

GROUNDWELL AFRICA

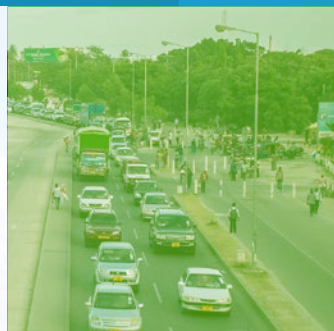
INTERNAL CLIMATE MIGRATION IN THE LAKE VICTORIA BASIN COUNTRIES

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INTERNAL CLIMATE MIGRATION IN THE LAKE VICTORIA BASIN COUNTRIES

EXECUTIVE SUMMARY

Acknowledgments

This report was developed by the World Bank's Environment Global Practice as part of a knowledge activity on internal climate migration under the leadership and counsel of Mark R. Lundell, Regional Director, Sustainable Development, Eastern and Southern Africa, and Simeon K. Ehui, Regional Director, Sustainable Development, West and Central Africa. The work was led by Kanta Kumari Rigaud, Lead Environmental Specialist, and David Maleki, Environmental Specialist. Strategic guidance and support from Iain G. Shuker, Manager, was instrumental to the delivery of the report. Maria Sarraf, Ruxandra Maria Floroiu, and Sanjay Srivastava provided guidance at key stages. Benoit Bosquet provided guidance at the outset.

This report was led by Kanta Kumari Rigaud and David Maleki (World Bank) with a core team comprised of Alex de Sherbinin, Susana Adamo, Tricia Chai-Onn, Briar Mills (Center for International Earth Science Information Network CIESIN), Bryan Jones (City University of New York CUNY), Anmol Arora and Anna Taeko Casals Fernandez (World Bank). Anne-Laure White (CIESIN), Analia Calcopietro, Ena Loureiro, Esther Bea, and Yesmeana N. Butler (World Bank) provided support throughout the project.

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The team is grateful to the authors of several background papers that informed the research. Francois Gemenne contributed a policy paper that provided an overview of frameworks and options to shape current and long-term policy responses in West and East Africa. Duygu Cicek worked with her colleagues in the World Bank’s Legal Department—Manush Hristov and Markus Pohlman—to provide a review of relevant legal frameworks and processes as inputs to the report. A portfolio review prepared by Kanta Kumari Rigaud, Silke Heuser, Nathalie E. Abu-Ata, and Anmol Arora provided insights on operational experiences and lessons learned from World Bank projects at the climate-migration-development nexus.

The report benefited from a virtual consultation in February 2021 with stakeholders from civil society, government institutions, and academia, as well as regional and international organizations and donors. Participants included representatives from Burundi, Kenya, Tanzania, as well as the African Union, GIZ, the Intergovernmental Authority on Development (IGAD), the Internal Displacement Monitoring Centre (IDMC), the International Crisis Group, the International Organization for Migration (IOM), United Cities and Local Governments of Africa (UCLG Africa), the United Nations Development Programme (UNDP), the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), and UN-Habitat.

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Sarah Farhat / World Bank

GROUNDSWELL AFRICA

LAKE VICTORIA BASIN COUNTRIES

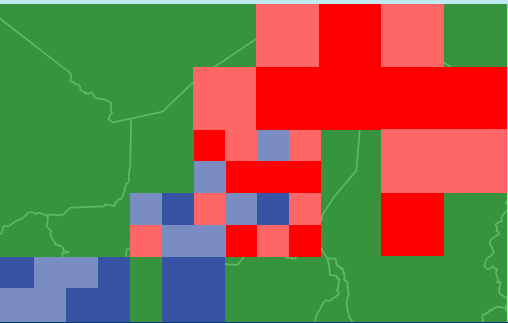


16.6 - 38.5 million

internal climate migrants in the Lake Victoria Basin countries by 2050.

30% reduction

in internal climate migrants across the Basin countries by 2050 with concrete climate and development action.



Climate migration hotspots could emerge as early as 2030

and continue to intensify and expand to 2050

The population migration model and analysis combine climate and nonclimate factors—expanding the Groundswell approach—to better inform policy dialogue and action.



Water availability



Crop productivity



Ecosystem productivity



Sea level rise and storm surge



Conflict



Sex



Flood risk

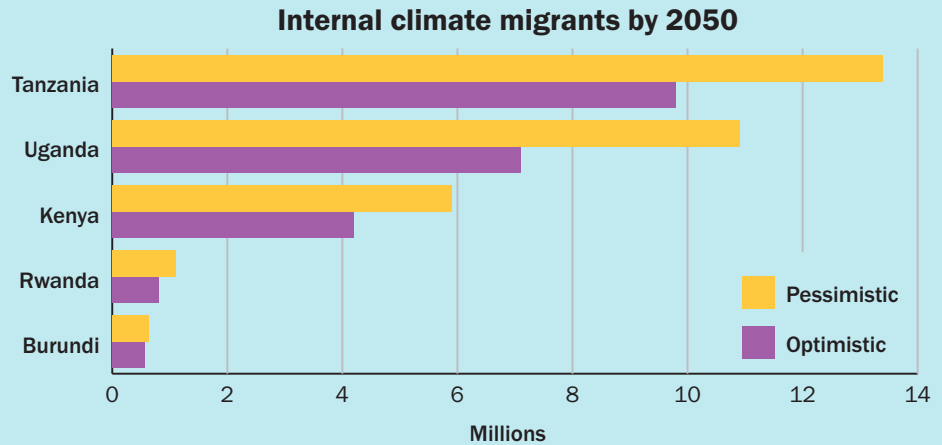


Median age

Locality and context matter

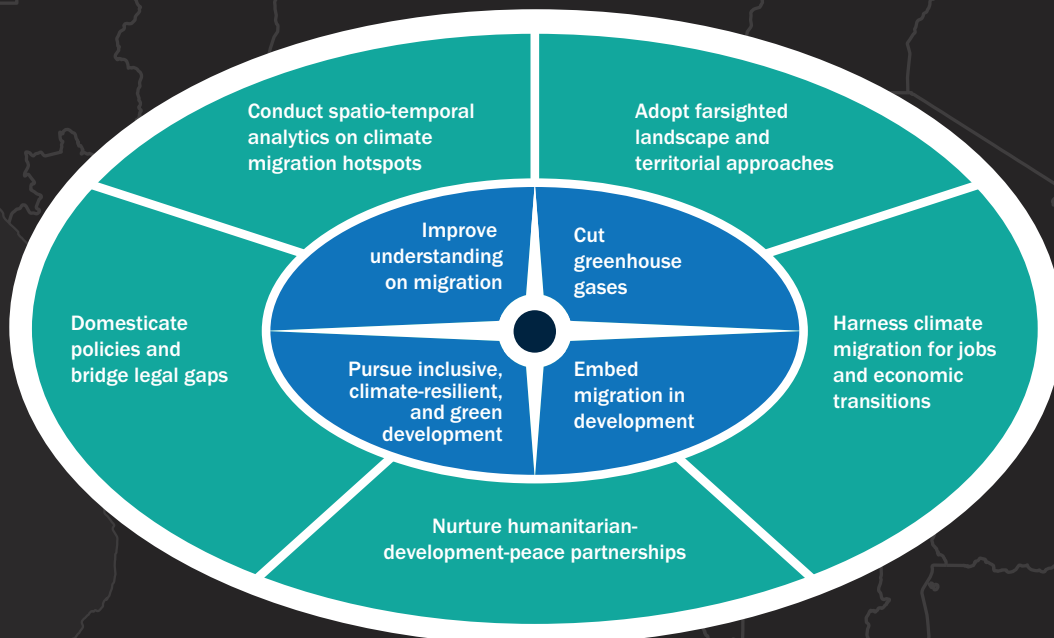
Internal climate migration is not uniform across countries. Some areas will be more adversely impacted by climate change than others.

The optimistic scenario (inclusive development and low emissions) yields lower numbers of internal climate migrants than the pessimistic scenario (high emissions and unequal development).



TAKING RESULTS TO ACTION

Migration and Climate-Informed Solutions (MACS)
Core Policy Areas and **Action Domains**





Scott Wallace / World Bank

Foreword

Amid a drought, a young family in Burundi must decide whether they will be better off staying at their home to farm the family plot or if they take the risk to search for better opportunities elsewhere. Another farmer in Tanzania knows he must leave but is deciding whether to look for other farmland or move to the city in search of new work. In Uganda, a mother that lacks safe drinking water also lacks the money to move and will stay put despite the health risks. In Rwanda, engineers are redesigning city streets to make them less prone to flooding and overcrowding amid an influx of newcomers. These are some of the decisions facing people in the Lake Victoria Basin as climate change impacts communities—decisions that are becoming increasingly common and increasingly critical to get right.



Hafez Ghanem
World Bank Vice President
Africa East and Southern Region

Without broad, urgent action in the Lake Victoria Basin, which extends into five countries—Kenya, Tanzania, Uganda, Burundi, and Rwanda—as many as 38.5 million people could be internally displaced as a consequence of climate change by 2050.

This report builds on the landmark 2018 *Groundswell* report, providing an update on climate migration trends in Lake Victoria Basin and expanding the analysis to provide more detailed information that can better inform policy makers and planners.

The report identifies hotspots where climate migration is expected to be felt most acutely. Communities that struggle to get by will see people leave for greener pastures, cleaner or more abundant water, or less risky settings while communities that fare relatively well will see people arrive, putting pressure on limited resources and job opportunities. And amid these seismic shifts, those in living in poverty or in fragile or conflict-prone settings are most vulnerable.

Still, the scenarios for climate migration presented in this report are not foregone conclusions—but local, national, and global action is urgently needed to drastically cut greenhouse gas emissions on the one hand and invest in adaptation and resilience on the other hand.

Together, these dual objectives can unlock new opportunities for low-carbon, resilient development that protects communities from the worst effects of climate change and stimulates opportunities for growth and job creation.

The World Bank Group's new Climate Change Action Plan, which complements the Next Generation Africa Climate Business Plan, commits that over the next 5 years, 35 percent of World Bank Group financing will directly contribute to climate action. This commitment will support the countries of the Lake Victoria Basin as they work to address climate change and pursue low-carbon, resilient development pathways.

Together, we can help families make safer, less risky decisions about their future, we can help communities get the services and resources they need to stay healthy, and we can help countries pursue resilient, long-term development—all of which allows people to truly thrive, unlocking new opportunities for innovation and promoting greater equity in development outcomes.

A handwritten signature in black ink, appearing to read 'Hafez Ghanem', written in a cursive style.



Sarah Farhat / World Bank

Executive Summary

MESSAGE 1:

The scale of internal climate migration across all five Lake Victoria Basin countries is projected to increase significantly by 2050, unless we pursue urgent and concrete climate and development focused action.

The Lake Victoria Basin (LVB) is one of the most mobile regions in the world, with a long history of trade, nomadic pastoralism, and dry season migration for livelihood diversification. Migration (or mobility, more broadly) in the five Basin countries—Burundi, Kenya, Rwanda, Tanzania, and Uganda—is intrinsically linked to the history, traditions, and social fabric. These are embedded in 20th-century colonial legacies and post-independence strategies, which are entrenched in broader geographical and climate characteristics. The Basin contains the largest tropical freshwater lake in the world and has relatively moderate temperatures throughout the year. Climate change stressors, such as change in rainfall patterns, endanger ecological resilience, and affect migration patterns because populations have increased demand for land, food, and hydrological resources.

Migration in the Lake Victoria Basin is driven by various economic, social, religious, political, environmental, and increasing, climate “push and pull” factors. In Rwanda, migration is primarily practiced by the working age group (16 years old and older) and includes both long-term and temporary or circular migration. Urban centers in Tanzania, such as Dar es Salaam, Mwanza, and Arusha, attract migrants because of economic opportunities, availability of land for settlement, and rich natural resources. Uganda, with 1.5 million refugees, is the third biggest refugee-housing country in the world and the largest in Africa. Burundi has a history of conflict displacement, including both refugee flows and internal displacement. Kenya has witnessed rural to urban flows to large and medium cities and nomadism of pastoral groups in the northern regions. Nomadic pastoralists in the Basin depend on favorable climate, and severe droughts have aggravated recurring tensions between farmers and pastoralists. Environmental shocks and climate variability have affected agricultural productivity, which coupled with population pressures, have amplified rural to urban and rural to rural migration patterns across the Basin.

This Lake Victoria Basin study reaffirms the finding on the potency for climate change to drive internal migration (Rigaud et al. 2018; Clement et al. 2021). The results described in this study are based on the application of an enhanced version of the pioneering Groundswell model with a more granular analysis and additional features better placed to inform policy dialogue and action (Box ES.1).

Without concrete climate and development action, the five Lake Victoria Basin countries could see as many as 38.5 million internal climate migrants (10.48 percent of the population) by 2050 as a consequence of slow onset climate impacts (Figure ES.1). This number could be reduced by around 30 percent under the optimistic scenario, which combines low emissions and moderate pathways. People will migrate from areas with lower water availability, declining crop and ecosystem productivity, and from areas affected by sea-level rise compounded by storm surges. No country in the Lake Victoria Basin is immune to internal climate migration, but there are differences among countries depending on their demographic, economic, and climate trends (Figure ES.2). Tanzania and Uganda are projected to have the highest numbers of internal climate migrants by 2050, reaching a high of 16.6 million and 12.0 million, respectively, under the pessimistic scenario (which combines high emissions with unequal development pathways). This will be followed by Kenya (7.6 million), Rwanda (1.2 million), and Burundi (1.0 million). A similar pattern emerges when we consider the share of internal climate migrants to total population. Tanzania exhibits the highest percentage under the high end of the pessimistic scenario (13.97 percent), followed by Uganda (10.72 percent) and Kenya (8.29 percent).

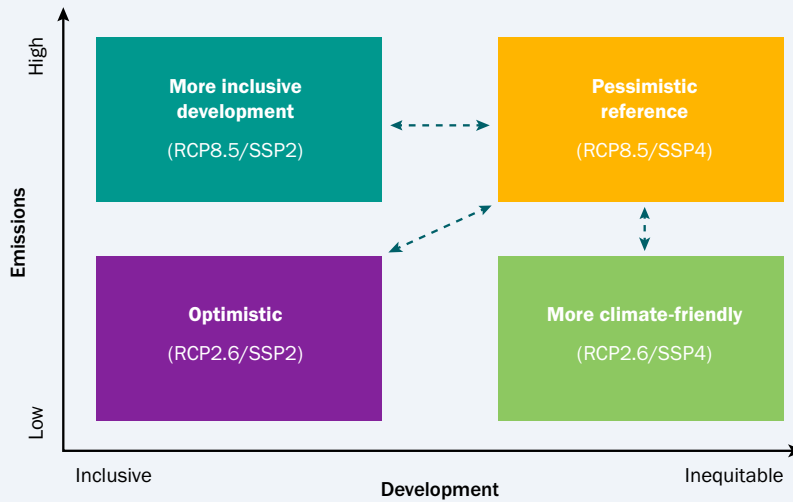


Box ES.1: An Enhanced Groundswell Model

The results described in this study are based on the application of an enhanced version of the pioneering Groundswell model (Rigaud et. al. 2018). The expanded model includes the optimistic scenario, and additional climate (net primary productivity, flood risk) and nonclimate factors as variables.

The modeling results presented here are based on four plausible scenarios—reflecting different combinations of future climate change impacts and development pathways—to characterize the scale and spread of climate migration by 2050.

Projecting Internal Climate Migration under Four Plausible Scenarios

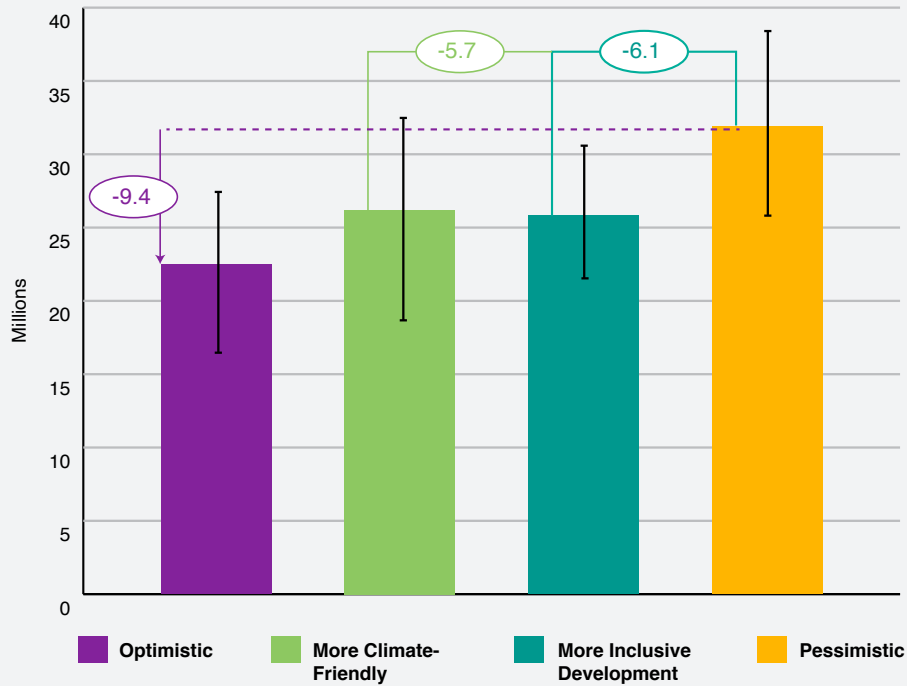


Note:

1. The scenarios are based on combinations of two Shared Socioeconomic Pathways—SSP2 (moderate development) and SSP4 (unequal development)—and two Representative Concentration Pathways—RCP2.6 (low emissions) and RCP8.5 (high emissions).
2. Estimates of climate migrants are derived by comparing these plausible climate migration (RCP-SSP) scenarios with development only (SSP) or the “no climate impact” scenarios

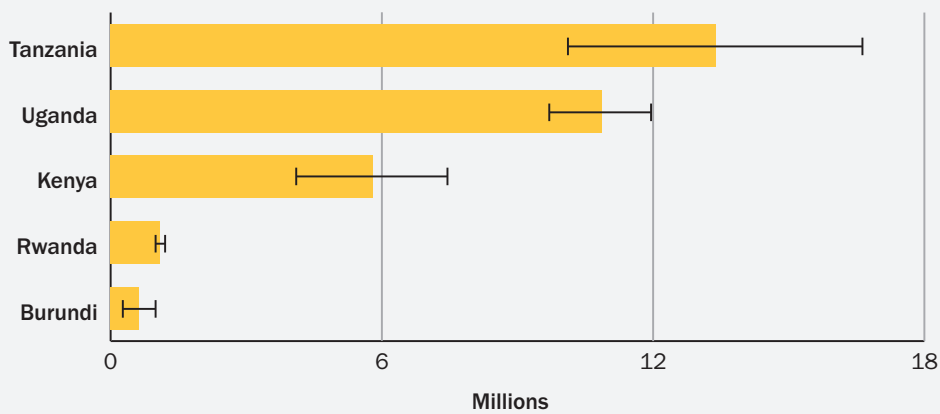
The expanded model provides a more granular analysis better placed to inform policy dialogue and action. To estimate the scale of internal climate migrants a population gravity model was used to isolate the portion of future changes in population distribution that can be attributed to climate change as a proxy for climate migration. To capture the effects of slow onset climate factors on internal migration, the methodology used state of the art simulations for crop, water, net primary productivity (NPP), flood risk models, and sea level rise with storm surge. Non-climate factors were considered, including demographic variables (sex and median age) and conflict. This expanded model was also used to analyze internal climate migration in West African countries (Rigaud et al. 2021a).

Figure ES.1 Projected Total Internal Climate Migrants, Lake Victoria Basin, by 2050



Note: The whiskers represent the lowest and the highest number of internal climate migrants in that scenario.

Figure ES.2 Projected Internal Climate Migrants in Lake Victoria Basin Countries under the Pessimistic Scenario by 2050



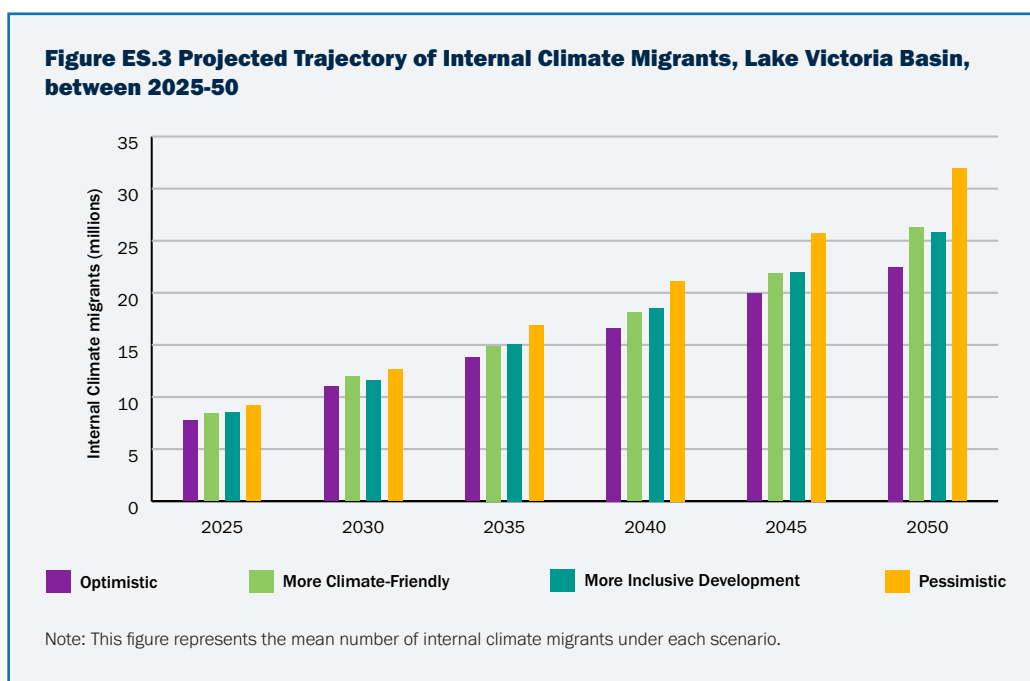
Note: The whiskers represent the lowest and the highest number of internal climate migrants in the pessimistic scenario.

MESSAGE 2:

The trajectory of internal climate migration is not uniform within countries in the Basin, but in all cases, early action can abate the worst impacts.

Internal climate migration in the Basin could increase between 2025 and 2050, but with some variation between scenarios and countries (figure ES.3). There is a consistent upward trend across the scenarios, but the pessimistic scenario shows an acceleration in the rate from 2045-50. The number of internal climate migrants in the Basin could see anywhere from a 2.9-fold increase (under the optimistic scenario) to a 3.5-fold increase (under the pessimistic scenario) between 2025 and 2050. This pessimistic scenario reflects the plausible outcome under continued high emissions and unequal development pathways. Alternative scenarios, which emphasize more inclusive and more climate-friendly pathways, could reduce the scale of internal climate migration.

Similar to the Basin, the trajectory of internal climate migration in Tanzania and Rwanda will be consistently upward trend in all scenarios across decades. In Uganda, the trajectory is more gradual up to 2030 and then increases more rapidly to 2050. In Kenya and Burundi, there is an accelerated upward trend in the last decade of the range, especially under the pessimistic scenario. These differences and the varying levels of certainties around these trajectories mean that internal climate migration will unfold differently in each country, and thus require contextualized responses. For example, Uganda exhibits higher level of confidence across the models for each scenario, compared to the other countries in the Basin.



Climate-induced migration could emerge as an important type of internal migration in the Basin by 2050. At the country level, climate migrants could outpace other internal migrants in Tanzania, Uganda, Kenya, and Burundi as early as 2030 in at least two scenarios, including the pessimistic. Even in Rwanda, climate migrants could constitute more than 75 percent of internal migrants. This underscores the point that climate-induced migration is not a distant policy challenge, but a reality set to increase in the Basin, and early action is key.

Timely and concrete climate and development action taken early on can modulate the scale of future climate-induced human mobility, but the window of opportunity for optimum gains is quickly closing.

The United Nations Intergovernmental Panel on Climate Change (IPCC)'s Sixth Assessment Report (IPCC 2021) highlights the growing nature of the climate crisis and the urgency for action. The latest science on warming and impacts could challenge the prospects of reducing the scale of climate migration under the optimistic scenario. For example, the number of climate migrants in Tanzania might reach up to 16.6 million by 2050 under the pessimistic scenario, but the optimistic scenario, with low emissions and inclusive development, could see a reduction of internal climate migrants of at least 27 percent (or 3.6 million). These projections underscore the need for both inclusive development and low emissions for modulating the scale of climate migration, and the need to pursue highly resilient policies and shifts toward less climate sensitive sectors at scale.

MESSAGE 3:

The emergence of internal climate in- and out-migration hotspots in the Lake Victoria Basin countries as early as 2030—and their convergence with impoverished areas and centers of economic growth—calls for holistic and farsighted approaches to ensure sustainable and durable outcomes.

Climate in- and out-migration hotspots could emerge as early as 2030 and continue to intensify and spread by 2050 (Figure ES.4). These plausible hotspots represent areas where population movements are considered of high certainty across the scenarios modeled. These shifts are a response to the changing viability of ecosystems and landscapes to support livelihoods due to water stress, drops in crop productivity and ecosystem productivity.

Lake Victoria is projected to be a major climate in-migration hotspot as early as 2030. The lake will become more attractive under climate change because of its higher elevation and more stable and plentiful rainfall, compared to semi-arid regions of Uganda, Kenya, and Tanzania. The Ugandan locality of Mbale, Ntungamo, and the capital Kampala, and the northern Tanzanian cities of Mwanza, Magu, and Geita could become high-certainty climate in-migration hotspots near the lake. Kenya could see out-migration immediately surrounding the lake, but in-migration in the area around Eldoret, just to the north of the lake but still within the Lake Victoria Basin. Given these countries' high reliance on fisheries and natural resources of the lake, proactive and collaborative management of its resources across the three countries is essential. Some of the climate in-migration hotspots (e.g. Mwanza in Tanzania) coincide with areas of high poverty. Coupled with increasing population density, these already vulnerable areas have poor infrastructure and basic social services and demand inclusive and participatory climate resilient development and planning.

Other major climate in-migration hotspots could emerge throughout the Basin. The central region of Rwanda close to the capital, Kigali, and in the north by the borders with Uganda and Tanzania, is projected to see climate in-migration by 2050. In Burundi, a high-certainty in-migration hotspot could emerge in the center, including the new capital, Gitega, by 2040. Given that the capitals of these countries are already facing high population growth and rapid urbanization, effective planning and management efforts will be indispensable to preserve growth and development.

Coastal areas could face out-migration due to sea-level rise amplified by storm surge. In Tanzania, coastal urban centers such as Dar es Salaam, and the Kenyan city of Mombasa are projected to see climate out-migration as early as 2030. Climate out-migration does not necessarily imply that populations will decline in these areas, rather that there will be a dampening of the population growth due to climate impacts. Early action to fortify coastal assets through green and gray infrastructure must be optimized through adapt in place options—and policy makers should consider participatory planned relocation as part of longer-term solutions.

Inland localities across the Basin could see climate out-migration by 2050 due to decreases in water availability and crop production. Uganda will have climate out-migration hotspots in the north-west and west central areas around Lake Albert, and Tanzania could see these in the south, north, and east central regions. In Burundi, the former capital, Bujumbura, could see climate out-migration. Focusing on these hotspots and the spatial dimension of the challenge will be pivotal to build resilience and readiness across timescales. See figure ES.4 for projected hotspots for 2030 and 2050.



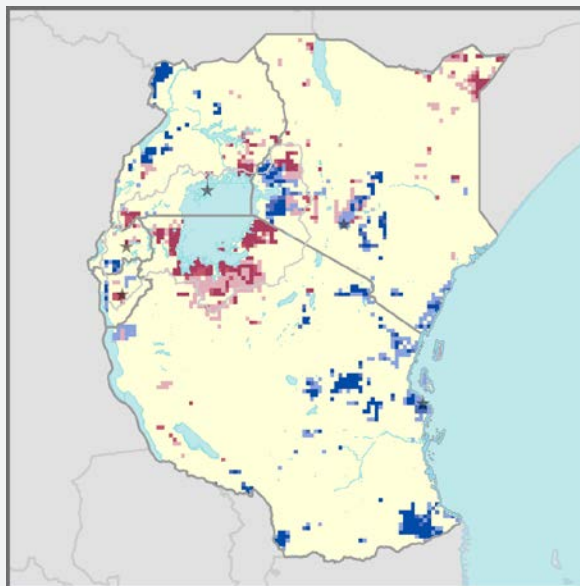
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Figure ES.4: Projected Hotspots of Climate In- and Out-Migration, Lake Victoria Basin, by 2030 and 2050

a. 2030



b. 2050



IN-MIGRATION

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

Note: High, moderate and low certainty reflects agreement across all four, three, and two scenarios modeled respectively. In- and out-migration hotspots are thus areas in which at least two scenarios concur on density changes. Data is based on compilation of Lake Victoria Basin country results between the climate and no climate impact scenarios by country for the top and bottom 5th percentile differences in the density distribution for climate in- and out-migration respectively

Unmanaged, climate migration patterns will not just undermine poverty eradication but can also roll back development gains in cities and centers of growth. Many of these climate in-migration hotspots in the Basin are facing severe environmental challenges due to climate change, including landslides, flooding, drought, and land degradation, on top of other development challenges, such as high poverty rates, informal human settlements, and weak services and infrastructure. Climate in-migration hotspots projected for Tanzania, particularly around Lake Victoria, in cities such as Mwanza, Magu, and Geita, coincide with areas where poverty incidence is the highest. In contrast, climate out-migration hotspots in the east and south include Dar es Salaam, Arusha, Korogwe, Dodoma, and Morogoro, which are centers of economic growth. These trends, in many cases, run counter to the historical development-induced migration. Better management of environmental and fisheries resources and the rural landscapes is an essential part of any strategy to avert the adverse consequences of migration and displacement.

Water stress, crop and NPP losses, and sea level rise are key climate factors that will influence internal climate migration in the Basin countries over the next decades. Generally, areas that see positive deviations in water and crop productivity experience more in-migration, as reflected through spatial population distribution shifts. The coefficient for water availability in rural areas is around 2.8 times higher than that of crop production and 4.7 times that of NPP. The climate impacts will continue to amplify beyond 2050, with some models indicating drying in the south of the Lake Victoria Basin region and a wetting in the north, while others showing mostly a wetting pattern across the region. A number of models show strong declines in crop productivity in northeastern Kenya and in western Tanzania and Uganda. Storm surge and sea level rise could lead to loss of habitable land across coastlines. For example, Tanzania's coastline in the east and south will witness sea-level rise compounded by storm surges, putting people and assets at risk.

As applied to the Lake Victoria Basin countries, non-climate factors, including median age, sex, and conflict, provide a more complete representation of how climate-induced migration trends could manifest. Age and sex composition are not strong influencers of spatial population shifts in the region, and conflict-related fatalities are negatively correlated with population change showing stronger effect in urban areas.

The climate migration hotspots in Lake Victoria Basin countries are not predestined, but the agreement across the scenarios on climate in- and out-migration underscores the need for farsighted and anticipatory approaches to avert, manage, and plan for the consequences of climate-induced migration. These approaches may require adapt in place measures to protect communities and assets and provision of basic services and job opportunities. Managed retreat will need to be facilitated in areas that pose high levels of climate risks to enable and support mobility. Box ES.2 summarizes the results of a virtual consultation with stakeholders of the Lake Victoria Basin countries.

Box ES.2: Regional Consultation on Internal Climate Migration

The report benefited from a regional consultation on internal climate migration with participants from civil society, government institutions, academia, and international bilateral and multilateral organizations (World Bank, unpublished). Several points of consensus aligned with the results of the modeling exercise, including agreement that climate change is an increasingly important driver of migration and displacement in the Lake Victoria Basin countries. Water availability was widely accepted as one of the driving factors of mobility in the region along with the ability of land to support livelihood. The group found the scenarios and climate in- and out-migration hotspots (developed in this study) to be plausible and stressed the importance of preparedness and resiliency. The areas of greater focus that emerged are population dynamics, pastoral communities, and the need to contextualize and localize results. In particular, the consultation pointed out the challenge of land degradation and poverty, which was emphasized in the study.

MESSAGE 4:

Global responsibility for swift action to cut greenhouse gas emissions is critical for significantly reducing the scale of internal climate migration.

Global commitments to cut greenhouse gas (GHG) emissions are off-track to meet the Paris targets.

The latest IPCC report finds that without immediate, rapid, and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C will be beyond reach (IPCC 2021). Beyond the threshold temperatures, extreme events will be on the rise and climate-related risks for natural and human systems are higher, with disproportionate impacts on the poorest and most vulnerable (IPCC 2021; UNEP 2020). Some impacts are already locked-in.

Concerted action at the global level to reduce GHG emission is an imperative to reduce the climate pressures that drive people to migrate. Without aggressive global emission reductions to meet the Paris targets—which are in line with the optimistic and climate-friendly scenarios modeled in this study—the chance to reduce the scale of internal climate migrants will be hard to achieve. The window of opportunity to meet the Paris target is fast closing. The responsibility for solving the challenges of internal climate migration cannot be delegated to the very communities that may have to move in response to increasing intensity and frequency of climate impacts.

Strong, green, resilient, and inclusive development may be the first line of defense in the face of stalling action on GHG emissions but will not suffice by itself. Managing environmental and land degradation, vulnerable coastal systems and pastoral livelihoods is particularly challenging. Major GHG emission countries must find direct and indirect ways to complement countries' efforts on climate-induced migration.

MESSAGE 5:

Internal climate migration in the Lake Victoria Basin is a reality and can be nurtured into a positive force through a proactive and dedicated focus on a core set of policy areas informed by domains of action.

Internal climate migration cannot be divorced from development and as the human face of climate change, it must be addressed in a holistic, end-to-end manner. The Migration and Climate-informed Solutions (MACS) framework (figure ES.5 and box ES.3) brings together domains of action, buttressed by core policy areas, to reduce the scale of climate-induced migration, usher in social and economic transformations, and reduce vulnerabilities. This anticipatory approach will ensure that the economy of the Basin countries is braced not just for the challenges but also the opportunities of internal climate migration.

The core policy areas, as advocated by the Groundswell report, remain critically important:

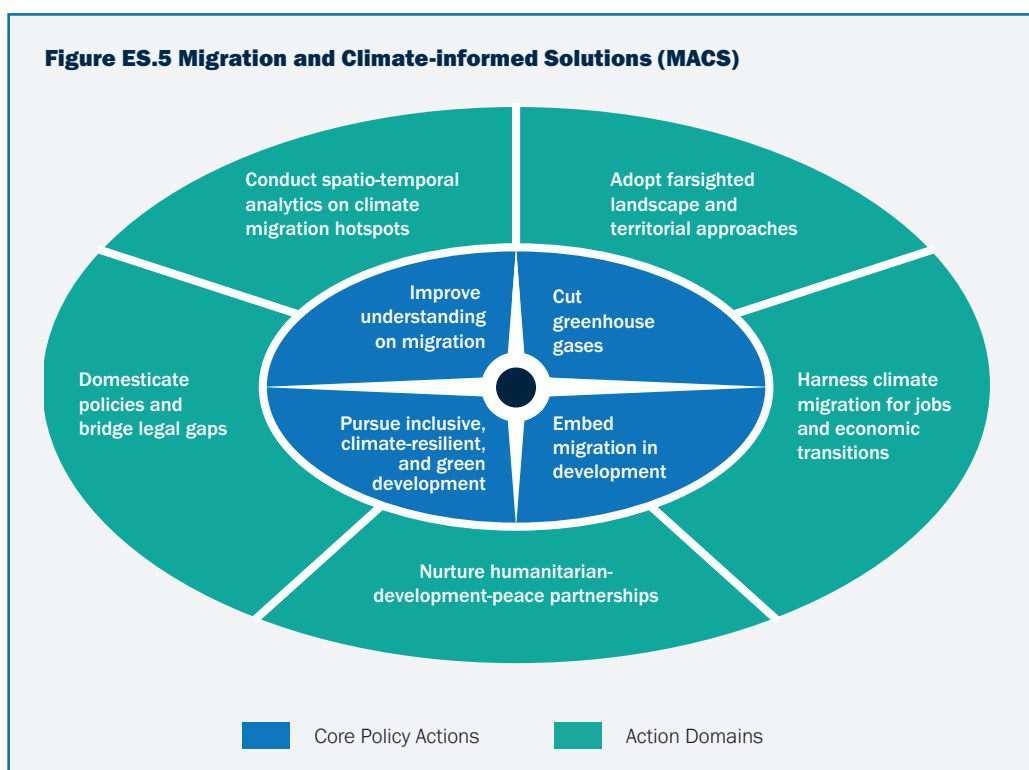
- Cut GHGs now.
- Pursue inclusive, climate-resilient, and green development.
- Embed migration in development planning.
- Invest in an improved understanding of migration.

The diverse context of countries in the Lake Victoria Basin where internal climate migration will play out calls for focused attention and solidarity. It can be guided by these five action domains to avert migration driven by adverse impacts of climate change:

- Conduct spatio-temporal analytics to understand the emergence of climate migration hotspots.
- Adopt farsighted landscape and territorial approaches.
- Harness climate migration for jobs and economic transitions.
- Nurture humanitarian-development-peace partnerships.
- Domestic policies and bridge legal gaps.

Action must be pursued through dedicated local and national action and regional cooperation, as appropriate.

Unfortunately, a certain amount of warming is already locked-in due to historical GHG emissions, so pursuing inclusive and climate-resilient development policies must be a priority. Policies must focus on the full migration life cycle, including creating measures that can support communities to *adapt in place* where local adaptation options are viable and sensible; or *enable mobility* or movement for people facing unavoidable climate risks when the limits of local adaptation and viability of ecosystems are reached. Critically, *after migration*, policy measures and other support must ensure that sending and receiving areas, and their people, are well-connected and adequately prepared to accommodate both outflows and inflows of people for the medium and longer term.



Box ES.3: MACS Framework

The MACS framework is the outcome of the World Bank’s efforts through the Groundswell reports and subsequent deeper dives via Groundswell Africa to better understand the implications of climate-induced migration and mainstream this phenomenon into development plans, programs, and policies. It stems from the result of the abovementioned modeling exercise, contextualized against current and historical mobility patterns, peer reviewed literature, and multi-stakeholder consultations. A portfolio review of the design features of 165 World Bank projects operating at the climate-migration-development nexus further informs this framework (Rigaud et al. 2021b). MACS is flexible and adaptive, based on the premise that climate migration is linked to broader development challenges across spatial scales. It can guide policymakers and practitioners by offering critical information and insights related to development and policy implications of climate-induced internal migration. This reflects the call for anticipatory approaches over larger time and spatial scales to avert and minimize the adverse consequences of climate-induced migration and harness opportunities brought forth by migration.

The scale, trajectory, and geographical spread of internal climate migration in Lake Victoria Basin calls for focused attention on their shared resources (table ES.1). Lake Victoria is rapidly deteriorating due to environmental degradation, including over-harvest of fish stocks, resurgence of water hyacinth, and deteriorating water quality, and these impacts are amplified by climate change. Addressing long-standing environmental challenges is an imperative in the Basin, where lives, livelihoods, and the economy are integrally linked with climate sensitive livelihoods. Unattended, these adverse consequences will lead to climate-induced migration, deepen existing vulnerabilities and lead to increased poverty, fragility, conflict, and violence.

Underpinned by the MACS framework and in support of a country’s development vision and plans, the right set of climate and development policies can help avert adverse outcomes while harnessing the opportunities of climate-induced migration. The National Development Plan (NDP), Systematic Country Diagnostic (SCD), and Country Partnership Framework (CPF) include pivotal actions to prepare, plan, and respond to climate migration in the Lake Victoria Basin. These include job diversification, land management, landscape programming, climate change resilience, and resource and environmental risk management. Nationally Determined Contributions (NDCs) recognize climate-induced migration as an adaptation strategy and a way to counter the adverse consequences of climate impacts. The Country Climate Development Report (CCDR), a new World Bank diagnostic, provides a further opportunity to understand and address climate-induced migration as a crucial part of supporting countries to identify low-carbon and resilient pathways and deliver the sustainable development goals.

The development community is not starting from zero. For example, the World Bank (Rigaud et al. 2021b) carried out a portfolio review to draw actionable insights from 165 World Bank projects operating at the climate-migration-development nexus, with commitments reaching US\$197.5 billion (from 2006 to 2019). The portfolio findings show that a more systematic and anticipatory approach in designing projects geared toward addressing climate migration is possible. Increasingly, projects not only address migrants’ direct needs but support enabling interventions (early warning systems and social safety nets) and address underlying causes of mobility. There is a need to step up such interventions with great vigor and urgency—acting in partnership and engagement of those directly affected.

Several projects supported by the World Bank provide lessons and opportunities for scaled-up action and engagement. An example of leveraging migration as an adaptation strategy is the Regional Pastoral Livelihoods Resilience Project (P129408) in Uganda and Kenya. It enhances mobility by building local platforms for conflict resolution and enables access to water through project infrastructure rehabilitation. The Development Response to Displacement Impacts Project in the Horn of Africa (DRDIP)—a partnership between the World Bank, the United Nations High Commissioner for Refugees (UNHCR), and the Government of Kenya (GOK)—protects the poor and those displaced by fragility and violence through investments in basic social service infrastructure, integrated natural resources management and alternative livelihoods like value-addition to agriculture products and fish farming. Both projects leverage migration as an adaptation strategy and seek to strengthen social risk management while also working towards poverty reduction.

MESSAGE 6:

Climate migration, as a cross-cutting issue, has to be addressed through policy-informed actions that are farsighted in their approach and execution.

The domains of action set out in the MACS framework provide a pragmatic and farsighted approach to addressing internal climate migration—delaying action will raise the stakes considerably. The five action domains outlined in the MACS framework can bolster the delivery of the core policies to reduce, avert, and minimize distress-driven internal climate migration.



Conduct spatio-temporal analytics to gauge the emergence of climate migration hotspots in poverty pockets and growth centers—for challenges and opportunities—with a focus on cities, the periphery of Lake Victoria, and coastal areas. 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 broader global trends. Water availability—a major driver of migration in the model—is projected to remain stable or to increase in the Lake Victoria Basin, but to decrease (under one of the water

models) in much of Tanzania to the southeast of the lake. Some of those areas (mostly larger towns such as Dar es Salaam, Dodoma, and Arusha) are characterized by out-migration hotspots. 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.



Embrace landscape and territorial approaches to enable early planning and action across spatial and time scales for climate in- and out-migration hotspots. Site-based and locally driven practices for forest and water management, integrated community programs, and land use plans can be leveraged in emerging climate in- and out-hotspots, especially in Lake Victoria. Areas around the lake are projected to become out-migration hotspots because of decreased water availability and crop production. The emergence of the lake and its surroundings as a climate in-migration hotspot suggests the urgent need for approaches that enhance its conservation and management. While the report does not focus exclusively on cross-border migration, the modeling identifies numerous migration hotspots in areas close to national borders. 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 or stay. An example of managing the Lake Resources within and across countries is the Lake Victoria Environmental Management Project (World Bank 2018), which fostered a collaborative management of the natural resources among partners and governments in the Basin.



Harness climate-induced migration for jobs and economic transitions to leverage green growth and development opportunities based on countries' structural transformational needs and investment on human capital (including with regard to youth bulge). For instance, Tanzania's highly productive areas in the southern and northern highlands are increasingly affected by declining rainfall, frequent droughts, and significant increases in spatial and temporal variability of rainfall. In this context, the focus on building resilience and adopting adaptive strategies must include farsighted planning not just for agriculture, but alongside economic transitions toward less climate-sensitive jobs and livelihood opportunities. Supporting climate-smart urban transitions with energy efficient, green, and resilient urban infrastructure and services, and embracing secondary cities or peri-urban areas as new growth poles, will offer ways to make migration a force for positive transformation.



Nurture development-humanitarian-peace partnerships to capitalize on their comparative advantages to support the needs of migrants and host communities. Stepped up action by development, humanitarian, security, and disaster communities across the mobility continuum will help overcome barriers around funding sources, coordination mechanisms, and project timelines. Ultimately, this commitment will help countries pursue durable and holistic solutions. The high levels of temporary and circular migration in Rwanda, conflicts between pastoralists and farmers in Tanzania, and climate pressures forcing the Karamoja pastoralists in Uganda to migrate longer and farther away are some of the factors that call for the integration of humanitarian-development-peace efforts.



Domesticate and bridge legal gaps in response to existing legal frameworks, agreements, and processes, and mobilize action, for example through the Kampala Convention. Climate-induced migration lies at the intersection of human rights, climate change, sustainable development, disaster risk reduction, and countries' sectoral frameworks pertaining to environment and management of natural resources. The legally binding African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (also known as the Kampala Convention) is a key regional framework for protecting internally displaced persons (IDPs). The Intergovernmental Authority on Development (IGAD) Free Movement Protocol contains provisions for access to territory of

the host country, conditions of stay, and protection of people moving due to climate impacts. World Bank financing instruments offer support climate change and mobility, and there is potential for further support that might focus on development opportunities and policies for the safe movement of people and provide viable options for *in situ* adaptation.

Climate-induced migration will occur in Lake Victoria Basin countries, and action cannot be postponed—the stakes are too high. The countries in the region can embark on a green, resilient, and inclusive path for development by exploiting new economic opportunities, recognizing that structural transformations must be informed by and responsive to climate change. Climate actions and plans should consider climate-induced migration and displacement. Spatial dimension and emergence of hotspots are critical to resilience-building efforts. Anticipatory and transformative action across the migration cycle will help to ease people out of vulnerability. The global community needs to do its part to contain GHG emissions as a critical part of reducing climate-induced migration. Climate migration is a reality and acting now will lead to sustainable outcomes for all concerned. This World Bank report on climate migration in the Lake Victoria Basin is also a call for collective action to reduce GHG emissions and for the development, humanitarian, disaster, and security communities to come together. Responding today will help secure the foundations of a peaceful, stable, and secure region for the people of the Lake Victoria Basin, Africa, and the global community.

Table ES.1 Summary of Results Aggregated for the Lake Victoria Basin Countries

Factor	Regional Results
Populations in 2025 and 2050	Increases from 201.0 million to 313.3 million (in SSP2); 210.3 million to 367.2 million (in SSP4).
Total population at baseline (2010)	140 million
Primary drivers	Water availability, followed by crop productivity and changes in NPP.
Number of internal climate migrants by 2050	Highest in pessimistic (reference) scenario, with average projection of 31.9 million (8.69% of projected population) and a high end of 38.5 million climate migrants (10.48%).
Trajectory to 2050	Gradual increase in the number of climate migrants, from 3.5 million from 2025–30, 8.5 million from 2030–40, and 10.8 million from 2040–50 under the pessimistic scenario. There is also a gradual increase under all scenarios, suggesting a growing momentum.
Internal climate in-migration hotspots	<ul style="list-style-type: none"> The shores of Lake Victoria are highly attractive for climate in-migration in Tanzania and Uganda, and most highland areas. There is a small in-migration hotspot in northeastern Kenya because of projected increases in water availability. A large, high-certainty in-migration hotspot is in the center of Burundi, including the new capital, Gitega.
Internal climate out-migration hotspots	<ul style="list-style-type: none"> The primary climate out-migration hotspots are in southern parts of Tanzania because of declining water availability. In Kenya and Tanzania, coastal areas see significant climate out-migration because of sea level rise. Three major high-certainty out-migration hotspots in Uganda are mainly in the northwest and west central around Lake Albert. A long, narrow out-migration spot is located in the west, close to Lake Tanganyika and including part of Bujumbura Marie in Burundi.
Climate migrants vs. other migrants by 2050	The projected number of internal climate migrants by 2050 (31.9 million) could surpass that of other internal migrants (28.0 million) in the pessimistic scenario.

Note: Based on aggregated individual country data. SSP2 represents a moderate development pathway, and SSP4, an unequal development pathway. NPP = net primary productivity; SSP = Shared Socioeconomic Pathway.

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