 Sub-Saharan Africa 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 #1 is the first in a series of three notes drawn from the Groundswell report. It provides an overview of results and their implications for Sub-Saharan Africa, 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.

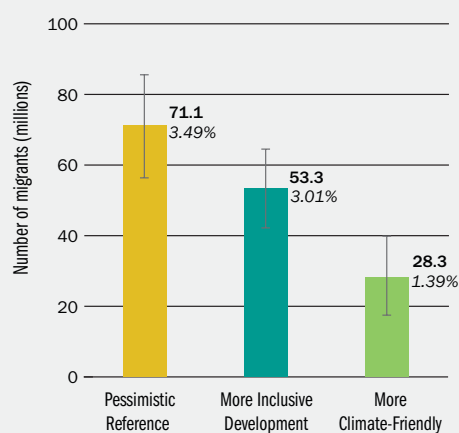
The objective of the *Groundswell* report¹, and the modeling applied, is to provide policymakers with a way to better understand and plan for the likely movement of people within their countries—over time and across different geographies—due to slow-onset climate change impacts. These include impacts 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.

SUB-SAHARAN AFRICA COULD SEE TENS OF MILLIONS OF INTERNAL CLIMATE MIGRANTS BY 2050

Internal climate migration will increase in Sub-Saharan Africa under all three scenarios due to lower water availability and crop productivity alongside rising sea level and storm surges (Figure 1). By 2050, the projected total number of potential internal climate migrants could be as high as 85.7 million or four percent of the region’s total population under the pessimistic reference scenario,² more than in South Asia and Latin America (the other regions of focus in the *Groundswell* report). Two factors may be driving this. First, Sub-Saharan Africa is highly vulnerable to climate

Figure 1: Projected total numbers and shares of internal climate migrants in Sub-Saharan Africa 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.
2. Averages for subregions for the three scenarios (Pessimistic Reference – More Inclusive Development – More Climate-Friendly) are as follows: East Africa (10.1 million, 9.2 million, 6.9 million); West Africa (54.4 million, 38.4 million, 17.9 million); Central Africa (5.1 million, 4.3 million, 2.6 million); Southern Africa (1.5 million, 1.5 million, 0.9 million).

impacts, especially in already fragile drylands and along exposed coastlines. Second, the region’s agriculture sector, which employs a significant portion of the labor force, depends on rainfall for almost all its crop production.

Under the more inclusive development scenario, internal climate migrants number 53.3 million on average. In this scenario, challenges to adaptation and factors closely intertwined with migration, such as population growth and urbanization, play out more moderately. The more climate-friendly scenario has the fewest internal climate migrants with 28.3 million on average. Here, large gains in sustaining livelihoods that help people stay in place come from investing in stringent mitigation measures that reduce emissions globally, coupled with adaptation policies.

The example of the East Africa 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 Ethiopia.

SPOTLIGHT ON EAST AFRICA

Dependency on agriculture—especially rainfed agriculture—is high in East Africa and suggests a high degree of sensitivity to climate variability and change. Livelihood systems are reasonably well adapted to rainfall variability, but rising temperatures and extremes are putting stress on water availability and cropping systems. Given projected increases in temperature in East Africa, even modest increases in rainfall are likely to be offset by increases in potential evapotranspiration, rendering much of the region hotter and drier. Climate variability, and particularly drought in dryland areas, has been a common driver of migration in the region. As a result of conflict and major droughts, the region has also had a history of internal displacement and refugee flows.

Climate migration will ramp up in the coming decades and the East Africa subregion could see up to 12.1 million climate migrants by 2050

In 2017, the population of East Africa was 422 million. Population growth under both moderate and unequal development scenarios will be rapid across the subregion, resulting in 675 million and 786 million people by 2050, respectively. This growth creates challenges for development that will be magnified by the future impacts of climate change. Past rapid population growth has contributed not only to land fragmentation, which has spurred rural to urban migration, but also to rapid urbanization, as well as pressures on natural resources and institutions. Future internal climate migration will occur in this context of already high internal mobility and burgeoning populations.

In East Africa, between 2020 and 2050, the number of internal climate migrants is projected to increase by a factor of three (Figure 2). Overall, East Africa could see an average of 10.1 million climate migrants by 2050 under the pessimistic reference scenario, with numbers steadily increasing from 2.6 million in 2020. The share of climate migrants in the population is projected to rise from 0.6 percent to 1.3 percent in the same period (Table 1). The more climate-friendly scenario has lower numbers of climate migrants. Under this scenario, climate migrants rise from 1.8 million in 2020 to 6.9 million in 2050 on average. The

Table 1: Projected numbers and shares of internal climate migrants by 2050 under three scenarios, East Africa

Subregion	Scenario					
	Pessimistic reference		More inclusive development		More climate-friendly	
<i>East Africa</i>						
Average number of internal climate migrants by 2050 (million)	10.1		9.2		6.9	
Minimum (left) and Maximum (right) (million)	8.1	12.1	7.2	11.2	4.3	9.3
Internal climate migrants as percent of population	1.28%		1.37%		0.87%	
Minimum (left) and Maximum (right)	1.03%	1.54%	1.07%	1.66%	0.56%	1.19%

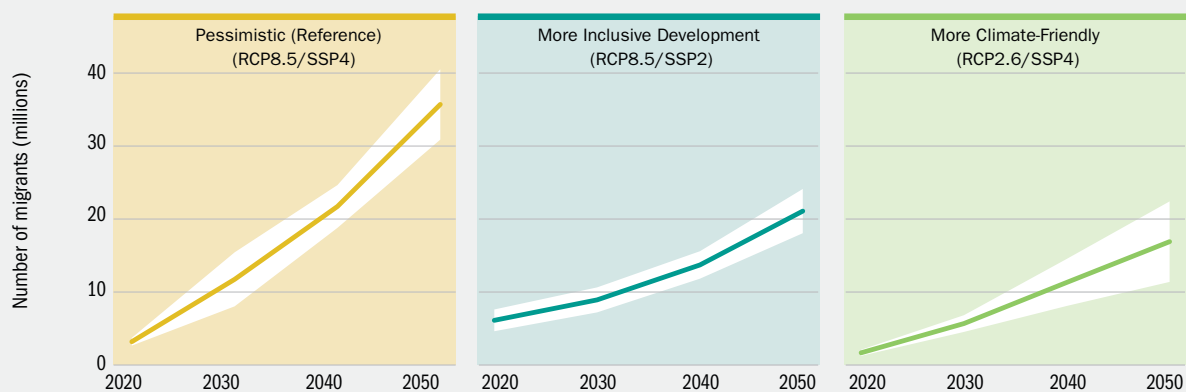
subregion will also see a sharp rise in the number of other internal migrants driven by economic, social, political, or environmental reasons. Climate migrants as a share of total internal migrants will increase across the scenarios albeit at slower pace—representing 11-15 percent of total internal migrants by 2050.

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 movement. It should be noted that climate projections for East Africa are highly uncertain, in part because the projections of future precipitation appear to contradict evidence of current drying. Water availability is not markedly worse than for 2010–50, although there may be more variability and more extreme rainfall events. However, crop productivity projections are significantly worse, with large areas of the subregion seeing steep declines.

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

Figure 2: Projected numbers of internal climate migrants in East Africa 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.

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 East Africa, rainfed croplands are likely to see climate out-migration. In contrast, pastoral and rangeland areas, as well as semi-natural and wildland areas may see climate in-migration owing to improved water availability, if the projections for rainfall patterns in East Africa hold true despite uncertainty. This will potentially lead to spatially concentrated climate migration hotspots.

In East Africa, 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. Such hotspots include northern parts of the Ethiopian highlands, parts of western Uganda, southern Rwanda, and southern Malawi (Figure 3). Even Addis Ababa, Ethiopia's largest city, could see slower population growth due to its reliance on increasingly unpredictable rainfall. Coastal zones, namely large swaths of coastal Kenya and Tanzania, could also experience out-migration, owing to the combined impacts of sea level rise and declining water availability. This includes the coastal city of Dar es Salaam, although this urban area will continue to support large and growing numbers of people.

In contrast, other major East African cities may become hotspots of climate in-migration. Declining crop productivity, coupled with existing rural to urban migration trends, means a high likelihood of movement toward non-climate-related sources of income and cities such as Kampala, Nairobi, and Lilongwe. Under all three scenarios, cities in East Africa will potentially face significant challenges because of population growth, even before climate change is taken into account. The urban population is projected to roughly quadruple, from 100 million in 2010 to 350 million in 2050 under the more inclusive development scenario and to more than 450 million under the pessimistic reference and more climate-friendly scenarios. Over 50 percent of the subregion's population will be urban under all scenarios, up from the current average of 27 percent.

The southeastern highlands of Ethiopia will also be an in-migration hotspot. Increasing population in these already densely populated and mostly semi-arid to arid areas will thus require strong adaptation interventions in rangeland management to ensure sustainability.

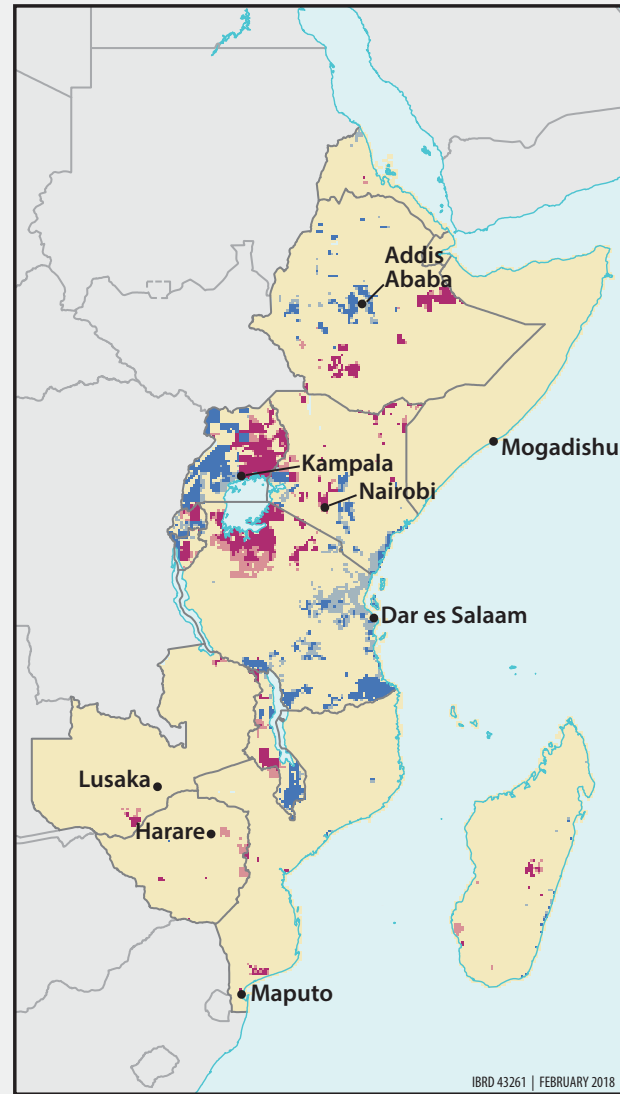
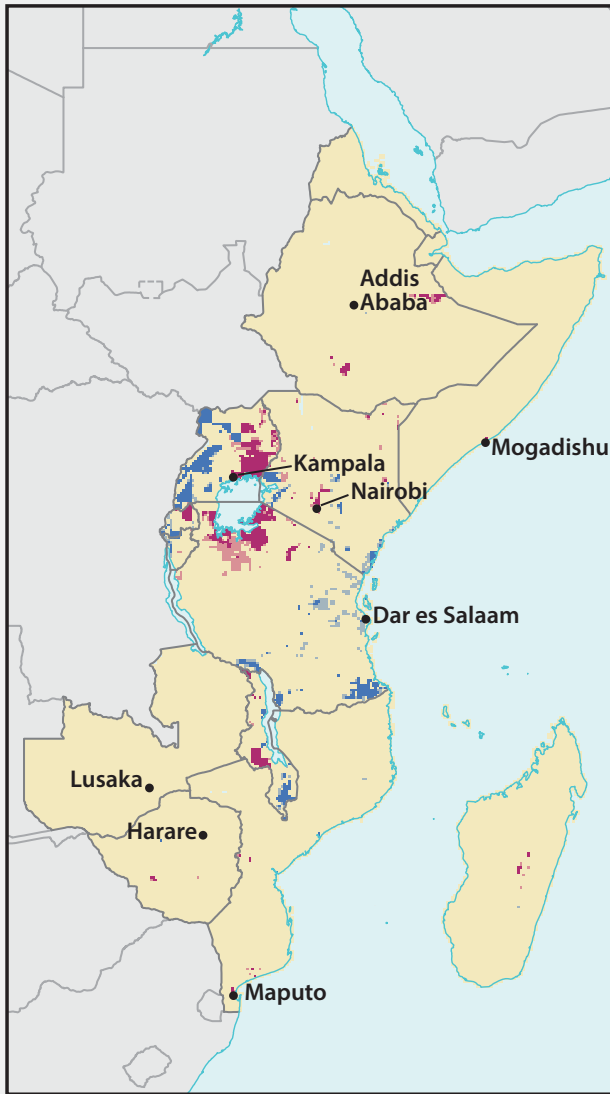
Several hotspots of climate in-migration are located in transboundary areas, including the Lake Victoria Basin. Although this study does not focus on international movements, in many areas migrants routinely cross borders, especially when droughts, crises, and conflicts hit. Climate change can be an inhibitor or a driver of cross-border migration, depending on a range of factors that propel individuals to decide to move. 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 East Africa, 2030 and 2050

a. 2030

b. 2050



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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.

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 Sub-Saharan Africa, under the more climate-friendly scenario, there would be up to 80 percent less climate migrants—with numbers reduced from a high of 85.7 million under the pessimistic reference scenario to 17.4–39.9 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. This is particularly important for low-income countries with high population growth, such as Ethiopia, where the more inclusive development scenario yields the lowest and most stable numbers of climate migrants. In some cases, an economic transition toward sectors that are less sensitive to climate change need to be part of the longer-term solution. In Ethiopia, for example, population is projected to grow rapidly by 60–85 percent by 2050. In addition, reliance on rainfed agriculture makes rural livelihoods especially vulnerable to climate change. This suggests a need for the country to diversify its economy and pursue climate-smart and inclusive growth in order to secure development gains. 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. Examples from the region include Ethiopia's Productive Safety Net Programme, which provides cash transfers to vulnerable households through public works projects that build community productive assets.
- *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. In particular, secondary cities have an increasing role to play as growth poles that can support large, active domestic markets and focus areas for tertiary manufacturing, while also strengthening rural to urban linkages by providing access to markets. 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.