THE IMPACT OF CLIMATE CHANGE AND ENVIRONMENTAL DEGRADATION ON HUMAN MOBILITY

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1 EXECUTIVE SUMMARY

The world is grappling with one of its greatest challenges in addressing human-induced climate change and sustaining efforts to limit global warming to 1.5 degrees Celsius from pre-industrial levels. The impact of climate change on environmental degradation, intensifying heatwaves, floods, and other disasters is exacerbating economic and social vulnerabilities of communities around the world – particularly for those already disadvantaged. Some countries are facing multiple threats alongside the climate crisis, as they are already impacted by issues including poverty, food insecurity, and conflict.

As climate change intensifies, its impact on human mobility becomes progressively evident. Whether because of slow-onset or sudden natural disasters, the evidence is increasingly clear in highlighting the continued risks associated with this warming trend on human mobility. Estimates predict that, by 2050, up to 200 million people could be displaced within their own countries due to climate change.[1] Policymakers and governments must address the impact climate and environmental degradation is having on human mobility and the challenges this presents on an economic and social level.

This paper examines the links between climate change, environmental degradation, and human mobility, with a focus on Rwanda as a case study. Rwanda, a country situated in a region experiencing adverse climate impacts, serves as an example of the challenges related to human mobility in the face of climate-induced hazards.

The paper delves into the complexity of migration drivers, acknowledging that environmental degradation is one of several factors contributing to human mobility. Policymakers must understand the interconnected dynamics of these drivers to develop comprehensive solutions that address the multi-faceted challenges.

Rwanda's vulnerability to climate change is evident in its susceptibility to natural hazards. The economic and environmental losses caused by climate-related disasters pose significant risks to livelihoods and economic stability. Despite the challenges, Rwanda has made remarkable strides in addressing

1 Katrina Miriam Wyman, "Responses to Climate Migration," *Harvard Environmental Law Review* 37, no. 1 (2013): 167–216.

climate change and its impact. Initiatives such as the Kamara Model Village demonstrate efforts to resettle households affected by worsening floods and landslides and restore degraded landscapes. Additionally, climate financing facilitated by institutions like the Development Bank of Rwanda and the Rwanda Green Fund is essential for implementing climate action goals.

The paper offers key recommendations and considerations for policymakers and governments moving forward:

Prioritize vulnerable communities and high-risk areas in the face of increasing climate events to address climate-induced human mobility, encompassing support for vulnerable groups and the relocation of individuals from high-risk zones who lack the means to adapt locally or relocate way from high-risk zones.

Enhance resilience in communities capable of local adaptation, mitigating displacement and involuntary migration while fostering local livelihoods.

Assess and address triggers of internal displacement, influencing consequential cross-border migration decisions.

By adopting a comprehensive and proactive approach to climate-induced mobility, policymakers and governments can take significant steps towards a more sustainable and resilient future.

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2 INTRODUCTION

Countries around the world are dealing with increasingly severe and compounded challenges due to climate change. The 2015 Paris Agreement reached during the United Nations Climate Change Conference (COP21) in Paris provided long-term goals to limit global temperature increases to well below 2ºC above preindustrial levels, while striving to limit the increase to 1.5ºC. Doing so would critically reduce the impact and risks of climate change, with every increment making a difference. The reality in 2023 is stark. Unless there are drastic carbon emissions cuts, the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report warns we are on course to reach the 1.5ºC level within the next two decades.[2] Further predictions by the World Meteorological Organization (WMO) indicate a 98% chance that the next five-year period will be the warmest on record, and that the world will breach the 1.5ºC above pre-industrial levels temporarily but with increasing frequency.[3]

The global scale and impact of a warming planet is evident. In 2022, Europe recorded its hottest summer, as reported by the Copernicus Climate Change Service (C3S).[4] Such record-breaking temperatures and increases in global temperatures are a grim reality of climate change – July 2023 witnessed the warmest three-week period on record.[5] Canada faced the devastating consequences of wildfires in 2023, causing the worst damage the country has experienced since 1995.[6] The repercussions are even more harrowing in regions that are highly vulnerable. For instance, while floods are a reoccurring phenomenon in Pakistan, the 2022 floods, triggered by extreme precipitation, resulted in the displacement of around 33 million people – a calamity unparalleled in its recent history in terms of spatial and temporal scale.[7] The climate crisis compounds other development challenges, including poverty, health, security, and mobility, threatening to undo decades of development.

There is a growing global conversation around the impact of climate change on human mobility. While most movements occur within national borders, people and communities are also moving across borders. This displacement and migration, whether temporary or longer-term, carries significant economic and social consequences for both the countries of origin and the host nations. Governments and policymakers face increased complexity in addressing climate-induced displacement due to overlapping triggers and limited data, making it challenging to fully assess climate and environmental degradation as a stressor.

The increasing number of climate-induced displaced persons is a clear indicator of the pressing needs to address policy gaps around the impact of the climate crisis on human mobility. According to the Internal Displacement Monitoring Centre (IDMC), the Geneva-based international body that compiles and publishes data on internal displacement, since 2008 there has been an average of 25.3 million people displaced by sudden-onset disasters each year.[8] In 2022, 60.9 million new internal displacements were recorded across 151 countries, of which a worrying 32.6 million were associated with disasters.[9] There is a need to adopt proactive policy responses as the number of displaced persons continues to rise. Estimates reveal that between 200 million to 1.2 billion people globally could be displaced within borders or forced to flee across them by 2050 due to climate change and natural disasters.[10]

2 "IPCC, 2022: Climate Change 2022, Mitigation of Climate Change. Summary for Policymakers," n.d.

3 "Global Temperatures Set to Reach New Records in next Five Years," May 15, 2023, https://public.wmo.int/en/media/press-release/global-temperatures-set-reach-new-records-next-five-years.

4 "Temperature | Copernicus," accessed June 20, 2023, https://climate.copernicus.eu/esotc/2022/temperature.

5 "July 2023 Is Set to Be the Hottest Month on Record," World Meteorological Organization, July 27, 2023, https://public.wmo.int/en/media/press-release/july-2023-set-be-hottest-month-record.

6 "Canada's Wildfires Have Burnt an Area 16 Times Larger than Normal," The Economist, accessed June 26, 2023, https://www.economist.com/the-americas/2023/06/15/canadas-wildfires-have-burnt-an-area-16-times-larger-than-normal.

7 J. S. Nanditha et al., "The Pakistan Flood of August 2022: Causes and Implications," *Earth's Future* 11, no. 3 (2023): e2022EF003230, https://doi.org/10.1029/2022EF003230.

8 "Disasters and Climate Change," IDMC, accessed June 26, 2023, https://www.internal-displacement.org/disasters-and-climate-change.

9 "IDMC | GRID 2023 | 2023 Global Report on Internal Displacement," accessed June 20, 2023, https://www.internal-displacement.org/global-report/grid2023/.

10 Rhett Butler, "No Place to Run: Climate Could Force 1.2 Billion to Move by 2050. Is the World Even Remotely Ready?," Mongabay News [BLOG] (Menlo Park, United States: Newstex, December 9, 2022), https://www.proquest.com/docview/2748318906/citation/F0AFD37C203243F7PQ/1.

The following chapters present an overview of how climate change contributes to environmental degradation and its effects on human mobility. Additionally, the role of other migration drivers will be explored to understand the interconnected dynamics and challenges. A case study on Rwanda will shed light on the country's response to climate change, exploring how sudden onset disasters including floods and landslides affect mobility. Finally, the paper presents a set of recommendations, emphasizing the need to prioritize the most vulnerable and those least equipped to adapt, particularly in contexts where the effects of climate change are acute and inescapable. These recommendations further highlight the importance of simultaneously enhancing climate resilience within national adaptation strategies to address the complex landscape of climate-induced migration.

3 UNDERSTANDING THE ENVIRONMENTAL DIMENSIONS

Before delving into the correlation between climate change end environmental degradation in the context of migration and displacement, below is an outline of key terminology that is used in the report.

3.1 Climate Change Impact on Environmental Stress

Climate change is amplifying environmental degradation, leading to an increase in both sudden and slow onset hazards. Sudden natural disasters include floods, storms, heat waves, and fires, while slow-onset natural disasters involve rising sea levels, droughts, desertification, land and forest degradation, and rising temperatures – all of which are consequences stemming from human-induced climate change.

Key terminology and concepts

Environmental degradation	The reduction of the capacity to meet social and ecological objectives and needs.[11]
Climate change	According to the United Nations, climate change refers to long-term shifts in temperatures and weather patterns which can be natural but increasingly since the 1800s are because of human activities and primarily the burning of fossil fuels.[12]
Human mobility	Describes population movement that includes displacement, migration, and planned relocation.[13]
Climate-induced migration	Herein this term refers to migration due to extreme weather events or sudden natural disasters – i.e., floods, storms, heat waves and wildfires. Also used to refer to migration linked to more gradual environmental changes – i.e., rising sea levels and droughts. Often denoting voluntary movement, it can broadly be applied to involuntary movement and situations of internal movement as well given the mixed flows of movement – therefore generally representing the movement of people due to climate change.
Displacement	Refers to the forced abandonment of a person's home.
Migration	Generally, can encompass both voluntary and involuntary movement, with an emphasis on crossing international borders.

11 Karoline Popp, *Climate Change, Environmental Degradation and Migration*, International Dialogue on Migration 18 (Geneva: International Organization for Migration, 2012).

12 "What Is Climate Change?," United Nations (United Nations), accessed June 26, 2023, https://www.un.org/en/climatechange/what-is-climate-change.

13 "Key Definitions," Platform on Disaster Displacement, accessed July 27, 2023, https://disasterdisplacement.org/the-platform/key-definitions/.

In the year of 2021 alone, a staggering 23.7 million new displacements related to disasters were recorded, with 22.3 million attributed to weather-related phenomena including floods and droughts.[14] The escalation in the frequency and severity of disasters, coupled with gradual changes of the environment, directly affects human mobility as communities struggle to sustain their livelihoods. Notably, extreme weather events now displace twice as many people as war or violence.[15]

Countries must address the challenge of mobility stemming from the surge in extreme weather events. Between 2000 to 2019, 7,348 disaster events were recorded – a marked escalation from the previous twenty years, which saw 4,212 disasters linked to natural hazards. This sharp increase is due to a rise in climate-related disasters, including extreme weather events. The number of climate-related events surged from 3,656 (1980-1999) to 6,681 (2000-2019), with floods alone doubling in frequency over the past two decades.[16] The effects of slow or gradual environmental degradation are equally consequential, driving people to leave their communities due to the destruction of livelihoods and food security. The environmental dimensions of climate-induced migration are part of a broader spectrum of factors driving migration. Recognizing the role of environmental degradation becomes paramount in understanding the escalating role of climate change in human mobility. The problem is clear: as climate change advances, environmental destruction intensifies, creating mounting pressure for individuals and communities to migrate.

3.2 Environmental Degradation and Human Mobility – Policy Challenges

In developing policies concerning the impact of environmental degradation on human mobility, policymakers must address several challenges. Firstly, there are migration flows that are undocumented, leading to a lack of comprehensive data on the issue. International migration is hard to quantify, as are estimates of internal migration, given the significant number of undocumented migrants.[17] Secondly, data on migration resulting from sudden disasters are more readily available compared to gradual environmental changes.[18] Despite evidence showing that environmental degradation also drives large-scale migration flows, monitoring numbers proves challenging due to people migrating alone or in small groups, unlike the larger movements seen during sudden disasters. This makes identifying them as environmental migrants more challenging.

4 CLIMATE CHANGE, MIGRATION AND DISPLACEMENT

4.1 The Interconnected Nature of the Issue: Multiple Migration Drivers

People migrate for a variety of reasons, be it for work, economic opportunities, study, or family. Although some of this movement is voluntary, there are also those who must leave their homes forcibly – often seeking food security, fleeing conflict or persecution, or due to environmental change. It is important to understand the interrelated and compounded nature of the drivers of migration, as the complex pressures behind human mobility are often intertwined. When considering the various triggers, they can be grouped in different ways. To begin with, they can be considered at three levels: macro, micro and meso. At the macro level, droughts, soil fertility, crises, population density, economic factors such as income, and social factors such as family ties and discrimination are examples of the drivers of migration. At the micro level, age, gender, education, and one's perception of risks and opportunities also play a role. The meso level highlights the specific contexts that

14 "People on the Move in a Changing Climate – Linking Policy, Evidence and Action," May 21, 2020, 34.

15 "Climate Change Link to Displacement of Most Vulnerable Is Clear | Department of Economic and Social Affairs," United Nations Department of Economic and Social Affairs Sustainable Development, April 22, 2021, https://sdgs.un.org/news/climate-change-link-displacement-most-vulnerable-clear-33087.

16 "The Human Cost of Disasters: An Overview of the Last 20 Years (2000-2019) | UNDRR," October 12, 2020, http://www.undrr.org/publication/human-cost-disasters-overview-last-20-years-2000-2019.

17 Cecilia Tacoli and David Okali, "The Links Between Migration, Globalisation and Sustainable Development," *International Institute for Environment and Development,* 2001.

18 Hildegard Bedarff and Cord Jakobeit, "Climate Change, Migration, and Displacement: The Underestimated Disaster | Climate-Diplomacy," *Greenpeace Germany*, May 29, 2017.

also impact people's decision to migrate, including available social networks at home and in the diaspora, and notably, the cost of migration.[19]

Climate is often acting in combination with other factors to impact migration and displacement. IPCC research indicates that, particularly in regions such as Eastern Africa where environmental change is present and increasing, it is influencing human mobility. In areas affected by slow-onset disasters such as increased precipitation or drought, there is a clear impact on food security given the dominance of the agriculture sector in the region. In Tanzania, a country where the agriculture sector employs about 80% of its labour force, rainfall variability in the north-east has been linked with food insecurity and, consequentially, human mobility. With 95% of the agricultural sector rain-fed and subsistence based, rainfall variability in the form of seasonal shifts, prolonged dry spells, and drought incidences has become the most notable threat to livelihoods. With households suffering from declining yields, many have adopted different coping mechanisms including seeking labour opportunities outside of their villages or sending their children away for labour prospects, while others choose to migrate to areas with better pastures.[20] While times of disaster can result in temporary migration when people seek refuge, individuals (men in most cases) may choose to migrate permanently in search of alternative sources of income when their livelihoods have been destroyed.[21]

Understanding the complexity of the interconnected drivers and the challenges this poses is crucial:

- Assessing the true impact of climate change on human mobility becomes difficult due to the presence of various economic, political, social, and cultural factors influencing migration decisions alongside environmental issues.[22]
- Crafting effective adaptation policies in response to climate-induced migration becomes more challenging when issues are addressed in silos rather than analyzed in the larger context of the various pressures driving human mobility.

5 CASE STUDY: RWANDA

5.1 Background and Key Trends

Africa is the most vulnerable continent to climate variability and climate change. With a heavy dependence on climate-sensitive sectors, the continent faces simultaneous challenges such as conflicts and poverty, exacerbating the impact of the climate crisis and threatening development progress. Consequently, there has been an increase in climate-induced migration on the continent. Natural disasters are projected to induce migration in the coming years that will affect millions of people in sub-Saharan Africa (SSA) with floods, droughts, and sea-level rise predisposing people in SSA to migrate. In East Africa, recent economic development has been concentrated in the climate-sensitive agricultural sector, which in some countries contributes to over 50% gross domestic product.[23] The rising frequency and severity of floods in the region have compelled farmers to seek jobs elsewhere. Globally, conservative estimates indicate that up to 60 million people are forcibly displaced annually due to food insecurity and the disruptive impact of climate change on livelihoods. Countries like Somalia, Ethiopia, and Kenya are some of the most badly affected in the region, with over 30 million people already facing food insecurity, leading to hunger-related deaths every 36 seconds in 2022.[24]

Rwanda, a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and to the Kyoto Protocol, is com-

19 Bedarff and Jakobeit.

20 Tamer Afifi, Emma Liwenga, and Lukas Kwezi, "Rainfall-Induced Crop Failure, Food Insecurity and out-Migration in Same-Kilimanjaro, Tanzania," *Climate and Development* 6, no. 1 (January 2, 2014): 53–60, https://doi.org/10.1080/17565529.2013.826128.

21 Hildegard Bedarff and Cord Jakobeit, "Climate Change, Migration, and Displacement: The Underestimated Disaster | Climate-Diplomacy," May 29, 2017, https://climate-diplomacy.org/magazine/conflict/climate-change-migration-and-displacement-underestimated-disaster.

22 Afifi, Liwenga, and Kwezi, "Rainfall-Induced Crop Failure, Food Insecurity and out-Migration in Same-Kilimanjaro, Tanzania."

23 Erin Llwyd Owain and Mark Andrew Maslin, "Assessing the Relative Contribution of Economic, Political and Environmental Factors on Past Conflict and the Displacement of People in East Africa," *Palgrave Communications* 4, no. 1 (April 24, 2018): 1–9, https://doi.org/10.1057/s41599-018-0096-6.

24 Butler, "No Place to Run."

mitted to addressing the impacts of climate change. This small landlocked East African nation, known as the 'Land of a Thousand Hills' due to its hilly, mountainous terrain, has a tropical climate, diverse ecosystems, and high vulnerability to the adverse effects of climate change. Despite being one of Africa's fastest-growing economies, Rwanda still struggles to ensure food security and promote progress in the agricultural sector, which employed nearly half of the country's labor force and accounted for 24% of real output in 2021.[25] The country relies heavily on rain-fed agriculture, which is especially vulnerable to climate shocks and predominantly produced by small-holder farmers.[26] Another 16% of Rwanda's output is in climate-sensitive services such as food and beverages, trade, transport, and hospitality.[27]

Rwanda faces numerous natural hazards including droughts, floods, landslides, and storms, which have a profound impact on the economy, lives, and livelihoods of its people. Climate related disasters in 2018 inflicted a cost of over $200 million in damages to property, livestock, and other assets.[28] Recovery and reconstruction costs from the 2018 floods were estimated at 336.3 million USD.[29] By 2030, additional net economic loss could be equivalent to a loss of almost 1% of GDP annually. Historically, droughts have had the widest reach, with the 1996 event affecting 12% of the population. Nevertheless, since the early 2000s, the frequency and severity of disasters, particularly floods, landslides, and droughts, have escalated considerably. These events have resulted in both human casualties and significant economic and environmental losses. Over the past decade, Rwandans have been among the world's most affected by landslides, underscoring the urgency of addressing climate-induced hazards in the country.[30]

As the climate crisis persists, Rwanda is expected to experience a rise in the risk and intensity of flooding due to increased frequency and intensity of heavy rainfall events. The issue is further compounded by recent population growth and land scarcity, which have driven settlements in flood-prone areas. These floods devastate not only livelihoods but also the soil essential for sustaining crops. Rwanda loses nearly 600 million tons of soil annually due to torrential rain, severely affecting agricultural productivity and creating a looming risk of famine.[31]

The risk of drought is also significant, particularly in the country's eastern and central regions where increased aridity threatens livelihoods. Past droughts have resulted in famine, displacement, and biodiversity loss, amplifying the challenges faced by communities. Furthermore, the Northern provinces are prone to landslides due to their high susceptibility to soil erosion and heavy rainfall. Rwanda's hilly and sloping landscape exacerbates the risks of landslides, making them a recurrent concern.[32]

The cumulative impact of these climate challenges raises serious concerns about their influence on human mobility.

5.2 Climate and Human Mobility

Climate change is a powerful driver of internal migration due to its profound impacts on people's livelihoods and the diminishing livability of highly exposed regions. By 2050, the SSA region could potentially witness a staggering 86 million internal climate migrants.[33] In Rwanda, the anticipated longer-term effects of climate change are expected to considerably impact displacement and exacerbate prevailing vulnerabilities. In May of 2023, the government reported that a single flood killed at least 120

25 World Bank Group, "Rwanda Country Climate and Development Report," September 2022, http://hdl.handle.net/10986/38067.

26 World Bank Group, "Climate Risk Country Profile: Rwanda," 2021, https://climateknowledgeportal.worldbank.org/sites/default/files/2021-09/15970-WB_Rwanda%20Country%20Profile-WEB.pdf

27 World Bank Group, "Rwanda Country Climate and Development Report."

28 "Rwanda Climate Change Portal," Republic of Rwanda - Rwanda Climate Change Portal, accessed August 4, 2023, https://climatechange.gov.rw/index.php?id=2.

29 World Bank Group, "Rwanda Country Climate and Development Report."

30 World Bank Group, "Rwanda Country Climate and Development Report."

31 Rahul Balasundaram, "Climate Change Is Causing Increasing Levels of Floods and Landslides in Rwanda," Climate Refugees, May 22, 2023, https://www.climate-refugees.org/spotlight/2023/22/rwanda-floods.

32 Climate Risk Profile: Rwanda (2021): The World Bank Group.

33 "Groundswell Report," World Bank, September 13, 2021, https://www.worldbank.org/en/news/press-release/2021/09/13/climate-change-could-force-216-million-people-to-migrate-within-their-own-countries-by-2050.

people – the highest death toll from a flood reported in a single day in its recent history.[34] Heavy rains triggered landslides and floods in various regions across the Western, Northern, and Southern Provinces, leading to thousands being displaced, homes destroyed, and entire villages affected.

According to the IDMC, from 2008 to 2022, Rwanda experienced 25,000 internal displacements due to 14 flooding disaster events.[35] In 2023 alone, the heavy rains and landslides in early May which affected various parts of the country resulted in 51,905 people being affected, 5,472 houses destroyed, and vast destruction of crops and livestock.[36]

Of particular concern is the disproportionate impact of climate change on the most vulnerable segments of the population, who often possess the lowest resilience. In Rwanda, refugees residing in camps and their host communities face elevated risks of climate-related hazards. Due to constraints on land availability, refugee camps are situated in areas more prone to extreme weather events.[37]

Rwanda faces significant challenges related to climate change, including increased displacement risks, severe flooding, and the amplified vulnerability of communities with low resilience. Addressing these issues requires comprehensive strategies and efforts to protect communities and build resilience in the face of a changing climate.

5.3 Examples of Progress

A range of innovative efforts involving various stakeholders have been adopted to combat the adverse effects of climate change. Rwanda is a signatory of the Kampala convention of the African Union (AU), adopted in 2009 and taking effect in 2012, which commits signatory states to protect and support people who have been displaced due to natural and human-induced disasters, including climate change.

A successful example of proactive initiatives addressing climate-induced challenges for vulnerable communities is the Kamara Integrated Development Model Village. Prior to its inception, households were living on slopes in High Risks Zones (HRZs) on the hilltops of Jali, Rebero and Kigali Mountains (see Figure 1). The model village, inaugurated in 2019, was established with the objective of resettling affected households and restoring degraded landscapes.[38] Presently, it accommodates 240 households comprised of 1,338 people (see Figure 2). The model village includes greenhouses for cultivating fruits and vegetables, a clinic, a school offering free education to 280 students up to nine years of age, and an early childhood development (ECDC) facility where children are cared for while parents work (E. Nzabandira, personal communication, July 31, 2023). Built and financed by the Government of Rwanda, in collaboration with the Rwanda Defence Force (RDF) Reserve Force, a total of 130 Integrated Development Program (IDP) model villages have been constructed across the country.[39]

Figure 1

34 Arafat Mugabo and Emma Bubola, "Flooding and Landslides Kill Over 120 in Rwanda.," *The New York Times*, May 4, 2023, A12(L)-A12(L).

35 "Country Profile: Rwanda," IDMC - Internal Displacement Monitoring Centre, accessed August 4, 2023, https://www.internal-displacement.org/countries/rwanda.

36 "Rwanda: Floods and Landslides - DREF Operation N° MDRRW022 - Rwanda | ReliefWeb," May 17, 2023, https://reliefweb.int/report/rwanda/rwanda-floods-and-landslides-dref-operation-ndeg-mdrrw022.

37 N. K. Dampha et al., "Climate Resilience in Rwanda: Evaluating Refugees' and Host Populations' Vulnerability to Risk," *Forced Migration Review,* no. 69 (2022), https://ora.ox.ac.uk/objects/uuid:867d4e47-9e48-45f2-84cf-6d82f390babd.

38 "President Kagame Inaugurates Karama Model Village to Mark Liberation Day," Ministry of Defence - Updates, July 3, 2019, https://www.mod.gov.rw/news-detail/president-kagame-inaugurates-karama-model-village-to-mark-liberation-day.

39 "Karama Integrated Model Village, Home for 240 Households," Ministry of Infrastructure, accessed September 27, 2023, https://www.mininfra.gov.rw/updates/news-details/karama-integrated-model-village-home-for-240-households.

Figure 2

Addressing climate change also requires significant climate financing to achieve climate action goals. A report by the Rockefeller Foundation and the Boston Consulting Group, ahead of the 27th United Nations Climate Change Conference (COP27) in Sharm El Sheikh, Egypt, revealed that only about 16% of global climate finance needs are being met, with an annual investment flow of approximately $3.8 trillion required globally through 2025.[40] Notably, Africa and Asia face the largest unmet needs.

Climate financing in Rwanda is facilitated by key institutions such as the Development Bank of Rwanda (BRD) and the Rwanda Green Fund (FONERWA). The BRD plays a vital role as a development bank, supporting the private sector's engagement in climate finance to drive the country's goal of becoming a climate-resilient economy by 2050. As the initial market player, the BRD mitigates risks that have discouraged commercial banks and insurers, enabling them to contribute to Rwanda's ambitious 2020 Nationally Determined Contributions (NDCs) of achieving a 38% emission reduction costing roughly USD 11 billion. With the public sector alone unable to raise the necessary funds, the private sector must be involved and incentivized. On the sidelines of COP27 in 2022, the BRD and FONERWA, with support from a range of development partners, launched Ireme Invest in response to this need. Ireme Invest is a green investment facility that will support Rwanda's private sector to access green finance and work to increase the sector's contribution to the country's response to climate change by offering a range of financial instruments tailored to meet the needs of the private sector.[41]

The Rwanda Green Fund (FONERWA) is an environment and climate change investment fund – one of the first of its kind in Africa – responsible for obtaining and deploying finance in the country. A remarkable example of progress made is the Green Gicumbi Project, targeting the Gicumbi District in the Northern Province, which ranks highest in exposure to climate hazards and second highest in sensitivity to climate-related impact. Implemented by FONERWA, the six-year project aims to strengthen the resilience of rural communities through adaptation strategies that reduce vulnerability to climate change and risk exposure.[42] By building climate resilient settlements for the most vulnerable in HRZs, restoring and enhancing watersheds, and improving community forest management, the project has significantly reduced the human loss resulting from recent floods in the area. The project's approach effectively combines tree planting, soil erosion reduction, and household relocation, demonstrating its efficacy in helping vulnerable communities adapt, relocate when necessary, and enhance their resilience in high-risk areas.

6 MOVING FORWARD

In the face of an existential climate crisis, regions that have contributed least to the issue bear its harshest consequences. Despite its minimal contributions of 0.003 percent to global greenhouse gas emissions, Rwanda grapples with the adverse impacts of climate change.[43] The country has made tremendous strides in responding to the crisis, adopting innovative

40 "New Rockefeller Foundation and BCG Research Reveals Size of Gap in Climate Finance," *The Rockefeller Foundation* (blog), April 11, 2022, https://www.rockefellerfoundation.org/news/new-rockefeller-foundation-and-bcg-research-reveals-size-of-gap-in-climate-finance/.

41 BRD PRMC, "Rwanda Launches $100 Million Facility to Boost Private Sector Access to Green Finance," *Development Bank of Rwanda* (blog), November 8, 2022, https://www.brd.rw/./rwanda-launches-100-million-facility-to-boost-private-sector-access-to-green-finance/.

42 "FP073: Strengthening Climate Resilience of Rural Communities in Northern Rwanda," Text, Green Climate Fund (Green Climate Fund, March 1, 2018), https://www.greenclimate.fund/project/fp073.

43 "Sustaining Growth in Rwanda Requires Building Resilience to Climate Shocks," World Bank, accessed August 14, 2023, https://www.worldbank.org/en/news/press-release/2022/09/29/sustaining-growth-in-rwanda-requires-building-resilience-to-climate-shocks.

solutions to address climate-induced displacement, and showing itself to be well ahead of many countries in its response to challenges from climate change.

The efforts undertaken by Rwanda highlight lessons and possibilities of significance on a global scale. The Rwandan case is particularly pertinent for nations facing similar challenges – encompassing environmental degradation, economic dependence on climate-vulnerable sectors, and a surge in displacement and migration driven by climate events. Within a country where a substantial portion of the workforce is engaged in the climate-sensitive agriculture sector, and vulnerabilities to climate impacts are on the rise, Rwanda's proactive and ambitious response stands as an exemplary model. From this case study, crucial insights and considerations emerge for governments and policymakers in addressing the intricate challenges of climate-induced displacement, migration, and environmental degradation:

1. **Prioritizing Vulnerable Communities and High-Risk Areas in the Face of Increasing Climate Events:** The Rwanda case study emphasizes the need for governments to address mobility within their borders by focusing on safeguarding and potentially relocating citizens from high-risk areas as an integral part of their climate adaptation strategy. Notably, floods are not the only climate-related disasters experiencing a substantial increase; storms, droughts, wildfires, and extreme temperature events have all recorded significant global upticks in the past two decades.[44] Governments must take proactive measures in the face of this trend, especially in finding solutions for those disproportionately affected by such events.

   Particularly, vulnerable groups lacking local adaptation options or means to move should be a priority. Addressing the needs of those willing but unable to relocate is crucial as they face heightened impoverishment and survival risks.[45] Furthermore, as exemplified by Rwanda's model village initiative, planned relocation should focus on enhancing the development prospects of the involved communities in their new locations.[46]

2. **Enhancing Climate Resilience in Communities Capable of Local Adaption:** While devising strategies to support and facilitate relocations is crucial, these strategies should align with efforts to bolster climate resilience whenever possible. Strengthening the resilience of communities capable of local adaptation is pivotal to curbing displacement and forced migration, even if on a temporary basis.

   The Green Gicumbi project exemplifies that community relocations need not occur in isolation as the project aims to increase the resilience of vulnerable communities in the Gicumbi District. This approach is especially pertinent for nations grappling with vulnerable groups disproportionately affected by climate events, particularly those reliant on agriculture. The project showcases the dual approach of constructing climate-resilient homes for relocated communities while ensuring their proximity to or integration within their original locality. Additionally, there is an emphasis on fostering climate-resilient agriculture and new environmentally friendly settlements.

   Furthermore, the project strives to restore and enhance ecosystems in degraded watersheds and increase the capacity of communities to sustainably manage forest resources.[47] Such initiatives help to ensure that, where possible, relocated communities and individuals can retain proximity to their homes, businesses, and livelihoods. This comprehensive approach not only supports the ongoing process of relocation but also enhances the capacity of these communities to withstand future climate climate-related challenges and fosters their sustainable development. This integrated strategy shows the value and possibilities for governments

44 "The Human Cost of Disasters."

45 Susan F Martin et al., "Climate Change, Human Mobility, and Development," *Migration Studies* 9, no. 1 (March 1, 2021): 142–49, https://doi.org/10.1093/migration/mnaa030.

46 Aimée-Noël Mbiyozo and Margaret Monyani, "Climate-Linked Mobility: A Key to Development" (Institute for Security Studies, July 28, 2023), https://issafrica.org/research/policy-brief/climate-linked-mobility-a-key-to-development.

47 "Strengthening Climate Resilience of Rural Communities."

worldwide of fostering climate resilience while effectively managing mobility challenges triggered by escalating climate events.

3. **Assessing and Addressing Triggers of Internal Displacement:** For national and global actors, recognizing the ramifications of mobility at local levels within the global framework is key. Many migrants from Africa who are seeking refuge in Europe have previously experienced displacement within their own borders due to natural disasters, violence, or wars. Mitigating the root causes and lack of opportunities in countries of origin can influence migration decisions.[48] For instance, farmers facing prolonged droughts or erratic climate patterns are under increasing pressure to relocate to preserve their livelihoods. This pressure is compounded for those already grappling with poverty, water scarcity, crop failures, and food insecurity. Focusing efforts at a national level to aid the most vulnerable individuals with limited adaptative capacities can exert meaningful influence over patterns of forced displacement and migration.

   Within the African context, attention must be directed towards individuals and communities who find themselves at the nexus of vulnerability and employment within the climate-sensitive agricultural sector. Efforts to strengthen their ability to adapt demands greater attention: agriculture engages over 60% of the working-age population in many African countries, and it is severely impacted by climate change-induced variations in rainfall, disruptive planting and cropping patterns, and the subsequent decline in yields and household income. Worryingly, many of those working in this sector are self-employed with little capital and training. Consequently, aiding individuals facing this reality is a key part of the adaptation process.[49]

Policymakers and governments must confront the complex impact of climate change and environmental degradation on human mobility and the economic and social challenges posed by the increasing climate-induced disasters that are impacting communities worldwide. By addressing these issues comprehensively and proactively, stakeholders can lay the groundwork for a more sustainable and resilient future.

48 Bedarff and Jakobeit, "Climate Change, Migration, and Displacement," May 29, 2017.

49 "Africa's Climate Crisis, Conflict, and Migration Challenges," Brookings, accessed August 14, 2023, https://www.brookings.edu/articles/africas-climate-crisis-conflict-and-migration-challenges/.

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