



Climate Change and Migration

A potential shock to demographic projections

- ◆ Climate change could trigger large waves of migration...
- ◆ ...both within economies and across borders...
- ◆ ...which could completely alter demographic projections

The impact of climate change on the world is likely to be vast. In addition to shocks to potential economic activity, there are not insignificant risks that certain parts of the world could become less hospitable or even uninhabitable, leading to much higher numbers of economic migrants or refugees in years to come.

There are already reasons to question longer-run demographic forecasts; we believe the way birth rates are modelled is too simplistic. But it also looks like migration assumptions are over-simplified in these sorts of models.

For example, the UN estimates that inward migration from emerging to developed economies (at a rate of three people per 1,000 in 2019) has already peaked this century, and that net migration in the next decade is set to be 30% lower than in the decade that preceded the pandemic. Its estimate is that net migration out of Africa will be 60% lower this decade than during the pre-pandemic period.

Climate change could have a significant impact on such assumptions. Expected rises in global temperatures in the coming decades will likely mean more economies or regions become harder or impossible to live in, including through more frequent and severe droughts and floods; this is supported by the recent Intergovernmental Panel on Climate Change (IPCC) reports, which see significant risks of more frequent climate-related natural disasters as temperatures rise.

As a result, involuntary migration from the most vulnerable parts of the world could pick up sharply, significantly altering the spatial composition of the world's population. Such scenarios could mean that parts of Africa see their populations shrink, whereas Europe doesn't.

The economic consequences are likely to be profound. Firstly, these scenarios imply changes to demographic assumptions that would alter potential growth rates for many economies around the world. Secondly, huge policy questions arise – from border to integration policies – as well as how best to tackle these challenges on an international scale.

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Snapshot: climate and migration

Potential climate change factors



Heat waves

Tolerance exceeded by humans, ecosystems and agricultural land degradation



Rising sea levels

Impact on infrastructure, degradation of water supplies and economic loss



Heavy precipitation

Flooding can result in loss of life, impacts on infrastructure, crops and food security

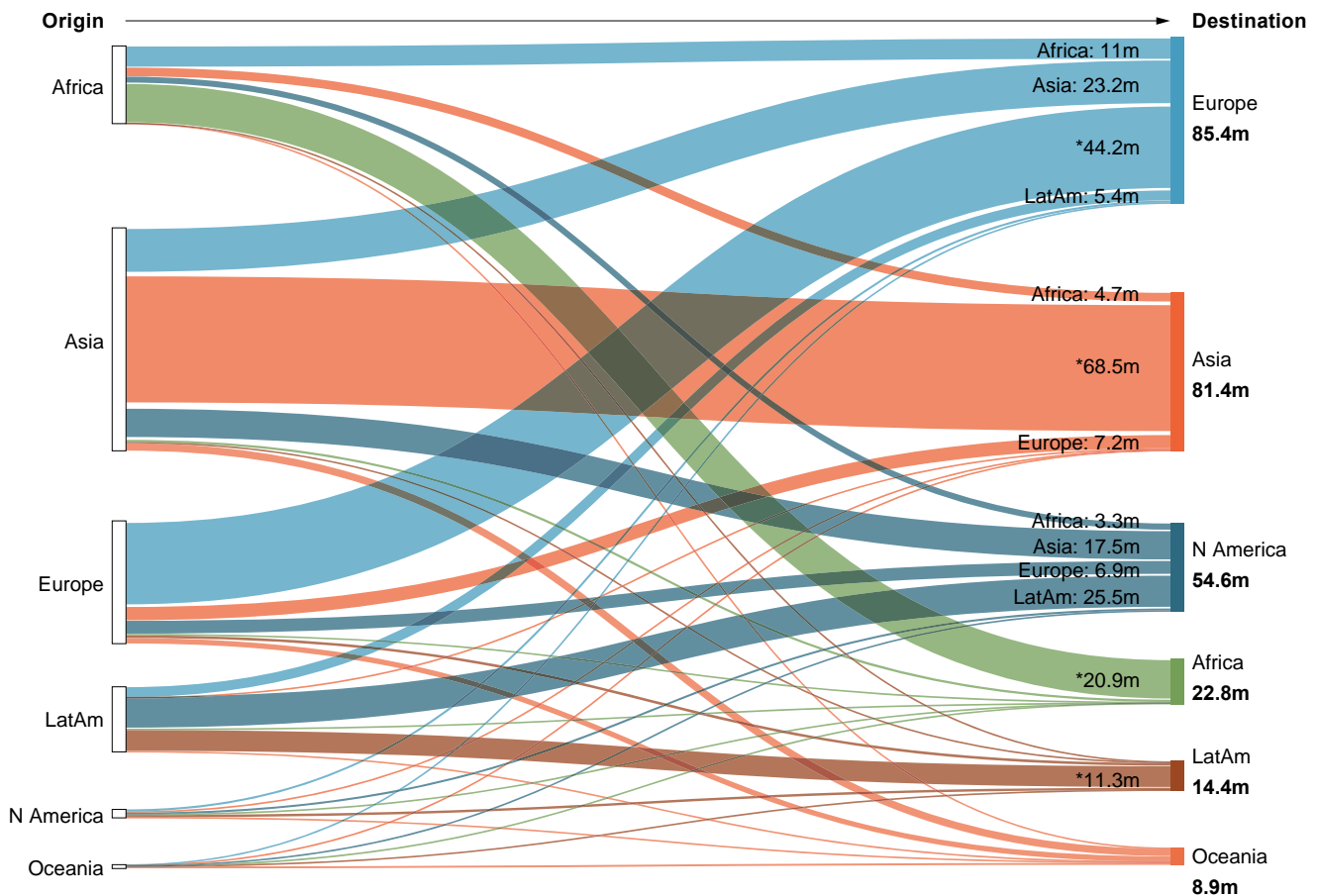


Intense cyclone activity

Loss of human life and livelihoods, impacts to the built environment and crops

Global migration flows by region

Migration isn't just likely to be between emerging and developed markets, or from Africa and the Middle East to Europe – migration flows take place all over the world. Data from 2020 (*internal movement within region)



Environmental refugees

Forcibly displaced through an extreme weather

23.7m

displacements were triggered by disasters in 145 countries and territories in 2021

21.6m

were internal displacements due to weather-related disasters

Environmental migrants

Impacted by slow-onset climate change

2.4m

displacements were caused by droughts between 2008 and 2020

1.1m

displacements were caused by extreme temperatures during the same period

Source: United Nations Department of Economic and Social Affairs, Population Division (2020). International Migrant Stock 2020, EMDAT (Emergency Disasters Database)

Climate Change and Migration

- ◆ Climate change could impact migration flows...
- ◆ ...and with temperatures rising and more common extreme events...
- ◆ ...such risks may need to be taken more seriously

Migration – a brief history

Climate change impacts the lives and livelihoods of the most vulnerable populations globally, leading to a range of interconnected effects such as displacement, political instability and conflict. The impacts of climate change are already being felt around the world. The UNHCR estimates that 21.5 million people worldwide were forcibly displaced annually between 2008 and 2016 by sudden-onset hazards linked to climate change impacts¹. In addition, long-term degradation of socio-economic security, through slow-onset climate change effects (reduced water availability, sea level rise, crop productivity, etc), has also impacted migration patterns, resulting in thousands more being displaced².

IPCC estimates 3.5 billion people live in areas vulnerable to climate change

While there is no internationally agreed definition, people that are forcibly displaced through an extreme weather event are sometimes referred to as **environmental refugees**, while those impacted by slow-onset climate change are often referred to as **environmental migrants**³. The Intergovernmental Panel on Climate Change (IPCC) estimates 3.5 billion people live in areas highly vulnerable to climate change impacts.⁴ The most vulnerable regions include East, Central and West Africa, South Asia, areas in the Pacific and Central America. People living in these areas have low ability to cope and adapt to climate impacts, which raises the risk of displacement given the projected increase in acute climate events, such as heatwaves and floods⁵.

The vast majority of climate migration to date has been internal migration

Although much attention is focused on cross-border or international migration, the vast majority of climate change induced migration to date is internal; borders are not usually crossed (see chart 1 for key terminology). While climate change is likely to exacerbate both internal and international migration, there is significant uncertainty around future estimates, in particular for international migration.

The lack of a globally recognised definition of climate migration hinders estimation

The lack of a globally recognised definition of an international climate migrant/refugee, and the complex interconnectedness of various drivers of migration, complicates future estimation. Improved scientific and economic understanding of climate migration, with a focus on vulnerable areas, is required to inform migration policy at the national, regional and intergovernmental level.

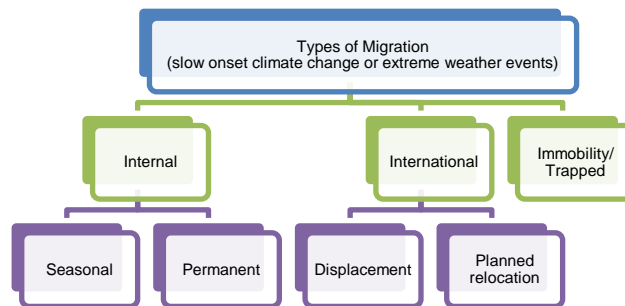
¹UNHCR 2016. "Frequently asked questions on climate change and disaster displacement"

² Ibid.

³ Waldinger and Fankhauser. Climate change and migration in developing countries: evidence and implications for PRISE countries. Oct. 2015

⁴ See our write up of the IPCC Working Group 1 (WG I) report, The Physical Science Basis (August 2021). *The twelve key points you need to know* (10 August 2021). And our write up of the WG II report, Impacts, Adaptation and Vulnerability (28 February 2022). *The 10 points you need to know* (1 March 2022).

⁵ IPCC, 2022: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change

Chart 1: Key terminology for climate change and migration


Source: HSBC

Why might people move?

To understand the impact of climate on migration we can examine supply and demand (pull and push) factors, which affect whether people migrate internally or internationally.

Supply side factors are predominantly associated with the expected economic potential of the host country/city. For international migration to be compelling, research shows the host country (to which people move) usually has an average annual per capita income more than double that of the source country (from which those people come)⁶. In terms of internal migration, seasonal or permanent migration may occur where labour demand and wage elasticities make migration more compelling, often depicted by rural-to-urban migration. The world's urban population is predicted to double by 2050 from 2015, driven in part by climate change; cities can provide greater economic and social stability.⁷

It is important to remember that people may still need to be willing to leave their home environment. Place attachment, harmful policies that deter people from moving, and international and national laws are some reasons often cited for people choosing to remain rather than migrate internally or internationally.⁸ Moreover, the most climate-vulnerable populations are also the ones who tend to have the least available resources to migrate, resulting in immobility or trapped people.⁹

Demand side factors are more often cited as key reasons for climate migration. Whether through slow-onset climate change or extreme weather events, any environmental impact causing long-term/permanent distress will likely increase migration. While some events may lead to temporary migration, the probability of permanent migration depends on a range of complex interrelated factors, including existing vulnerability (poverty, inequality, environmental degradation, state fragility and poor institutional support, etc.) and the context in which migration has occurred, e.g. if homes are destroyed as a result of the event¹⁰. This is particularly true when climate directly and permanently impacts the income-earning potential of individuals, increasing the economic incentive to migrate.

People still need to be willing and able to leave their home environment.

⁶ OECD (2001). Trends in Immigration and Economic Consequences

⁷ United States Institute of Peace (2022). Climate Change, Migration and the Risk of Conflict in Growing Urban Centers

⁸ See McKenzie, D., and D. Yang. 2014. "Evidence on Policies to Increase the Development Impacts of International Migration & Waldinger, M. 2015. "The Effects of Climate Change on Internal and International Migration: Implications for Developing Countries." & Koubi, V., G. Spilker, L. Schaffer, and T. Bernauer. 2016. "Environmental Stressors and Migration: Evidence from Vietnam." World Development 79: 197–210

⁹ The White House. 2021. Report on the Impact of Climate Change on Migration

¹⁰ IDMC. 2021. "Global Report on Internal Displacement 2021."

Table 1: Examples of climate change impacts on lives and livelihoods

Climatic change	Impact on livelihoods	Historical examples
Heat waves	Heat stress tolerance exceeded by humans and ecosystems. Pastoralism declines, farming size reduces, lack capital for farming intensification.	◆ Heat wave deaths in India (2015), Europe (2019); impacts of weather extremes in highly vulnerable economies (e.g. Dominican Republic, Jamaica); agricultural land degradation
Rising sea levels	Impacts on built infrastructure, degradation of water supplies, economic loss, small scale fishing declines, coastal farms under increasingly intensive cultivation	◆ Over wash and groundwater contamination in Pacific and Indian Ocean atolls (e.g., 5 m King tides, Republic of Marshall Islands, 2014)
Increases in heavy precipitation events	Flooding can result in loss of life, impacts homes and infrastructure as well as crops, increasing food insecurity	◆ Flash floods in Nepal (1993, 2020); monsoonal floods and abrupt migration in Bangladesh (1987-1988, 2004, 2007)
Increases in intense tropical cyclone activity	Loss of human life and livelihoods; impacts to the built environment; salinity impacts on crops	◆ Migration from Caribbean islands in the aftermath of Hurricanes Irma and Maria (2017) and after Tropical Cyclone Gorky, south-eastern Bangladesh (1991)

Source: The White House (2021), HSBC

The evidence to date on climate change and migration

The decision to migrate is a combination of many factors

Even when migration can be directly linked to climate events, as is often the case with extreme weather events, the above discussion shows that the decision to migrate is based on many interrelated factors (including economic, political and social).

While data and corresponding evidence on migration and climate change are improving, knowledge gaps remain. For instance, long-term longitudinal data would better outline how slow-onset climate change has resulted in migration¹¹. Moreover, with slow-onset climate change, people do not move in mass waves, hence data harmonisation is difficult. In addition, climate change may also impact political stability, resulting in heightened conflict, which in turn is also a driver of migration. While 95% of all conflict displacements in 2020 occurred in countries also vulnerable to climate change¹², the empirical evidence from studies linking climate change to these conflicts is contested.

Reflecting this complexity, the majority of literature that links climate change to migration is focused on the impacts of extreme weather events and on internal migration only. The International Displacement Monitoring Centre (IDMC) on disaster displacement finds that in 2021, 23.7 million new displacements were triggered by disasters in 145 countries and territories with 21.6 million people being internal displacements due to weather-related disasters¹³. In addition, recent studies have become better at attributing the effects of slow-onset climate change, such as variability and anomalies in rainfall, extreme precipitation and temperature changes, to migration¹⁴. The IDMC also reports that over the period 2008 to 2020, 2.4 million displacements were caused by droughts and 1.1 million by extreme temperatures¹⁵. Despite the difficulty in attribution, attention should be paid to vulnerable sectors and geographical locations (as stated above).

Those whose lives and livelihoods depend on the agricultural sector face higher climate migration risk

Evidence suggests that countries and people whose economies and livelihoods depend on the agricultural sector (see Box 1 for an example from Africa) will likely see more climate migration. Slow-onset climate change, such as droughts and limited precipitation, and sudden climate events, such as heat waves, will directly impact the sector, resulting in an increase in urban

¹¹ IOM 2022. World Migration report

¹² UNHCR 2020. Global Trends in Forced Displacement 2020

¹³ International Displacement Monitoring Centre (IDMC) 2021 Global Report on Internal Displacement 2021

¹⁴ Šedová, B., L. Čizmaziová and A. Cook 2021 A meta-analysis of climate migration literature

¹⁵ International Displacement Monitoring Centre (IDMC) 2020 Global Report on Internal Displacement 2020

migration. To reduce the negative impacts of migration, specific adaptive techniques can be implemented, such as more resilient and sustainable agricultural techniques, e.g. low-till and drought-tolerant crop variations, and diversification of livelihoods, but also through financial means, such as access to credit and insurance¹⁶.

Box 1: Regional considerations: Africa

Slow-onset climate change impacts migration and this can already be seen in Africa. Future projections indicate sub-Saharan Africa will have the largest number of internal climate migrants. North Africa is particularly vulnerable due to scarce water supplies and the expected rainfall decrease and increase in drought¹⁷. Coastal populations within the area have also increased, resulting in potential exposure to sea-level rises¹⁸. At the same time, warming within North Africa will likely cause more extreme heat waves, impacting air quality and human health¹⁹. Modelling suggests the number of internal climate migrants in North Africa could increase to 6% of the total population in the worst case scenario²⁰.

The World Bank estimates 216 million people could be displaced internally by 2050

Future Projections. The World Bank estimates (high-end pessimistic scenario) that 216 million people may be forced to move internally by 2050 across six world regions²¹. Its modelling looks specifically at slow-onset climate change and internal migration. According to the World Bank, forced displacement and trapped populations could be reduced through:

1. Cutting greenhouse gases (reducing climate pressures driving migration)
2. Integrating climate migration into development planning
3. Planning for each phase of migration; to support necessary migration
4. Investing in understanding the drivers of climate migration (through evidence-based research, models and consultations).

Migration may be a form of adaptation to climate change

As the above four points indicate, future migration depends not only on climate impacts but also on development policy (including mitigation and adaptation). Where development fails and populations remain extremely vulnerable to climate impacts, migration may be the only viable adaptive technique. In this case it is crucial to ensure that climate migration of displaced peoples does not exacerbate existing inequalities and vulnerabilities. Poorly managed migration can result in high economic, social and psychological costs and be a sign of adaptation failure.

Long-term estimates of climate migration are largely absent and underestimate possible migration levels

What is largely absent from the literature is estimates of longer-term international migration under scenarios of more extreme climate change, eg where the global average temperature increases over two degrees centigrade on pre-industrial levels. While it is challenging to estimate migration impacts at these temperature levels, and it gets harder as temperatures rise, on current emissions paths the probability of these scenarios is rising. While scientific literature is largely absent on migration at these temperature levels, commentators including Jared Diamond and Lord Nicholas Stern have provided informed speculation.²² They have suggested that at these temperatures it is likely that climate impacts would overcome vulnerable populations and cause billions to move internally and across borders. They envisage the possibility of scenarios where, for example, “wet-bulb” temperatures (a measure of temperature and humidity) in many parts of the world could exceed human tolerance (causing hyperthermia),

¹⁶ Waldinger and Fankhauser. 2015. Climate change and migration in developing countries: evidence and implications for PRISE countries.

¹⁷ World Bank 2021. Groundswell: acting on Internal Climate Migration Part 2

¹⁸ World Bank 2014. Turn Down the Heat: Confronting the New Climate Normal.

¹⁹ World Bank. 2019. Sand and Dust Storms in the Middle East and North Africa (MENA) Region: Sources, Costs, and Solutions.

²⁰ World Bank 2021. Groundswell: acting on Internal Climate Migration Part 2

²¹ Ibid.

²² Diamond. 2011. Collapse: How Societies Choose to Fail or Survive. Stern, 2016. Why are we waiting: The Logic, Urgency, and Promise of Tackling Climate Change.

rainfall and monsoon patterns could radically shift forcing billions to move as crops fail, sea levels could rise dramatically, flooding major population centres, and so on. Conflict, they suggest, would be a likely result, with severe economic consequences; they suggest that history does not leave a positive record on vast movements of populations. It is important we keep these more remote possibilities in mind, even if they are currently low probability scenarios.

Below we look at existing international migration projections, examine their assumptions and compare these to a range of different possible future scenarios; we go beyond the largely benign assumptions embedded in existing demographic and migration modelling and consider how factors such as a pick-up in climate change induced migration could radically change many countries' future populations. What becomes clear is the need for better immigration policy to manage the possible future economic and social impacts from migration of often extremely vulnerable people.

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In the full note, we look at modelling demographic projections. This involves migration estimates which are hard to forecast and are subject to big shocks which could completely change underlying population trends. We do this to predict where we could see the biggest moves in terms of migration - not only that which is related to climate change but overall migration – and its impact on economic assumptions.

We also take a look at the policy angle. We consider how the challenges of climate change and migration may be tackled, from border to integration policies, and how to tackle these on an international scale.

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