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FUTURE THEMES | SUSTAINABILITY

Causes and effects of climate migration: Five essential insights

KEY POINTS

We believe:

- Permanent changes in livability are principal drivers of climate migration.
- Climate migrants prefer to remain close to home, but transnational moves are possible.
- Climate migration will accelerate urbanization.
- The hottest parts of the world will be most negatively affected.
- Regional political instability increases the likelihood of climate migration.

A key takeaway from Wellington's work with Woodwell Climate Research Center is that climate change will likely lead to climate migration, with considerable social, economic, and geopolitical consequences. We set out to research the causes and effects of structural climate migration in detail. What aspects of climate change may drive people to permanently leave their homeland? Where will they go? How will climate migration affect outbound and inbound regions? And finally, what are some of the investment implications across regions and industries? In this paper, we share our insights on this complex, long-term issue.

1. Permanent changes in livability are principal drivers of climate migration

We believe permanent, chronic deterioration in livability is the primary driver of climate migration. In many parts of the world, climate change is contributing to — and exacerbating — declining livability. Gradual temperature increase is the biggest factor, while other slow-onset changes, including drought conditions and sea-level rise, can also be material. We found that while acute climate events like hurricanes or floods may result in temporary displacement as a region recovers, they are unlikely to lead to permanent migration unless their occurrence becomes a pattern, in combination with slow-onset changes. These include repeated flooding or storm surges as a function of rising sea levels, for example, or more frequent wildfires caused by perennially hotter, drier conditions.

As the US defense community has noted, climate change alone does not drive outbound migration. By amplifying underlying political, economic, or social tensions, climate change can become a threat multiplier — a



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livability tipping point that helps catalyze an exodus. For example, Syria's mass migration was a direct consequence of civil war brought on by decades of dictatorship and repression. In addition, persistent drought conditions caused agriculture yields to collapse and food prices to skyrocket. These stresses, compounded on the middle and lower classes, may have accelerated the escalation to physical conflict and emigration. More broadly, rising temperatures have been shown to negatively correlate with per capita income, labor productivity, health and mortality, political stability, civil cohesion, and crime rates.¹ These factors can all be catalysts for migration away from a troubled region. We conclude that if people perceive their long-term economic and/or personal security to be at risk in part because of climate change, they are more likely to move away for good.

2. Climate migrants prefer to remain close to home, but transnational moves are possible

Our research revealed that most climate migrants will aim to relocate within affected countries' borders, preferring to remain as close to family, culture, and social networks as possible. One important caveat is a phenomenon called "stepwise migration," where migrants make incremental adjustments in the process of their long-term resettlements, again, to minimize personal disruption each time. Researchers for a recent study by The New York Times Magazine and ProPublica found that for climate migrants: "It's only when those [new] places fail them that they tend to cross borders, taking on ever riskier journeys."² Migrants who do exit their country may leave a spouse and other family members behind, preferring to minimize the disruption and send financial assistance home.

Within regions subject to climate change, people are not affected equally. Higher-income individuals may have a broader range of options and defense mechanisms. They may be able to remain at home and adapt, adjusting living and working conditions with cooling systems for homes and offices, swimming pools, or frequent travel. At the other end of the income spectrum, people with the fewest resources may be unable to leave a climate-affected region at all. Women may be particularly disadvantaged as male family members depart, leaving traditional caretakers behind to manage homes and farms in increasingly unstable environments. We believe that most climate migrants will fall somewhere in the middle of the socioeconomic continuum.

3. Climate migration will accelerate urbanization

Climate migration will almost certainly contribute to the rapid urbanization already occurring in many parts of the world. With migrants preferring to leave at-risk rural areas yet stay as close to their original location as possible, both push and pull factors drive urbanization. On the push side, the economic prospects for people in agriculturally dependent areas may dim as crop yields decline and farming becomes more difficult and uneconomic. On the pull side, migrants may perceive cities as offering better living conditions, including more education and employment opportunities and less risk of personal harm from extreme weather events.

The effects of climate-driven urbanization will vary. Many cities are already overcrowded and resource stretched. Climate-induced population growth could exacerbate those conditions, creating new social, economic, and political challenges. On the other hand, newcomers may opt to move on after a brief stay, in stepwise fashion. If fewer people put down roots, social or economic instability may increase as well. In some

¹"The slow onset effects of climate change and human rights protection for cross-border migrants," Annual report of the United Nations High Commissioner for Human Rights and reports to the Office of the High Commissioner and the Secretary-General. March 2018. | ²Lustgarten, Abrahm, "The Great Climate Migration," The New York Times Magazine, in partnership with ProPublica, July 2020.

cases, higher-income urban residents may decide to leave, leveraging their financial means and personal networks to abandon the city or their home country outright. While departed cities could experience the negative effects of “brain drain,” receiving cities could benefit from lower-cost sources of skilled labor, new markets for local business, and additional sources of tax revenue.

Finally, many cities are located in low-lying coastal areas. Continued growth plus advancing climate perils could create a concentration of insurance risks in these urban areas, with property and casualty insurers paying out large sums following repeated climate events, or with households and businesses unable to afford or secure coverage.

4. The hottest parts of the world will be most negatively affected by climate migration

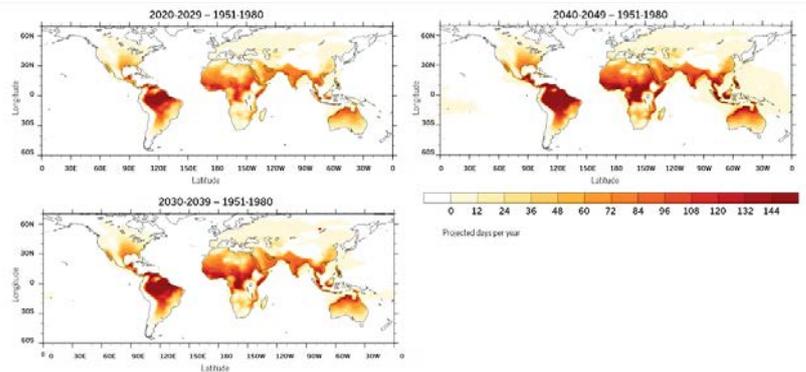
Climate data generated from Wellington’s collaboration with Woodwell project that the equatorial region will experience the largest temperature increases, prompting a concentration of climate migration. As **FIGURE 1** shows, climate models estimate that the geographic zone 30° north and south of the equator will see between two and five additional months of “danger” or “extreme danger” temperatures in the coming decades, as compared to a baseline period between 1951 and 1980. Because we believe that climate migrants will prefer to remain in country, we conclude that the nexus of climate migration will be in this zone, home to several large emerging markets and several countries where political instability is already high.

An important exception are “bottleneck” regions that lie in major migratory corridors. If and when cross-border migrants feel the need to relocate to wealthier developed markets, certain countries could face pressure from transitory mass migration. Turkey, for example, has been challenged by an influx of migrants leaving Syria en route to Europe. Mexico may also see increased pressure from migrants from Central America aiming to resettle in the US.

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As climate migration is an option of last resort, we believe demand for adaptation solutions that improve livability will increase as people first attempt to adapt to a “new normal.”

FIGURE 1
Geographic hotspots could also be climate migration hotspots



Danger zone is defined as the National Weather Heat Index danger and extreme danger zones, which include heat index values above 103°F. Source: National Weather Service. | The target data presented is hypothetical in nature. No assurance or guarantee is made that any target data can or will be achieved. Actual experience may not reflect all of the data or may be outside of stated ranges. | Source: Woodwell Climate Research Center

5. Regional political instability increases the likelihood of climate migration

The risks of climate change and climate migration are not new to national security organizations. For decades, the US military and the Central Intelligence Agency have been aware of the consequences of a warming world, especially within the 30° equatorial band. In pockets of North Africa and the Middle East, the Indian subcontinent, the South China Sea and swaths of Southeast Asia, and parts of Central and South America, climate change is already a threat multiplier, contributing to or exacerbating resource conflicts, domestic socioeconomic and policy weakness, and extremist activity.

Domestic climate migration will likely be a priority for China, as poor, rural migrants facing challenging climate conditions in agricultural regions migrate to cities. Historically, the Chinese government has viewed internal migration as a threat to domestic stability and, therefore, party control. Climate-induced migration will be an even bigger challenge to manage. Within Europe, while internal migration away from hot southern countries may be a concern, the national security focus will likely center on an increase in climate migrants from the Middle East, and North, East, and West Africa.

Finally, we note that climate change affects US military readiness at home as well. Two-thirds of US military bases within the continental US are currently challenged by increasing heat, floods, wildfires, drought, or hurricanes. Affected facilities span multiple military branches and include the world’s largest naval base. The US military recently reported a 60% increase in heat-related illnesses among service personnel over the past decade.³ Climate change may intensify the need for military operations and presence while simultaneously reducing the effectiveness of those operations in certain places, increasing national security implications and the focus on climate migration.

³Hasenmyer, David, U.S. Soldiers Falling Ill, Dying in the Heat as Climate Warms,” Inside Climate News, July 2019.



Local and global remittance providers may benefit as climate migrants send financial assistance back to family members who stay behind.

Investment implications

Regional dispersion within national boundaries is possible. Investors may be tempted to integrate climate migration insights along national lines, avoiding higher-risk countries in favor of those with less risk. But we believe the picture is much more nuanced and research needs to be granular. We suggest investors assess regional climate risk within countries. Even countries with low aggregate levels of climate exposure could be home to certain regions with very high risk, and could suffer from spillover effects.

Demand for climate adaptation and mitigation solutions may surge. As climate migration is an option of last resort, we believe demand for adaptation solutions that improve livability will increase as people first attempt to adapt to a “new normal.” Air conditioning and air purification can help households and businesses cope with worsening heat or air quality. Electrical grids may need to be upgraded for renewable sources and technologies that reduce reliance on fossil fuel. Solutions that address water scarcity will be needed: water delivery and treatment, storm and groundwater recapture, and agricultural technology like efficient irrigation, drought-resistant seeds, and connectivity devices that help farmers manage weather variability.

High-end real estate could be devalued. Climate migration may put higher-end real estate in climate-exposed places at risk, as wealthy homeowners relocate inland or to areas otherwise seen as having less risk. Coastal cities and portions of the Middle East may feel these effects most acutely. In affected areas, if a concentration of insurance risks leads to unaffordable or unavailable coverage, residential and commercial real estate pricing, along with mortgage financing and insurance, could take a hit.

Money transfer companies could see growing markets. Local and global remittance providers may benefit as climate migrants send financial assistance back to family members who stay behind. Unexpected beneficiaries from this trend could be telecommunications and mobile providers in emerging markets that increasingly offer a range of mobile money products. From a macro standpoint, countries that do experience significant cross-border outbound migration (which is not our primary base case) may be at risk of having a larger portion of GDP depend on remittances. India, Mexico, and the Philippines are potential examples.

ESG may become a critical consideration for fixed assets. Climate migration may create downward pressure on the tax bases of developing countries, leading governments to seek greater revenues from fixed-asset industries like mining. In these cases, companies with strong community ties, government relations, and stakeholder management may be able to operate more effectively, with fewer disruptions. At the same time, countries with well-run natural resource sectors may be increasingly attractive for foreign investment into development projects.

Sovereign debt dislocations are possible. Investors may want to begin to integrate climate migration risks and opportunities into sovereign risk analysis. Countries with a combination of weak economies and political instability could potentially experience negative effects of outbound migration and brain drain. On the other hand, stronger economies with more stable political environments situated just outside the equatorial hot zone might benefit from attracting lower-cost, skilled and educated workers.

Defense spending should continue to be strong. As climate migration is perceived as a geopolitical destabilizing factor, we believe investment in traditional defense spending as well as dual-use technologies with application for both military and civilian uses will rise. These solutions may include next-generation communications, advanced missile systems, hypersonic weapons, satellite networks, robotics, and artificial intelligence.

Areas of further research

We plan to continue our research into climate migration, a highly complex issue that will evolve as climate change progresses. We will delve deeper into geopolitical and national security ramifications, for example. We will also aim to assess whether the paths of climate migrants will be the same or differ from historical, non-climate-related migratory routes. Finally, and perhaps most importantly, we will seek to determine how inbound regions can benefit socially, economically, and politically from welcoming and integrating climate migrants. ■



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