Great Caribbean Shifts

The Greater Caribbean Climate Mobility Report

Enabling Positive Adaptation Journeys in the Greater Caribbean

Global Centre for Climate Mobility

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Foreword

The Greater Caribbean is racing against time.

Defined by the sea, its pristine beaches, and the diversity and richness of its people and ecosystems, our region is as beautiful as it is vulnerable. Millions of people are settled along the coast in low-lying areas that are already losing ground to sea-level rise. Increasingly devastating hurricanes, extreme temperatures and water shortages threaten to uproot communities and foreclose opportunities for future generations. While this report was being written, global warming exceeded the 1.5°C target set in the Paris Climate Agreement. For a region grappling with debt and inequality, and dependent on climate-vulnerable industries such as tourism and agriculture, uncharted and possibly rough waters lie ahead.

Already, the climate crisis is causing significant damage to public finances, businesses and households in the region, affecting people's wellbeing and their mental health. As more extreme weather and disasters reshape the land, sea and ecosystems, they undermine the livelihoods, heritage, and social and cultural fabric of affected communities. Life in the Greater Caribbean is characterized by increasingly difficult choices, on where and how to rebuild, and whether to stay at serious risk or move at great uncertainty.

Alleviating the burden of such decisions starts with increasing our region's capacities for anticipation. When governments are prepared to center their action around affected people and to anticipate climate mobility, they can better support the adaptation journeys of their communities, enable agency, protect rights and preserve dignity. **The Great Caribbean Shifts Report** provides modelling projections and scenarios on where people may decide to move in order to live under more favorable climate conditions. This knowledge helps identify hotspots and anticipate possible climate mobility futures for affected communities today. The Report also provides insight into how people currently experience climate change and when they consider leaving home. Based on the knowledge gained through the modelling, field research and stakeholder consultations, the Report offers an Agenda for Action as a comprehensive blueprint for navigating the region's uncertain trajectory.
Many of the policies and tools needed to act are already at our disposal. The work ahead lies in bringing them together under a common regional framework that allows for protecting people's right to stay, while increasing preparedness for forced displacement and harnessing climate mobility to achieve climate-resilient development. Pathways for climate mobility can address labour and skills needs and foster regional economic growth, while ensuring effective protection for persons forcibly displaced by climate impacts.

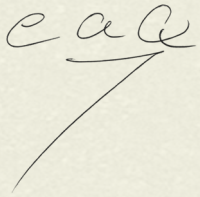
The Greater Caribbean, with its rich history of cultural and economic exchange, is uniquely positioned to develop innovative solutions to climate mobility. These solutions must be co-created with all constituencies in a whole-of-society approach. By tapping the diverse knowledge, experiences, and aspirations of our region, grounding our work in data and evidence, and centering our action around affected communities, we can transform the threat of climate change into an opportunity for deeper regional cooperation and resilience.

The path forward requires sustained commitment,

innovation, and, above all, unified action. By working together, and with our international partners, the countries of the Greater Caribbean can lead the way and amplify the needs and priorities of island and coastal States in global forums.

This Report, prepared by the Global Centre for Climate Mobility (GCCM) and the Association of Caribbean States, and developed in collaboration with the wider United Nations System, the World Bank, and hundreds of leading practitioners, experts, and stakeholders from the region, speaks to the power of cooperation. It is a statement of confidence that we can address hard challenges if we face them together and build on what is working. Rooted in the strength and diversity of our communities, we can navigate these transformative times and grow resilient together.

H.E. Carlos Alvarado Quesada
Former President of Costa Rica & Chair of the GCCM Foundation Advisory Board



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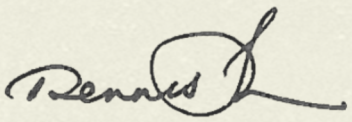
President of the 78th Session of the United Nations General Assembly



About the GCCMI

The Greater Caribbean Climate Mobility Initiative (GCCMI) aims to enable governments, affected communities and partners to anticipate, plan for, and harness climate mobility to support positive community transition across the region.

Forced mobility is emerging as the human face of the climate crisis. There is global consensus that the climate crisis threatens the well-being and livelihoods of people in many ways, including through the greater frequency and severity of extreme weather events, water scarcity, decreased crop yields, rising temperatures, unhealthier air, and rising sea level. The climate crisis is also emerging as an accelerator of forced displacement and migration. By 2050, it is estimated that over 200 million people globally may be forced to leave their homes due to climate-related reasons.[1]

Many of the countries most exposed to disasters and at risk of displacement are in the Greater Caribbean. Extreme weather patterns, intensifying climate stressors, and increased vulnerability of ecosystems are already undermining social and economic development in the region. Coastal communities are particularly impacted given their reliance on the sea and marine ecosystems, as are small islands dependent on tourism. Likewise, rural communities whose livelihoods are based on nature and agriculture will see harsh adverse effects. In the face of extreme weather and deteriorating environmental conditions, Greater Caribbean communities are already forced to make difficult decisions about staying in place or leaving home.

In the face of these challenges, the Greater Caribbean Climate Mobility Initiative (GCCMI) was launched in 2022 to support nations in the Greater Caribbean in harnessing the potential of mobility for climate resilient development in the region and coordinating efforts to address climate-forced displacement and migration through comprehensive and locally anchored solutions. By anticipating future climate risks and movements of people, the Initiative seeks to support planning and cooperation to enable positive community transition, create safe climate mobility pathways and protect the rights and dignity of those who are forced to move.

The GCCMI is a joint effort of the Global Centre for Climate Mobility (GCCM) and the Association of Caribbean States (ACS), in close collaboration with United Nations Development Programme (UNDP), the UN Office for Disaster Risk Reduction (UNDRR), the UN Framework Convention on Climate Change (UNFCCC), the International Organization for Migration (IOM), and the World Bank. By building the evidence base, bringing together diverse actors and stakeholders from across the region and beyond, and advancing a common Agenda for Action, the GCCMI works to foster a growing climate mobility ecosystem in the Greater Caribbean and to support the integration of policy action across sectors and levels of governance. In this way, the region can build collective resilience, uphold people's right to stay, and consolidate sustainable development gains under more severe climatic conditions.

The Global Centre for Climate Mobility (GCCM) is a global entity at the intersection of climate action and human mobility, enabling positive adaptation journeys for people and communities on the frontlines of the climate crisis, upholding their adaptive capacities and "right to stay". Hosted at the United Nations Office for Project Services, the GCCM is supported by champion countries, UN Agencies, the World Bank, regional organizations, philanthropies, civil society, and research institutions.

The GCCM advances positive community transitions in climate-vulnerable regions through regional initiatives that support governments and frontline communities to anticipate, plan for, and respond to climate mobility, including the Africa Climate Mobility Initiative (launched in 2021), the Greater Caribbean Climate Mobility Initiative (2022), the Pacific Climate Mobility Initiative (2023), and the Coastal Cities Initiative (2025). The GCCM also enables the Rising Nations Initiative (RNI), which is dedicated to addressing the existential threats posed by sea-level rise. The GCCM is structured around four core Practices: the Knowledge & Policy Hub, the Solutions Lab, the Communities Climate Adaptation Facility (C-CAF), and the Climate Mobility Academy, through which the Centre delivers modeling & research, co-creates locally led solutions, informs policy, fosters partnerships, and builds capacity across the climate mobility ecosystem. It serves as the secretariat for the Coalition for Addressing Sea-Level Rise and its Existential Threats (C-SET), the Ocean Rise and Coastal Resilience Coalition, and the Climate Mobility Elders Group (C-MEG).

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Acronyms

ACS	Association of Caribbean States
CGE	Computable General Equilibrium
COP	Conference of Parties (of the UNFCCC)
ECLAC	Economic Commission for Latin America and the Caribbean
FMA	Free Movement Agreement
GCCM	Global Centre for Climate Mobility
GDP	Gross domestic product
GHG	Greenhouse gas
IDPs	Internally displaced persons
IMF	International Monetary Fund
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
LDCs	Least Developed Countries
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
RCP	Representative Concentration Pathway
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SSP	Shared Socioeconomic Pathway

UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar

Executive Summary

The Greater Caribbean is united by the sea. The Caribbean Sea provides the central shared resource that nourishes the cultures, heritage and economies of island states and coastal countries alike.

Yet, the sea's rise threatens the very existence of the Caribbean way of life. More frequent and intense hurricanes lead to unprecedented high tides and inundations. Irreversible changes in the ocean temperature and acidification further threaten the fragile ecosystems that island and coastal communities depend on for their livelihood. By 2050, low-lying and coastal areas of the Greater Caribbean could see significant declines in GDP per capita due to the climate crisis.

Consequently, up to 8.2 million people in the Greater Caribbean are projected to have permanently moved by mid-century, leading to population shifts within and across countries. As economic opportunities in potential destination areas decline and poverty across the region rises, nearly 6 million people, who might have otherwise moved, will be trapped in place, facing increased vulnerability to climate hazards. Projections indicate that certain groups including the elderly, less educated and poorer segments of the population will be more likely to be left behind. Women are projected to move in slightly higher numbers than men. More women than men are also expected to be discouraged from moving due to climate impacts. Compared to older age groups, young people are more prone to link their preference to move to the impacts of climate change.

Against this backdrop, the Great Caribbean Shifts Report details how people across the region experience the impacts of climate change today; how they are coping and adapting; and how these experiences may shape their decisions to move in the future. It is informed by surveys, focus group discussions, and interviews with more than 2,200 respondents in 14 communities in current climate mobility hotspots in Antigua and Barbuda, The Bahamas, Colombia, Costa Rica, Jamaica, and Suriname. The Report is also informed by cutting-edge modeling of future climate mobility trends across the entire Greater Caribbean, based on a spatial general equilibrium model that simulates the impacts of climate change on the economy, which affects people's decisions to move. Consultation workshops with over 1200 stakeholders from the region and international experts to assess the research and modelling findings led to the development of recommendations for action.

Field Research Findings

The big picture that emerges from the GCCMI's field research is clear:

Climate impacts are already taking a heavy toll on people, economies and ecosystems across the entire region. These encompass negative mental as well as physical health impacts from unpredictable weather patterns and recurrent disasters.

People across the region long to stay in their homes even if the environment around them is changing beyond recognition. Place attachment is strong, and people are ready to press for their right to stay. In many places, local adaptations are already underway, yet the growing costs of disaster recovery and reconstruction are weighing heavily on local communities and government budgets as well as hindering investments in long term adaptation. This is particularly the case of Caribbean Small Island Developing States (SIDS). Damaged public infrastructure and services result in deteriorating living conditions, leading some people to migrate after having weathered severe hurricanes.

Climate mobility is already a part of life for many Greater Caribbean households and communities. People move for economic opportunities, education or family reasons. Yet, those who move generally migrate with

the expectation that it will be temporary, and they will return home. Climate change is altering established movement patterns. Changes in farming cycles cause disruptions and unpredictability to labour mobility. As soils degrade, coastlines erode and flooding claims shores and riverbanks, people are forced to permanently relocate. Respondents from Indigenous and nature-based communities likened the experience of being uprooted from their land, livelihood, culture and heritage to a form of "death."

Traditional gender roles - including the predominance of men in most forms of migration to-date - influence women's intentions and capacity to migrate when faced with climate hazards. Women are more likely than men to report being unable to move despite the desire to migrate. They are also likely to give more weight to climate change when considering future relocation.

Modeling Results

The GCCMI Climate Mobility Model made projections for three possible future scenarios:

The **Green Road** scenario assumes a world of global and regional cooperation leading to more equitable and inclusive development and rapid decarbonization, limiting global warming to 1.5°C by 2050. Under this scenario, 5.8 million people could be forced to leave home due to climate impacts in the Greater Caribbean by 2050.

The **Middle Road** scenario assumes 'business as usual' with continued slow progress towards the Sustainable Development Goals and persistent inequality. Global warming is mitigated to below 2°C by 2050. 6.4 million people in the Greater Caribbean could be forced to leave home over the same period, and nearly 5 million more remain vulnerable to climate impacts, as they lack the means to move.

The **Rocky Road** is a "regional rivalry" scenario, assuming less international cooperation, slow development with high income inequality and rising emissions, driving global warming beyond 2°C. The consequences are severe for the ecosystems and economies of Greater Caribbean countries, especially the SIDS. Climate mobility is projected to increase by 28% compared to the Middle Road scenario. By 2050, 8.2 million people in the Greater Caribbean region could be forced to leave home due to climate impacts under this scenario.

Differences in outcomes between these scenarios suggest that the development paths countries take will shape climate mobility trends in the future. Reducing inequality through inclusive development will improve people's resilience and ability to recover from climate shocks, forcing fewer to migrate. Debt reduction and concessional financing will be needed for the Greater Caribbean countries to pursue this path. Such support will be even more critical as climate change is projected to exacerbate inequalities in the region.

Climate impacts are projected to lead to a population decline and increase in poverty in farming communities. Of the 2.5 million people in the region who could be pushed into poverty due to climate impacts by 2050 under the Middle Road scenario, some 2.2 million are expected to live in rural areas. Coastal areas are projected to account for 75% of all climate mobility in the region, as people move away from rising tides. The region's largest cities with the most diversified economies are projected to see an influx of people looking for safety and new economic opportunities. Meanwhile, smaller cities will serve as springboards for internal and cross-border movements and are projected to see population declines.

Climate mobility is projected to be mostly internal by 2050, especially in the mainland Caribbean countries. Relocation to traditional destinations in North America and Europe will likely dominate cross-border climate mobility and could account for up to 2.4 million people (Rocky Road), around a third of total climate mobility in the region. The United States is expected to receive 70% of those movements. The largest share of cross-border climate mobility from the region will originate in Mexico. Suriname and Guyana are projected to

see the largest number of climate displaced persons as a share of their population (up to 10% and 5%, respectively) by 2050, driven by the negative economic impacts of sea-level rise, extreme heat, and climate related disasters.

Recommendations for Action: Adapt, Protect, Cooperate

To prepare for a future in which more people will be forced to move, governments need to plan for climate mobility and enable people to make informed decisions, by equipping them with the knowledge, rights, and resources to adapt in place and relocate with dignity. Countries in the Greater Caribbean region have begun to recognize climate mobility in their policies, most prominently in national adaptation plans. However, comprehensive policy responses are yet to be developed.

Governments should start with protecting people's right to stay by improving access to climate risk information and by using climate mobility projections to inform participatory adaptation planning.

Adapt Locally

Local solutions – such as mixed farming methods, mangrove planting, water collection & harvesting, and elevated housing – should be scaled up and adopted widely. Enforcing zoning and building regulations as well as improving infrastructure and services in informal settlements and underserved areas would enhance climate resilience. Health systems need to be urgently strengthened to prepare for the impacts of climate hazards like hurricanes, flooding and extreme heat.

Pathways for safe and orderly climate mobility within and beyond the region, paired with investments in skills needed to grow local economies, including the labour markets of larger cities in the Greater Caribbean, will allow people to move with more successful outcomes. Regional cooperation is needed to create safe and regular pathways that protect migrants from abuse and exploitation by criminal networks. Business should be an active partner in building the climate resilience workforce, developing green skills, as well as protecting the rights of migrant workers in the context of climate mobility.

Protect Rights

Increasingly frequent and severe climate impacts threaten people's fundamental rights and pose a growing challenge for States to meet their human rights obligations. In the Greater Caribbean, there is an urgent need to ensure predictability for affected people and communities by developing regional and national legal frameworks and policies that support evacuation and relocation while guaranteeing people's individual and collective rights.

Governments have been using existing regional free movement agreements and immigration laws to respond to cross-border movement related to environmental and climate hazards. However, these provide mostly temporary and event-specific protections. Thus, a gap remains, as existing pathways are yet insufficient to ensure safe mobility and dignified relocation for affected people and communities. The Greater Caribbean can lead from the front by developing a regional framework for climate mobility that will protect the 'right to stay' and those who move, by creating safe and regular pathways for temporary mobility and permanent relocations that advance community resilience and the economic prosperity of the region.

Act Together

Collective action in the region is needed to meet climate mobility challenges. The Greater Caribbean Climate Mobility Initiative set out to mobilize regional and international actors - from governments and intergovernmental organizations to academic and expert institutions to business, civil society and grassroots associations - to develop a common understanding, language and agenda for action on climate mobility in the region.

By being able to anticipate climate mobility and plan accordingly, governments can better utilize their resources and prioritize their efforts toward enabling a positive transition for frontline communities. Conversely, when climate impacts are experienced without anticipation or preparations, they are more likely to result in displacements, a loss of agency, and the degradation of people's livelihoods.

By preparing people and institutions and dedicating more resources to people-centered adaptation and resilience, the countries of the Greater Caribbean can harness climate mobility as a potential driver of development and regional integration even under more severe climatic conditions. Adopting a common agenda for action in regional forums, will enable the Greater Caribbean countries to elevate their mutual priorities on the global agenda. Together, they can take the lead in advancing structural reforms that avail more resources for climate adaptation and set normative standards to protect people's right to stay and ensure regular, safe, and dignified climate mobility pathways for those who move.

Seven Actions for a Positive Transition

Guided by the above three core tenets — Adapt Locally, Protect Rights & Act Together — the GCCMI recommends an Agenda for Action with seven key actions to prepare for climate mobility. Anchored in regional precedents, including the Escazú Agreement, the Cartagena Declaration, and rulings by the Inter-American Court of Human Rights (IACHR), the Agenda directs climate mobility responses in line with meeting the 2030 deadline of the Sustainable Development Goals and the Paris Agreement.

The Agenda for Action outlines concrete measures to advance each of the seven Actions. It calls on Greater Caribbean leaders across sectors and levels of governance, stakeholders, and international partners to:

1. Ensure Access to Climate Risk Information

Recognize climate literacy and the availability and accessibility of relevant climate risk information as fundamental to protecting people's rights and agency in the context of the climate crisis, including for their individual and collective adaptation and mobility decisions.

2. Enable Positive Adaptation Journeys

Support frontline communities in protecting their homes from climate hazards and strengthen their adaptive capacities, as well as agency in decisions to move by scaling up participatory planning, institutional capacities, and investments for climate adaptation, taking account of differences in local exposure and vulnerability to climate hazards.

3. Protect the Right to Stay & Support Relocation in Dignity

Address the threat that climate change poses to people's attachment to place, their land rights, and potentially to the habitability of entire regions and countries by creating legal protections and predictable procedures that define State responsibilities and international commitments in guiding action and informing responses where people's right to stay is threatened.

4. Advance Rights-based Climate Mobility Responses

Establish rights-based responses to climate mobility, anchored in people's right to stay, and the protection of those who are forced to move due to climate impacts, whether internally or across borders, individually or as a community, to uphold their human rights and promote positive outcomes, especially for vulnerable groups.

5. Respond Collectively to Loss and Damage

Assess, document, and address all forms of loss and damage while elevating the visibility of non-economic loss and damage, particularly for countries and communities to whom climate change poses existential threats, such as SIDS and Indigenous peoples.

6. Integrate Climate Mobility into Regional Development Strategies

Build a regional ecosystem that plans for, builds capacities, and addresses climate mobility in the Greater Caribbean by developing common approaches across existing regional cooperation and integration mechanisms, pursuing a division of labor and pooling of resources, and by building public-private partnerships, and embracing the leadership of cities across the region.

7. Strengthen International Solidarity with the Region

Scale up international support for countries of the Greater Caribbean that have historically contributed little to climate change but find themselves on the frontlines of its impacts, resourcing their capacities to adapt and address loss and damage, and enabling people from the region to use mobility to pursue opportunities and strengthen their resilience.

In support of the above Actions, the GCCMI will continue to work with regional Champions, build coalitions, and nurture the climate mobility policy ecosystem in the Greater Caribbean region to advance people-centered, locally led, and well-planned solutions at the intersection of migration governance, climate action, and sustainable development.

Aim and Approach of the Report

The Greater Caribbean region, defined by the Caribbean Sea, includes Mexico, the nations of Central America, northern South America and the Caribbean islands, including many Small Island Developing States (SIDS). The Greater Caribbean Climate Mobility Initiative (GCCMI) focuses on the 25 Member States of the Association of Caribbean States (ACS). In addition to their geographic proximity in the Caribbean basin, ACS member states share similar colonial histories that shape the social, economic, and political challenges confronting them today. The region is highly diverse, home to dozens of Indigenous communities, African descendent populations, and migrants from all over the world. It is also highly exposed and vulnerable to disasters and the impacts of climate change.

Figure 1: Map of Member States to the Association of Caribbean States (ACS)

Figure 1: ACS Member States include Antigua and Barbuda, The Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Venezuela.

The people and communities of the Greater Caribbean region find themselves today on the frontlines of the climate crisis. As their ways of life are being upended by unpredictable weather patterns and more frequent and extreme disasters, many experience a deep sense of uprooting: "home" no longer feels like home. In a region where many people are already on the move, climate change will amplify existing drivers of mobility and force more people from their homes. Climate change impacts negatively affect livelihoods, poverty, and food security.[2] Climate hazards also directly displace people through the destruction of property, shelter, and infrastructure. SIDS in the region face some of the highest disaster displacement risk in the world.[3] As droughts and flooding become more frequent, and tropical cyclones become more severe, communities will be forced to make difficult decisions about whether to rebuild or to relocate.

The Great Caribbean Shifts report is informed by a year and a half of research, including the following projects:

Primary Data Collection - The GCCMI collected primary data in six countries across the region to explore how people currently experience the impacts of climate change, how those experiences shape decisions to stay or leave home, and how people fare once they have resettled.

Modeling -The Greater Caribbean Climate Mobility Model projects how climate hazards may impact the economy and people's decisions to move, shifting the population distribution across the Greater Caribbean through 2050.

Rooted in a combination of lived climate mobility experiences and novel modeling projections, the report offers critical insights into current climate impacts, anticipated risks, and how these might interact with people's mobility preferences. It reflects the strong desire of many frontline communities to stay in place, and documents the loss and damage they are already withstanding. Looking forward, the report highlights projected climate mobility trends across different geographic scales through 2050. Amidst current and anticipated climate threats and mobility responses, the report showcases existing community-driven solutions and policy initiatives. It emphasizes the need for people-centred climate action and rights-based approaches to human mobility to protect people's right to stay and the places they treasure, whilst enabling relocation in dignity and harnessing the movement of people for climate resilient regional development.

The observations and recommendations set forth in this report build on the research and modeling findings. They were further informed by consultations with experts, policy makers and stakeholders. The GCCMI and partners engaged some 1200 participants through its Technical Advisory Group, 10 virtual Stakeholder Consultation workshops, two peer-review workshops on the Agenda for Action and one Stakeholders Forum, designed to share the research findings and the Agenda for Action with all those who contributed to the process.

The Great Caribbean Shifts Report is complemented by the "Voices from the Frontlines" project, which contributed the photography for this Report. The project documents climate impacts and people's responses in some of the places and communities where the GCCMI's research was conducted. The full suite of photos and videos produced can be accessed on the Voices from the Frontlines Digital Platform (voices.climatemobility.org), where the Report is also available for download.

Key Terms and Concepts

Climate mobility

This report explores the complex relationship between climate change and human mobility in the Greater Caribbean region. It employs the term '**climate mobility**' to describe the movement of people that is driven by the adverse effects of sudden- and slow-onset climate impacts. Climate mobility occurs over different distances both within and across national borders and can be temporary, recurrent, or permanent. It involves different levels of constraints, agency, and vulnerability, encompassing a spectrum of movement including, displacement, migration, and planned relocation. Although planned relocation is being considered and carried out in the Greater Caribbean region, it was not directly assessed as part of the research for this report.

The Greater Caribbean Climate Mobility Model projects shifts in population distribution over 20 year intervals, up to 2030 and 2050. It thus captures permanent migration dynamics between identifiable places of origin and destination within and across countries, based on historically observable migration patterns (see 'Climate in-migration,' 'Climate out-migration,' and 'Climate net mobility' in the Glossary for how movement is defined in the model). It does not project circular, seasonal, or temporary migration and displacements that may occur during the projection period, but rather provides a snapshot of the number of people who will have permanently resettled by the end of that period. The model assumes that permanent migration decisions are made on the basis of economic factors, which in turn are affected by climate impacts. It assumes that people have information about factors like wage levels and migration costs for specific destination areas and thus have a degree of agency in decisions to move or stay.

Climate displaced persons

In this report, the term "climate displaced persons" refers to people who are moving and projected to move due to climate change impacts in the region, whether within countries or across borders. While recognizing that people have different degrees of choice and agency in decisions to move, this terminology was chosen to reflect the findings of the GCCMI field research, whereby people across the region described the experience of having to permanently move away from their place of home as a forced uprooting rather than a voluntary decision. Thus, while the GCCMI model assumes that people make informed decisions about when and where to move, climate impacts act as a forcing factor, imposing the need to make these kinds of decisions and constraining people's mobility options as well as their ability to return.

Climate immobility

Just as some people will be compelled to move in response to climate change, others will be deterred from moving and staying in place. Both the primary data collection and the GCCMI Climate Mobility Model find evidence of climate hazards contributing to immobility. Immobility (see 'Immobility' in the Glossary) similarly falls on a spectrum of forced to voluntary – while some people have a strong desire to stay in place despite escalating climate risk, others feel that they cannot move despite wanting to.

The Climate Mobility Model captures immobility as a response to climate change impacts in potential destinations (see 'Climate Immobility' in the Glossary). When climate damages to wages in potential destinations are higher than migration costs, migration to such places becomes less attractive and people are deterred from leaving their homes. Thus, projected climate immobility captures the number of people who stay in place in a scenario with climate impacts negatively affecting potential destinations, while they would have moved in a scenario without climate change. Like mobility, immobility is captured over 20-year time periods. This means that people might have moved temporarily within that timeframe, but are back in their place of origin and thus considered 'immobile' by the end of the projection period (by 2030 and by 2050).

Section 2

The Greater Caribbean Context

Report photography captured by GCCM

2.1

Mobility Dynamics

Across the Greater Caribbean people are moving in search of a better life.

Report photography captured by GCCM

Across the Greater Caribbean, migration, whether to a different country or the next town over, serves as an economic lifeline, a means to find safety from violence, extortion, and persecution, and a window into a new life. Yet migration drivers, trajectories, and outcomes vary widely. Historical and present mobilities in the region provide the backdrop and shape options for decisions to stay or move when faced with climate impacts. Climate hazards compound other drivers of movement. Existing migration trends and networks, cultural and political connotations of migration, and personal migration experiences shape the trajectories, scales, and durations of climate-forced movement. However, some climate impacts are predictable, enabling planning and anticipatory actions to protect people's rights, create opportunity, and reduce loss and damage in the context of climate mobility.

For many decades, the region has seen emigration in pursuit of employment and education, partially facilitated by the migration policies of former colonial powers. The resulting linguistic, diaspora, and family connections continue to pull people toward certain destinations today.[4] For instance, entrenched migration corridors link Spain to the countries of northern South America, including Colombia and Venezuela,[5] whereas the United Kingdom draws migrants from many of the Caribbean islands.[6]

Overshadowing these traditional routes is the pull of the US economy, which draws the highest share of migrants from the region.[7] For most of the 20th century, Mexico was the primary country of origin for migration towards the United States. However, since the 2008-09 financial crisis, Mexico has become a country of transit and destination as movements from Central and South America to the United States have increased.[8] Difficult economic conditions exacerbated by the financial crisis and the shock of COVID-19, violence associated with gangs and drug cartels, climate hazards and environmental disasters, as well as political instability and weak governance have all contributed to a spike in South-North migration over the last decade.[9] Significant numbers of migrants continue to move through the region in the hopes of reaching the southern border of the United States, enduring treacherous conditions as some cross the Darién Gap between Colombia and Panama[10], the Northern Triangle countries of Guatemala, El Salvador, and Honduras, and through Mexico. Along the route, migrants face threats from organized crime networks engaging in extortion, kidnappings, human trafficking, and other forms of violence.[11]

This criminal activity, combined with high migration costs and the lack of regular pathways, have encouraged increasing numbers of migrants to remain in the region. Intra-regional migration has grown since the turn of the century and experienced a dramatic uptick since the 2010s, largely due to ongoing crises.[12] [13] As of April 2024, 6.6 million Venezuelans - out of a total of almost 8 million refugees and migrants that have fled the country - had settled in other Latin American and Caribbean countries, including Colombia, Panama, Mexico, the Dominican Republic, and Trinidad and Tobago.[14] Haitians and Cubans have also sought refuge in neighboring countries in the Greater Caribbean. Since 2015, the number of Haitians living in the Dominican Republic rose by 22%, and by 7% in The Bahamas.[15] Mexico is among the top three recipients of refugees and asylum seekers from both Haiti and Cuba.[16]

Many economic migrants are also staying in the region. The development of Free Movement Agreements (FMAs) has facilitated an increase in regional labour mobility, for instance among countries that are members of the OECS and CARICOM. The economic promise of tourist destinations, such as The Bahamas and Saint Kitts and Nevis, is drawing Caribbean islanders seeking higher wages and diversified opportunities.[17] Other sectors, such as healthcare, recruit workers from neighboring islands to fill labour shortages that result from health worker emigration to Global North countries.[18] Although there has been an uptick over the last decade, labour migration between islands is not new, and has long been used as a coping mechanism in response to changing climatic, societal and environmental conditions.[19] In Central America, labour migration between neighbouring countries

is also common. For instance, in Nicaragua, the temporary or circular migration of workers to Costa Rica and El Salvador, has been a core pillar of the economy since the 1990s.[20]

Not all migrants in the region cross borders. Internal migration towards cities away from agricultural communities has been commonplace throughout the region, driving decades of urban expansion through the 1980s. Since then, urban-urban flows have replaced rural-urban migration as the dominant internal movement pattern.[21] Youth and women drive much of today's influx into cities, a trend that affects the economic and social systems of origin and destination communities.[22] As all other types of movement, internal migration is driven by a myriad of personal and contextual factors; for many it is pursued as a form of livelihood diversification, for education and employment opportunities. For instance, workers in the agricultural sector have habitually relied on seasonal migration to neighboring towns or regions during breaks in the harvest cycle or drought periods.[23]

Climate hazards are already forcing mobility, including migration and displacement, in the region. According to the IPCC, a "climate hazard is a climate condition with the potential to harm natural systems or society."[24] Climate hazards, such as tropical cyclones, floods, changes in rainfall, drought, rising temperatures and sea-level, affect mobility in the Greater Caribbean in multiple ways. When sudden-onset disasters like hurricanes strike, people often have no choice but to move. Populations of the region's SIDS face some of the greatest disaster displacement risk in the world, with Antigua and Barbuda, Haiti, and Cuba among the top twenty most at-risk.[25] Across the Americas, new internal disaster displacement hit record highs in 2017 and 2020 with 4.5 million and 4.7 million people being displaced, respectively.[26] The two Category 5 hurricanes that hit the region in 2017 displaced around 3 million people from 16 countries and territories, including entire island populations in Barbuda and The Bahamas.[27]

Other movements in the Greater Caribbean are more sensitive to medium-term climate impacts on the economy, or driven by slow-onset but lasting changes, such as the rise in sea level.[28] Rising sea level, increased rainfall variability, and temperature extremes can drive mobility as people flee economic decline, poverty, and food and water insecurity. The economic impacts of changing weather patterns are particularly felt in sectors that rely on natural resources such as agriculture in Central America, and fisheries and tourism in the Caribbean islands. In the agricultural sector, temperature changes have a greater impact on mobility than precipitation. For instance, a study on the impacts of temperature increases in Mexico determined that higher proportions of local employment in agriculture led to increases in international migration during warm spells. The effect was three times higher than during wet spells.[29] Another study in Mexico found that a 10% reduction in average municipal crop yields pushes an additional 2% of the population to emigrate.[30]

People's decisions to move are, however, rarely attributable to a single climate hazard. Across the Greater Caribbean, hazards are experienced simultaneously and sometimes in quick succession. For instance, migration from agricultural communities in the Eastern Caribbean can be linked to the compounding effects of increased hurricane frequency, water stress, heat stress, including more hot days per year, and less overall rainfall combined with more intense rains during wet periods.[31] Disaster displacement tends to be temporary and often results in return.[32] However, when multiple disasters in succession deplete household assets and substantially weaken the ability of communities to rebuild, the continued risk exposure may ultimately motivate people to migrate more permanently.[33] [34]

Whether in response to past damage or in anticipation of future risks, countries in the region have begun to permanently relocate entire communities away from vulnerable islands and coasts. In response to more than a decade of increasingly severe flooding due to sea-level rise, Panama has started relocating the Indigenous

Guna people away from their home island of Gardí Sugdub.[35] In the Eastern Caribbean, Dominica is pursuing plans to relocate communities on its eastern shores that have faced recurrent loss and damage from heavy rainfall events, including Hurricane Erika in 2015 and storms in November, 2022.[36]

As more Greater Caribbean countries consider planned relocation of communities and infrastructure, participatory planning and financial support will be critical to minimize losses and assist people in rebuilding their lives.

2.2

Climate Hazards

Greater Caribbean countries have contributed little to the climate crisis, but are already bearing the brunt of its impacts.

Report photography captured by GCCM

The Greater Caribbean is home to some of the world's most unique ecosystems, including over 9% of its coral reefs. The region's biodiversity has nurtured people and shaped cultures for centuries. However, in the context of climate change, people's reliance on natural resources and coastal amenities increasingly presents risks.

Greater Caribbean countries have contributed less than 5% of total global greenhouse gas emissions (Figure 2). Contributions from Small Island Developing States (SIDS) are even more negligible at 1%. Yet, the Greater Caribbean is one of the world's most climate-vulnerable regions. The Eastern Caribbean is around 12 times more exposed to disasters than the global average.[37] The populations of The Bahamas, Belize, and Puerto Rico are ranked among the top 10 globally for exposure to coastal storms,[38] whereas Suriname and Guyana are projected to suffer some of the greatest impacts from sea-level rise.[39] The Cayman Islands, and Antigua and Barbuda experience the highest GDP losses globally due to cyclonic wind, while The Bahamas, Montserrat, and Dominica are some of the most at-risk to storm surges.[40]

Figure 2: Latin America and the Caribbean share of global emissions

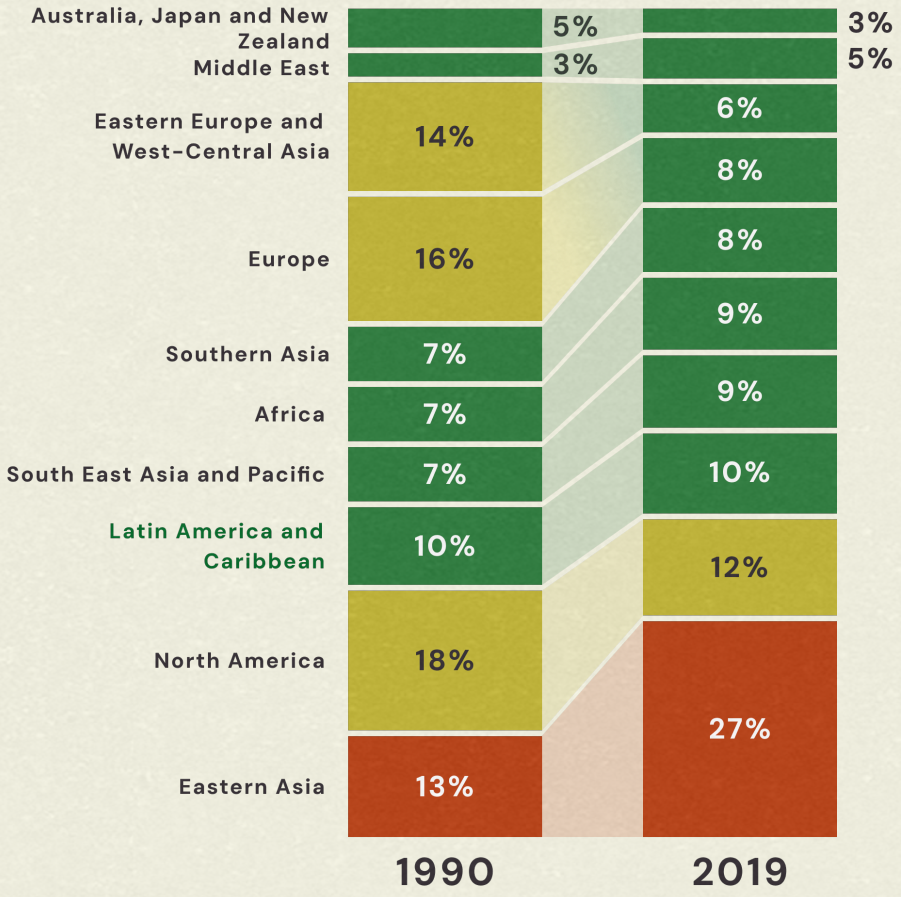


Figure 2: Latin America and the Caribbean share of global net anthropogenic GHG emissions region (1990 – 2019)
Source: Figure 2.9 in Dhakal, S., et al., (2022) Emissions Trends and Drivers. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change[P.R. Shukla, et al., (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA.

Sea-level rise, ocean acidification, hurricanes, flooding, droughts, and extreme heat are some of the top climate hazards currently threatening the region, most of which are projected to increase in frequency and intensity.

Flooding - due mostly to sea-level rise and extreme rainfall - is the most widespread and frequent hazard affecting the Greater Caribbean. Over 33 million people have been impacted by floods since 2000.[41] One third of the affected people are in Colombia, where flooding has impacted over 20% of the population in the last two decades, making it the most flood-affected country in the region.[42] Tropical cyclones are often the main cause of flooding,[43] but the monsoon season can also bring widespread flooding to low-lying areas such as river valleys and coastal lowlands. Among the Caribbean islands, the Greater Antilles are the most exposed to flooding particularly from tropical cyclones. Haiti has experienced the most flood events over the last century, at almost double the rate of the Dominican Republic, which ranks second.[44]

Sea-level rise has increased flood risk in coastal zones, particularly affecting low-lying coastal regions in northern South America. Erosion, subsidence and saltwater intrusion from sea-level rise-related flooding threaten the physical integrity of housing and infrastructure.[45] Suriname is projected to experience some of the gravest impacts of sea-level rise. Over 90% of its population currently lives near the coast, placing it fourth globally in terms of the share of its population (7%) that is likely to be affected by a 1-meter rise in sea level.[46] Both Suriname and Guyana are already prone to coastal erosion and flooding, negatively affecting the agricultural sector in both countries.[47] In this century, several SIDS and low-lying countries are projected to lose considerable territory to rising sea level, with some areas running the risk of becoming uninhabitable. Already, rising sea level is disrupting traditional livelihoods and leading to economic hardship and increased poverty. The erosion of coastal landscapes and the displacement of communities is jeopardizing human health[48] and invaluable cultural heritage and traditional knowledge, including intangible heritage.

Droughts are also widespread throughout the region, affecting 19 million people since 2000.[49] The 2014-2016 drought was deemed the worst on record for a number of Greater Caribbean countries, particularly for those in the Dry Corridor region of Central America where 3.5 million people required humanitarian assistance.[50] It was the second longest meteorological drought since 1928, and had the greatest recorded rainfall deficit.[51] The drought caused additional hazards such as bushfires, dried up water reservoirs threatening water security, and impacted both agriculture and tourism across the region.[52]

Changing rainfall, which is projected to increase in intensity for specific events, but decrease in terms of the overall amount per year, means that both droughts and flooding will become more severe. These projections suggest a heightened risk of compound hazards, whereby Greater Caribbean communities are increasingly likely to face multiple hazards simultaneously or in rapid succession.[53]

The extent to which these climate change impacts will cause further loss and damage will depend on the resilience of both the natural environment and human communities. In many countries of the region, high exposure to climate-related disasters combines with social vulnerability to drive significant economic losses.[54] [55]

The Greater Caribbean already endures the highest cost of disasters as a share of its economy compared to all other world regions. Hurricanes are by far the costliest climate hazard, and are projected to increase in intensity over the next decades.[56] Hurricanes primarily affect Mexico, Central America and Caribbean SIDS, but the proportion of storm damage to national GDP is often most extreme in

smaller economies. On average, Caribbean SIDS suffer yearly losses from storm damages equivalent to 17% of their annual GDP. However, single storms can lead to significantly more extreme damage.[57] In 2017, Hurricanes Irma and Maria marked the first time that two category five storms made landfall in the Caribbean island chain of the eastern Antilles in a single year. Cost estimates exceeded 5.4 billion USD for only five out of the 11 countries affected. Hurricane Maria alone caused damages worth 226% of Dominica's GDP, arriving only two years after Hurricane Erika cost 92% of its GDP.[58] Then, in November 2020, Nicaragua, Honduras, Guatemala, Belize, and Costa Rica and the south of Mexico were impacted by back-to-back hurricanes Eta and Iota. The torrential rains caused extensive flash and riverine flooding and landslides, and affected about 7 million people.[59] As recovery from hurricanes tends to be slow, countries are often still dealing with the fallout from one storm while facing the next.[60]

This dynamic is exacerbating the debt crisis in the Greater Caribbean. Countries in the region are already dealing with persistently high public debt; in 2023, the average debt for Caribbean nations was 74% of GDP.[61] The rapidly accumulating loss and damage from subsequent disasters have driven many SIDS into even deeper debt. In Dominica, the quick succession of Hurricane Erika (2015) and Hurricane Maria (2017) contributed to an almost 30% increase in public debt; by the time Hurricane Dorian arrived in 2019, public debt nearly equaled GDP (Figure 3).[62] Debt relief efforts and restructuring initiatives have had some success, for example in Jamaica and Guyana, but unsustainable debt burdens remain a key barrier to long-term development and climate adaptation.

Limiting global warming to 1.5°C above pre-industrial levels is imperative to thwarting the escalating loss & damage from climate change, which could pose existential threats to SIDS. A warming scenario above 1.5°C risks the loss of key ecosystems and damage to the dependent economic sectors. Above 1.5°C, ocean acidification and warming will be detrimental to coral reefs,[63] a vital resource for the region's tourism industry. In addition to higher climate risk, a warming scenario over 1.5°C will pose increasing limits to adaptation and to addressing loss and damage.[64] Global emissions mitigation coupled with sustainable development and equitable adaptation strategies are vitally important to addressing the existential threats of a warming world.

Figure 3: Debt as a percentage of GDP of Dominica and The Bahamas

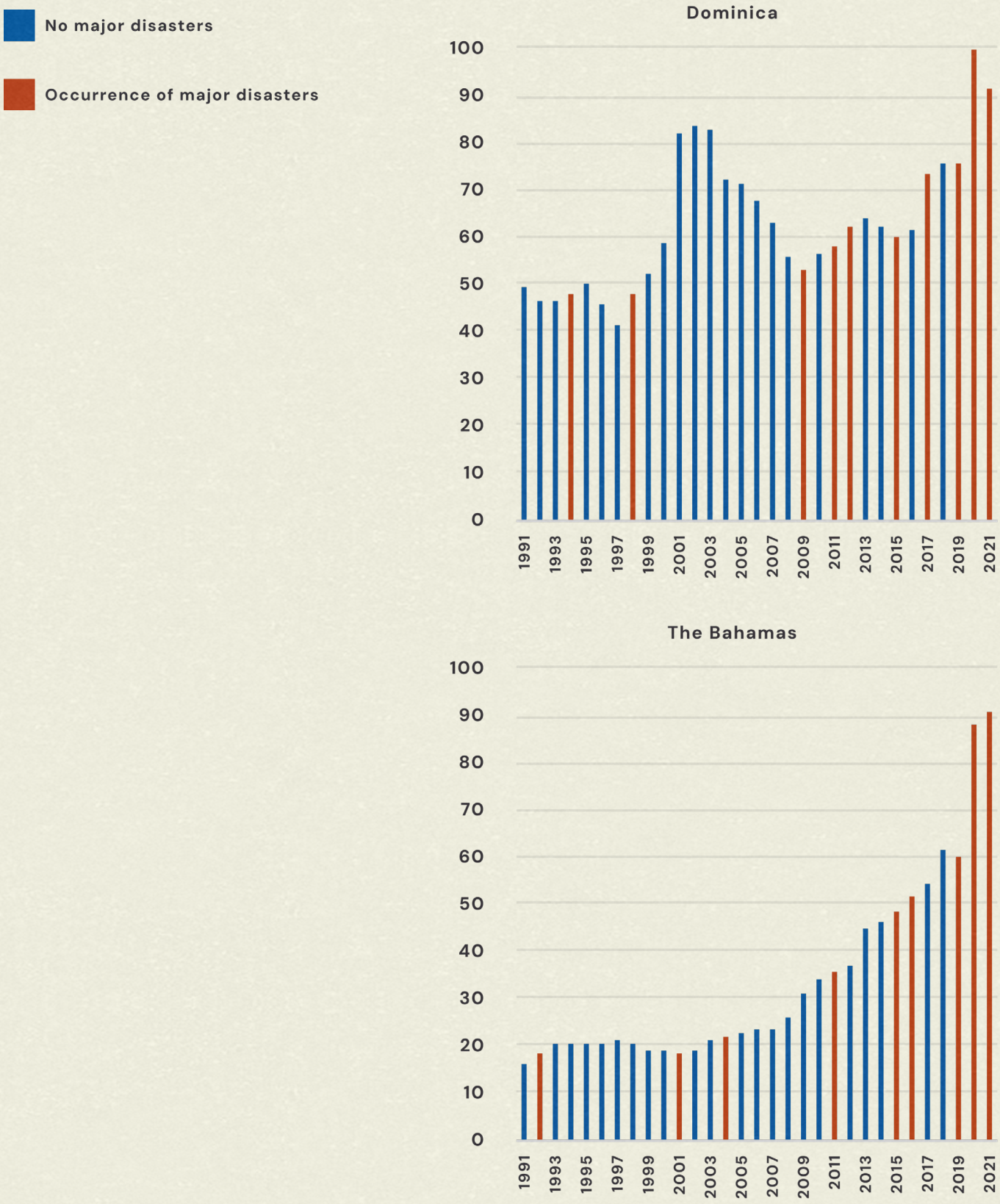


Figure 3: Debt as a percentage of GDP of Dominica and The Bahamas
Source: Adapted from Figure 9 in Bharadwaj, M. et al. (2023) Sinking Islands, Rising Debts, based on data from the International Monetary Fund (IMF, n.d.a) and EM-DAT (Centre for Research on the Epidemiology of Disasters, n.d.).

Section 3

Present Realities

Report photography captured by GCCM

Primary Data Collection Approach

The GCCMI worked with Samuel Hall to collect data on the impact of climate change in people's lives today and their decisions to stay or leave home. The research design considered rapidly accumulating climate impacts, future projected climate risks, and complex mobility dynamics in the region to explore how people currently experience and adapt to climate impacts, how those experiences shape their decisions to move, and how people fare who have moved. Between October 2023 and July 2024, data was collected in 14 communities across six countries in the region, including three island countries and three mainland countries (see Annex A.2.1).

Figure 4: Map of research locations

Figure 4: Primary data collection was carried out in 14 communities across 6 countries in the Greater Caribbean.

Research Locations

The countries and local research sites were chosen in consideration of several factors: human development, geography, displacement, and climate profiles. Sites within countries were further evaluated for geographic and economic diversity, in order to encompass urban, rural, and coastal environments, and highlight impacts in different economic sectors. The sites were also chosen based on mobility patterns. They include places of origin to gather perspectives from individuals considering leaving and those who chose to stay. Also included were destination locations to gather insights from those who had already moved, at least partly due to climate factors, or were considering future migration. It should be noted that places have fluid and overlapping roles as mobility patterns change over time, and are often not exclusively origins or destinations. In each location, the research targeted a sample of the population impacted by climate change or residing in areas of high climate risk, as well as those affected by human mobility – having either been displaced or migrated themselves or residing in areas where migration or displacement are occurring.

1. Antigua & Barbuda

Origin: Barbuda
Hurricane Irma (2017) displaced the entire population of Barbuda. Most of the population has since returned to the island, providing an opportunity to examine a post-displacement and recovery context.

Destination: Antigua
St. Johns is Antigua's capital city and was a key destination for the Barbudans displaced by Hurricane Irma, when the island experienced a sudden, 2% population growth.

2. The Bahamas

Origin: Grand Bahama
An island heavily impacted by hurricanes since 2004— including Frances, Jeanne, Irma, Matthew, Sandy, and Dorian— Grand Bahama is regarded as an urban, coastal place from which many have been displaced.

Destination: New Providence
The Bahamas' financial hub and a key destination for migrants displaced by storms or seeking employment, especially in the capital city Nassau.

3. Colombia

Origin: Santa Lucía
An inland rural area with a history of significant flooding-induced displacement. Current concerns about river levels and El Niño reflect an economy reliant on climate sensitive sectors such as livestock, fishing and agriculture.

Destination: Barranquilla
Placed between the Magdalena River and the Caribbean Sea, the tourism-reliant city of Barranquilla is prone to flooding. It is a destination for both internal migrants and Venezuelans who have fled their country.

4. Costa Rica

Origin: Tarrazú

A coffee producing canton in the province of San José. The main city of San Marcos and the surrounding area witness climate impacts like erratic rainfall that affect coffee harvests and related labour mobility.

Destination: Santa Maria de Dota

A rural district of the Dota canton in the province of San Jose, home to a significant population of migrants from Panama and Nicaragua who work in the coffee industry.

5. Jamaica

Origin: Flagaman

A rural community just inland from the coast that is recognized for its agricultural output. It is considered a potential origin area of migration because of climate disruption to farming.

Origin: Portland Cottage

Situated on the coast, rural Portland Cottage is considered a place of origin as climate change disrupts marine life and its well-known fishing industry.

Destination: Negril (inclusive of Orange Bay)

These two bordering towns along the urban west coast of Jamaica are destinations for tourists and economic migrants alike.

6. Suriname

Origin: Para & Brokopondo

These rural inland districts stand out as some of the most climate vulnerable in Suriname, facing heightened risks in the agricultural sector and loss of critical infrastructure. They grapple with increased temperatures, flooding, limited access to drinking water, and deforestation due to mining.

Destination: Paramaribo

The capital and largest city in the country, located on the Suriname River, 15 kilometers inland from the Atlantic Ocean. As a coastal city, it faces increasing challenges posed by flooding, which has progressively damaged critical infrastructure. The erosion of coastal protections, largely attributed to human activity, further exacerbates Paramaribo's vulnerability to rising sea level.

Table 1: Fieldwork methods and sample

Quantitative or Qualitative	Tool	Sample Group	Target Achieved
Quantitative	**Household Survey**	**Randomized group with a representation of different age, gender, ethnic and socioeconomic groups.**	**2,220 total** **400** in Antigua and Barbuda **355** in The Bahamas **404** in Colombia **365** in Costa Rica **297** in Jamaica **399** in Suriname
Qualitative	**Expert Interviews**	**High level informants working in and/or affected by climate mobility: government officials, experts from academia, law and policy or UN agencies, and community leaders**	**2-3 per country; 17 total** **2** in Antigua and Barbuda **2** in The Bahamas **3** in Colombia **3** in Costa Rica **2** in Jamaica **4** in Suriname
Qualitative	**Focus Group Discussions (FGDs)**	**Women, youth, Indigenous groups, ethnic minorities, elderly, climate displaced persons**	**23 FGDs in total; 128 people in total** **19** in Antigua and Barbuda **24** in The Bahamas **24** in Colombia **11** in Costa Rica **26** in Jamaica **24** in Suriname

Table 1: Fieldwork methods and sample.

Across all countries, data collection employed household surveys, focus group discussions, and expert interviews (summarized in Table 1). A total of 2,200 respondents participated in household surveys and 128 participated in focus groups discussions along with 17 experts. The majority (62%) of survey respondents were women.

The surveys sought to capture the following data from each respondent:

- Household demographic profile
- Housing type, ownership, and permanency
- Employment type and income reliability
- Access to infrastructure and services (electricity, transportation etc.)
- Awareness of climate change
- Climate hazards experienced
- Impact of climate hazards
- Perceptions of community relations, aid networks, and emergency support
- Past migration experience, including duration of time lived at current residence and, if applicable, reasons for previous moves
- Future migration intentions, including duration, destination, and reasons to consider moving

Note: Survey respondents showed varying levels of awareness of and direct experience with climate change impacts. This was reflected in responses to questions about whether participants had heard of climate change and whether they had been personally affected by its impacts. Interestingly, some respondents who reported experiencing climate change impacts did not recognize those experiences as related to climate change. This disconnect suggests that while individuals may not be familiar with the scientific or academic definition of climate change, they can still experience its effects firsthand.

Despite differences in understanding, all respondents were asked the same core survey questions, with some follow-up questions based on their earlier responses. For example, respondents who indicated limited knowledge of climate change or who did not recognize experiencing its impacts were still asked to complete the remaining questions, which explored how climate change might influence their decision-making. This approach is valuable because even if individuals do not identify specific events as climate change-related, their decisions may still be impacted by those experiences. Results presented in this report are aggregates of all survey responses unless otherwise noted.

Figure 5: Financial situation of sampled households, by country

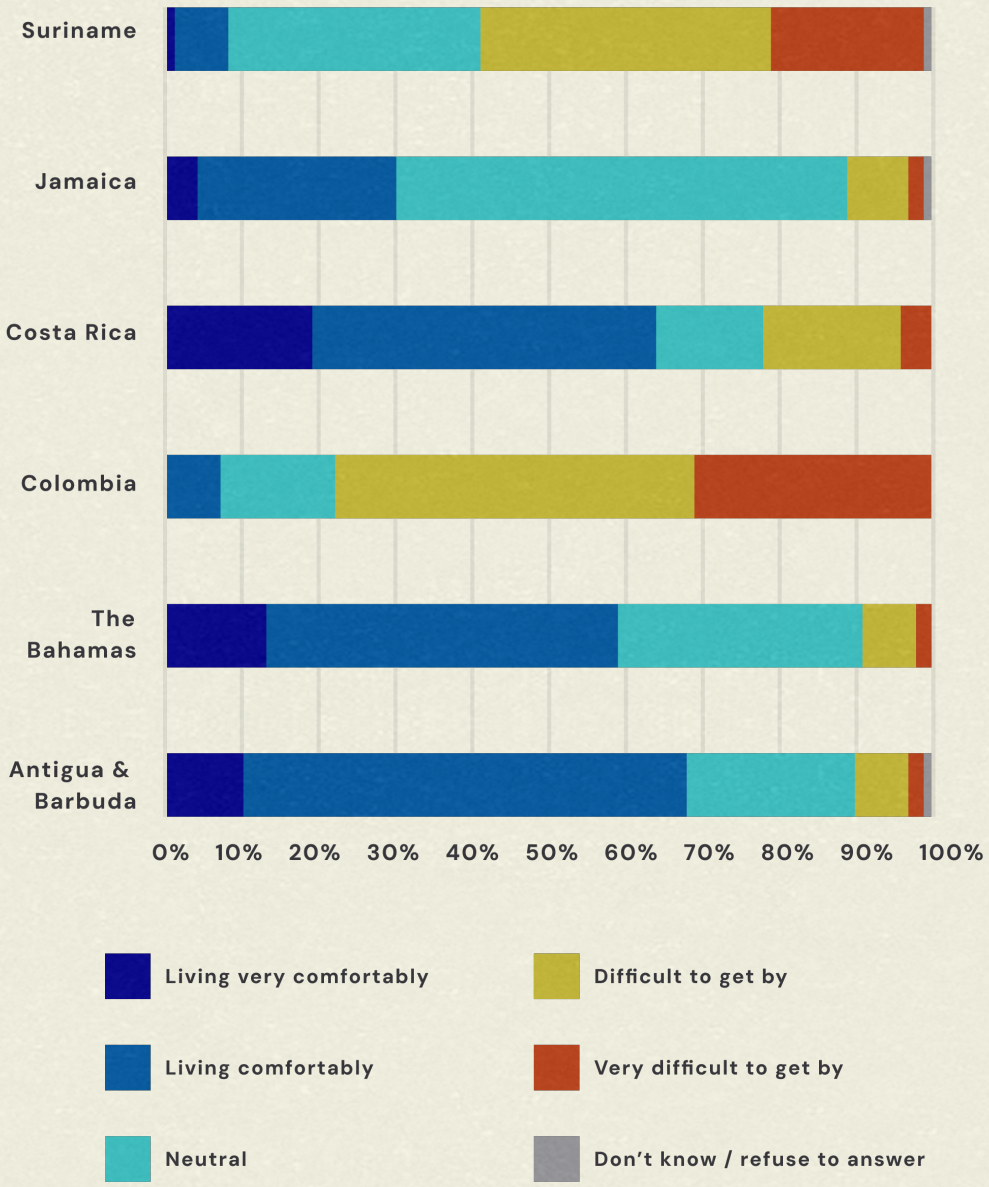


Figure 5: Financial situation of sampled households, by country
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

The survey findings provide a detailed snapshot of demographic characteristics, socioeconomic status, and employment patterns among respondents from the studied locations. They indicate significant economic disparities, with respondents from Colombia and Suriname reporting more challenging financial circumstances than those from island nations (Figure 5). Similarly, the migration profile of respondents reveals distinctive mobility patterns. Respondents in Colombia were the most likely to have previously moved (74%), while Jamaica shows the lowest proportion of migrant respondents (33%). Among migrants, a majority had resided in the place where they were interviewed for over 20 years, except in Colombia where half of those who had previously moved (51%) have lived in their current location for less than a decade (Figure 6).

Figure 6: Length of time lived in the research location, by country

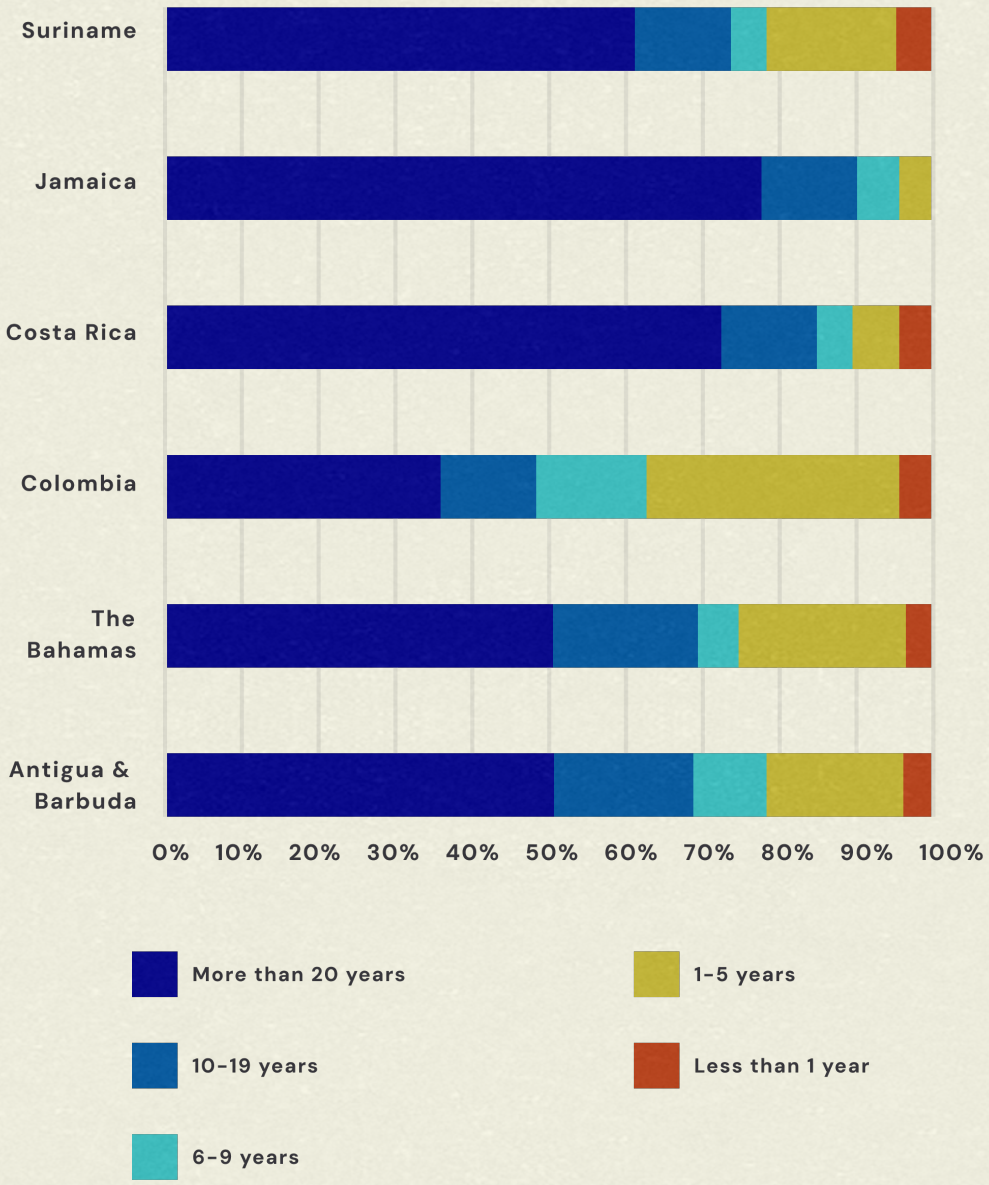


Figure 6: Survey responses about length of time lived in the community where research was conducted
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Beyond the topics covered in the surveys, the focus group discussions and expert interviews provided additional contextual information. Specifically, the focus groups gave insights into topics such as local climate stressors and how they interact with different socioeconomic conditions; current adaptive and maladaptive practices employed by individuals and communities; the contextual and demographic factors that shape individual vulnerability to climate change and mobility; how people perceive mobility generally and in the context of climate change; the impacts of migration processes on origin and destination communities; and potential solutions to address climate change and mobility, and how to implement them.

The following sections present some of the key research findings.

3.1

Climate Costs Today

Climate change is a lived reality in the Greater Caribbean region.

Report photography captured by GCCM

Witnessing the impacts of climate change is a nearly universal experience in the Greater Caribbean. Three out of four research participants indicated that they have seen the impacts of climate change in their lives (Figure 7) . However, what “climate change” means to people and how it affects them is far from homogenous. Research participants in Colombia (96%) were most likely to report that they have experienced climate change while respondents in Jamaica (53%) were least likely. People’s living conditions and cultural contexts contribute to how they understand “climate change.” Respondents in the island countries tended to associate climate change with extreme weather, especially extreme heat and drought, rather than gradual changes such as sea-level rise. A distinction can be drawn between the first-hand experience of climate impacts and fully understanding the phenomenon of climate change. In The Bahamas, more respondents indicated that they are aware of climate change (96%) than that they had experienced impacts (72%). In Colombia, nearly all respondents experienced climate impacts (96%) but a smaller share had heard of "climate change" (80%).

Figure 7: Perception of climate impacts

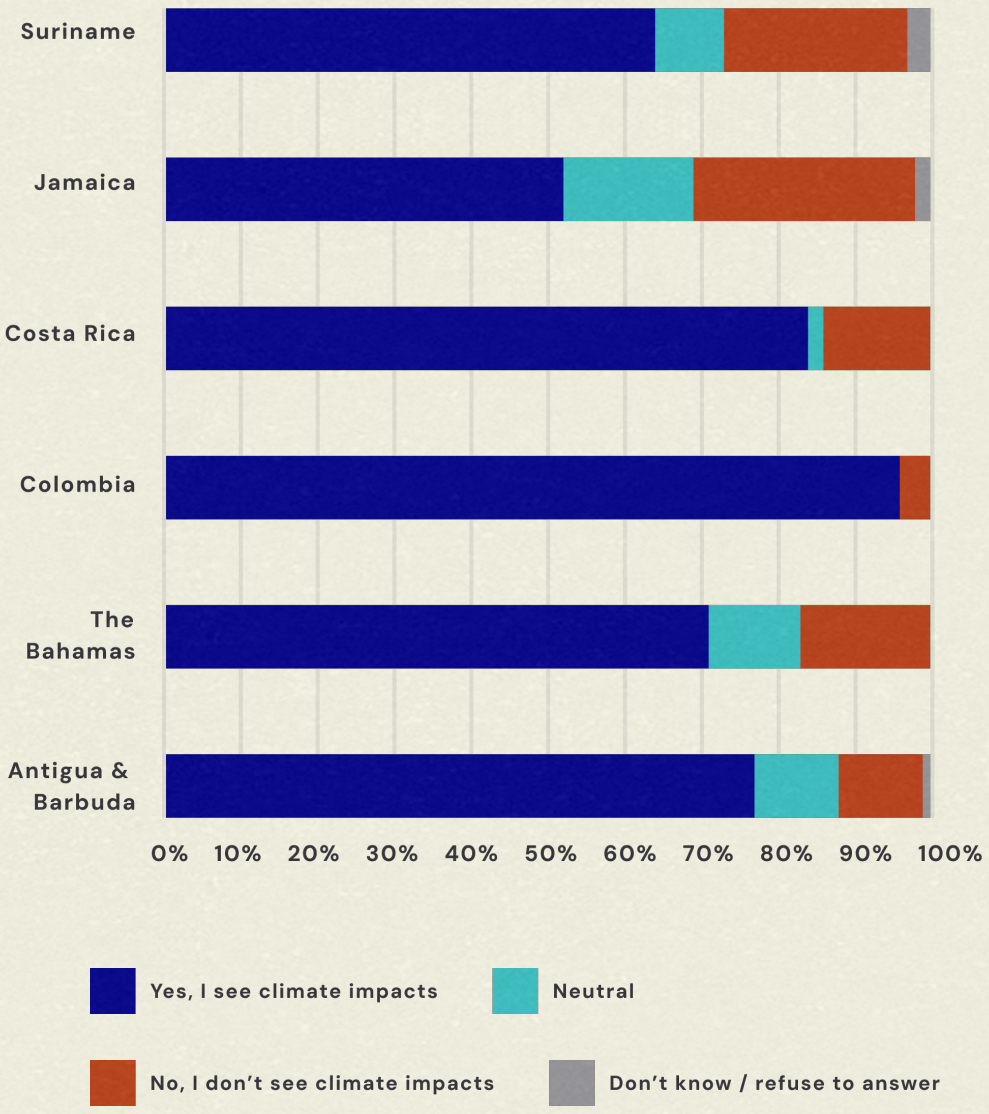


Figure 7: Survey responses to the question ‘Do you see the impact of climate change in your life?’
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Gender plays a noticeable role in the way that climate change is experienced and perceived. Women were more likely than men to report that they had witnessed climate change impacts (77% vs. 71%) and that they have experienced climate events frequently (37% vs. 31%). This might at least partially be explained by women's role in caregiving and household management tasks that are sensitive to climate change impacts. Their climate experiences and perceptions are often rooted in its domestic impacts, such as on food prices, dietary choices and children's health. Being aware of some of the more immediate and tangible effects of climate change in the household could explain women's heightened sensitivity to the phenomenon.

Figure 8: Climate impacts experienced in the last 5 years

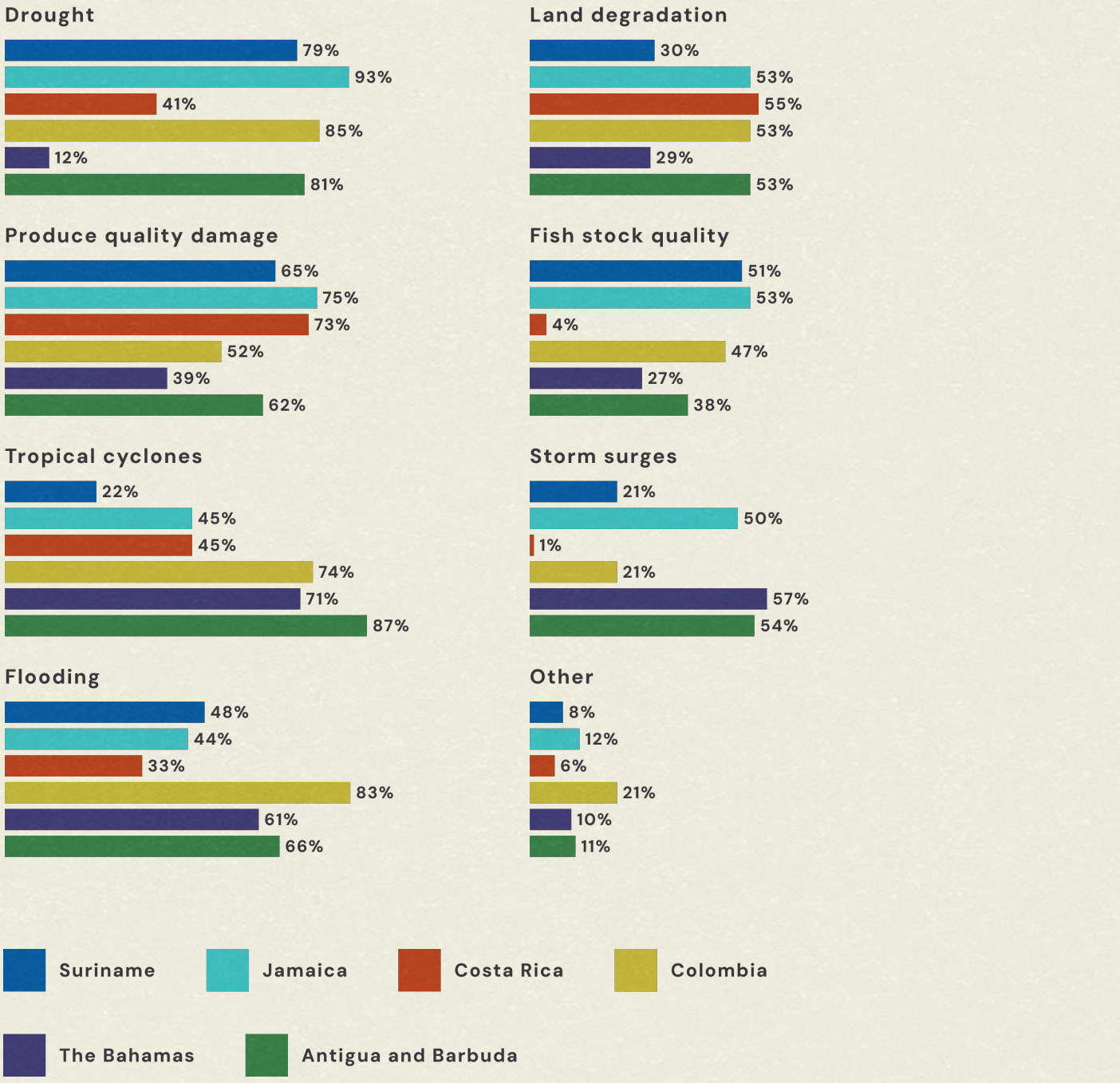


Figure 8: Survey response to the question, 'Which of the following have you experienced in the past five years?'
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

A multitude of climate hazards threaten the region, sometimes affecting communities simultaneously or in rapid succession. Tropical cyclones were the most frequently reported hazard in The Bahamas (70%) and Antigua and Barbuda (87%). Drought was the most frequently reported hazard in Colombia (85%), Suriname (79%), and Jamaica (93%), where nearly every respondent listed a recent drought experience (Figure 8). In Costa Rica, the most frequently reported impact was damage to the produce quality (73%), which was also commonly noted in Jamaica (75%). Flooding was also experienced frequently, especially by respondents in Colombia (83%). As would be expected, storm surges were more commonly reported in the island nations (Jamaica, The Bahamas and Antigua and Barbuda).

Spotlight – Sea-level Rise and Impacts on Coastal Communities

Sea-level rise (SLR) is a threat to coastal communities throughout the region, leading to the visible erosion of coastlines and gradual, less obvious, loss of land. In addition to its direct impacts, SLR is a risk multiplier, contributing to the increased frequency and severity of other coastal threats such as storm surges and flooding. Among the surveyed countries, SLR has been particularly detrimental for communities in Suriname, Antigua and Barbuda, and Jamaica. In these contexts, SLR is understood as a key contributor to the disappearance and fragmentation of coastal communities, and the associated losses of heritage and culture. People struggle to wrap their mind around the loss of familiar places:

"Yes, like where I am right now, I've actually seen about 30 feet of land that has already gone into the sea. Places that I used to stand on are no longer there." – (Focus group participant, Antigua and Barbuda)

Ecosystem-based adaptation through the protection of key environmental resources such as mangroves and coral reefs was recommended as a strategy for preventing the accumulation of loss and damage in coastal communities across the region.

Unpredictable

Extreme and erratic weather patterns are undermining people's sense of agency and their ability to plan for the future.

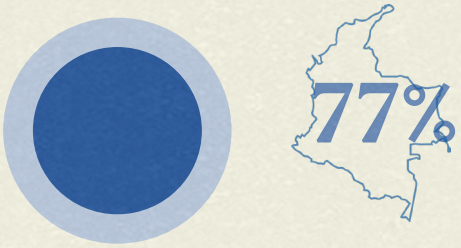
In the Greater Caribbean, traditional ways of life are deeply interwoven with natural cycles. Livelihoods, cultural and social practices rely on predictable weather patterns from one season to another – when to expect rainfall or a dip in temperatures. Climate change is disrupting these long established life rhythms by introducing uncertainty, thereby altering how people experience the present and envision the future.

For those employed in agricultural and nature-based sectors, the inability to predict temperature and rainfall can severely disrupt harvest cycles. Such unpredictability threatens livelihoods and food systems, and challenges the flow of trade, services, goods and people. Changing weather patterns often directly call into question the appropriateness of traditional practices and local knowledge, as noted by a farmer in Antigua and Barbuda:

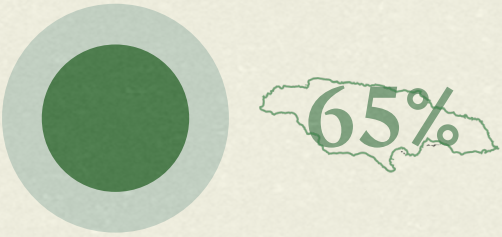
"I have a book that my father gave me, the book that farmers usually use. And because it describes what you're supposed to do, what was supposed to happen, the prediction was accurate. From 2020, everything has changed.'– (Focus group participant, Antigua and Barbuda)

Similarly in Costa Rica, climate change has undermined weather prediction traditions, challenging farmers' ability to plan for upcoming seasons. The first 19 days of January have a certain importance in Costa Rica, due to what is known as "Las Pintas." Las Pintas is a popular Costa Rican belief that the weather in the first part of January 'shapes' the weather for the rest of the year and can be used to predict planting patterns. Today, for many family farms in Costa Rica, monitoring Las Pintas is a way of perpetuating this old tradition. However, under the effects of climate change, Costa Rican coffee farmers now associate the word 'weather' with 'uncertainty' and 'change' (focus group participant, Costa Rica).

Table 2: Effects of climate hazards on households (by country)



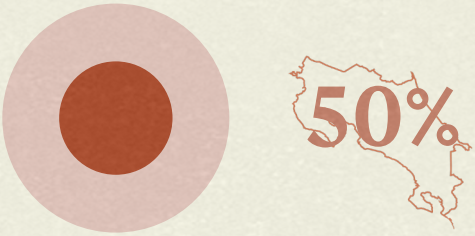
of people surveyed in Colombia have experienced negative effects on health due to climate change.



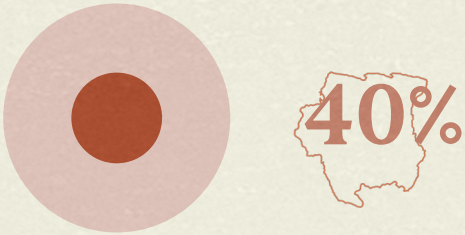
of people surveyed in Jamaica have experienced negative effects on their emotional well-being and stress levels due to climate change.

of people surveyed in Antigua and Barbuda have experienced negative effects on their emotional well-being and stress levels due to climate change.

of people surveyed in The Bahamas have experienced negative effects on their emotional well-being and stress levels due to climate change.



of people surveyed in Costa Rica have experienced negative effects on their livelihood, food security and income generation due to climate change.



of people surveyed in Suriname have experienced other negative effects due to climate change such as infrastructure damage and food insecurity.

Table 2: Survey responses to the question, 'How has your household been affected by climate change?' By country.
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Extreme weather and changes in land and ecosystems affect people's physical and psychological health. Negative effects on people's emotional well-being and chronically-high stress levels are some of the most commonly reported symptoms of climate change (Figure 9). Mental health impacts are particularly acute in the Caribbean islands of Antigua and Barbuda, The Bahamas and Jamaica (Table 2). For many, living in a constant state of fear for their physical safety and that of loved ones, and for the security of property and housing, leads to deep distress. In Colombia, urban residents living in an informal settlement facing recurrent flooding, described feelings of hopelessness, confusion, and despair:

"When we are faced with situations like rain and floods, the loss of property, . . we could say that mental health is very important, because when we lose everything, we lose... now, what do I do? What do I do? I don't know. We end up getting sick, our blood pressure goes up, we lose everything.... What do we do now? Where do we go? Then despair sets in, doesn't it? Who's going to look after us? Who's going to help us?" – (Focus group participant, Colombia)

Environmental deterioration can sever community ties to the land and ecosystems that are foundational to their culture and heritage. The result can be feelings of grief, anxiety, and despair. For these reasons, Indigenous peoples are particularly susceptible to climate-related mental health impacts.[65] Indigenous Wayana respondents in Suriname experience deep loss and distress from witnessing the deterioration of the natural world around them; these feelings are akin to solastalgia, the inability to find comfort in a familiar landscape due to changes in the environment.

Climate change impacts also threaten physical health directly. Dust from droughts can worsen air quality and lead to respiratory conditions. New floodplains provide breeding environments for mosquitos that transmit diseases. Farmers attempting to stabilize their crop yields have turned to chemical treatments and fertilizers, which can have negative effects on their health and on local public health. Gender seems to play a role in perceptions of how climate impacts affect health: female respondents were 12% more likely to cite negative health effects from climate change than male respondents.

Health impacts are worse for people who lack access to protective infrastructure. In Colombia, poor housing conditions were an important contributor to physical risk and health impacts. Three in four respondents reported health impacts. Those living in informal settlements indicated that the combination of heavy rainfall, lack of drainage, extreme heat, strong winds, humidity and insects increase illnesses, such as respiratory diseases and skin conditions. In other contexts, climate-related health impacts are exacerbated by a lack of reliable healthcare services, especially in rural areas and in communities reeling from the impacts of disasters. In The Bahamas, the country's healthcare infrastructure suffered extensive damages from successive hurricanes, which has interrupted health service provision.

Figure 9: Climate impacts on households

Climate change is impacting households on multiple levels, from emotional well-being and health to financial security and access to natural resources.

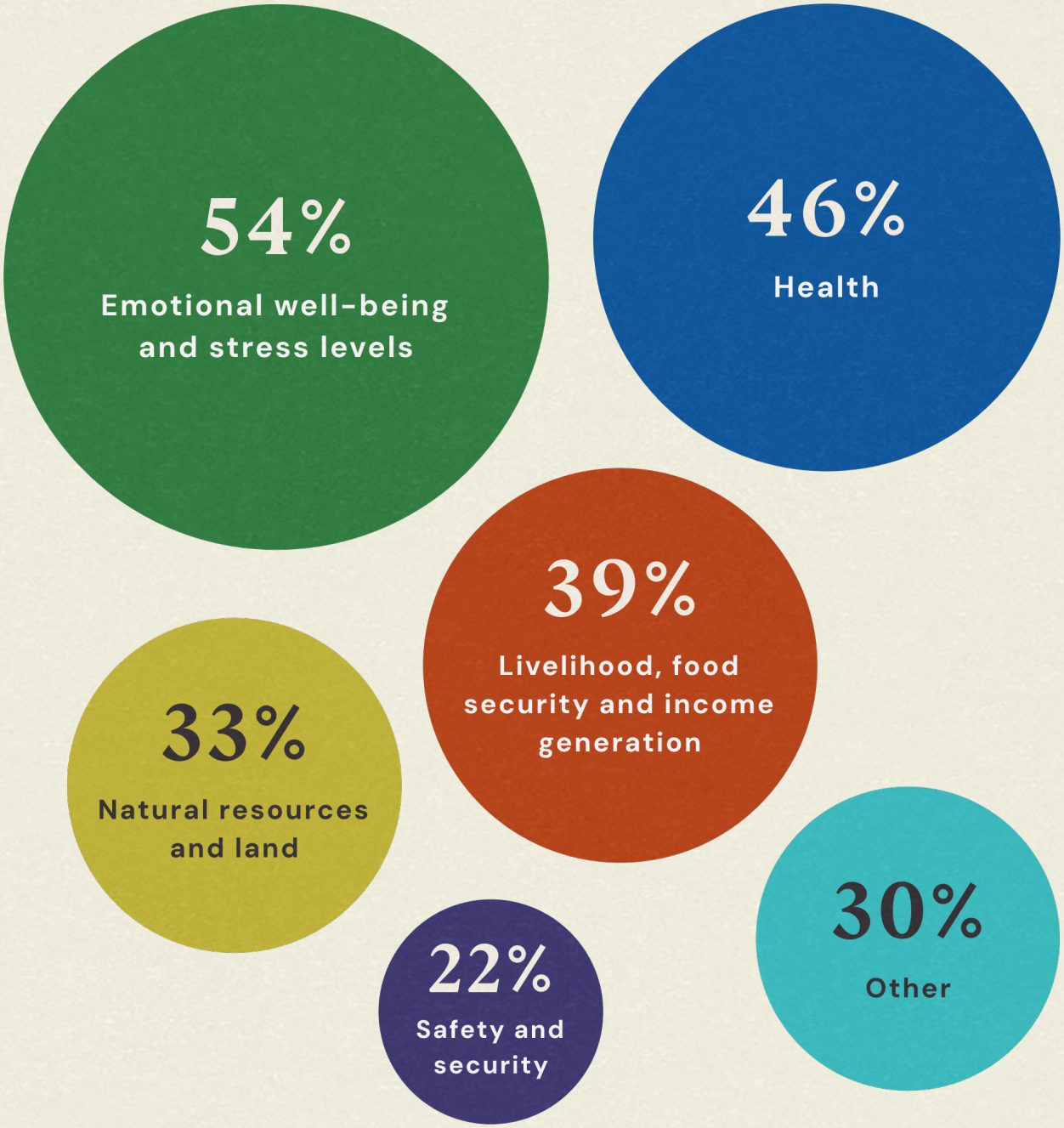


Figure 9: Survey responses to the question, 'How has your household been affected by climate change?'
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Upended

Traditional livelihoods, cultural practices, and mobility patterns are thrown into disarray.

Precipitation and temperature changes that contribute to hazards such as droughts and flooding are threatening traditional livelihood practices, particularly in nature-based sectors, such as farming and fishing. Negative effects on livelihoods, food security, and income generation were frequently reported (Figure 9), especially in Costa Rica and Colombia. For coffee farmers in Costa Rica, a changing climate threatens the sustainability of their craft. Rainfall variability jeopardizes the health of soil and crops, making coffee yields more unpredictable. The result is a misalignment between harvesting and labor migration cycles. Inconsistent coffee harvests have forced seasonal migrant workers from Nicaragua and Panama to look for jobs elsewhere. Without the needed labor, coffee growers watch their crops go unharvested and spoil, causing them to worry about their ability to survive until the next season.

The disruption of livelihoods and food cultivation practices can also have profound cultural implications. In Suriname and Costa Rica, affected communities have seen cultural norms -- from dietary habits to community interactions -- altered due to climate events. For Suriname's Indigenous Wayana, food exchange between villages is a staple social practice that maintains important connections. Yet, chronic flooding disturbs this barter:

"I have family in Kawemhakan and Apetina [two Indigenous Wayana villages], and they often send me manioc. In recent months, they haven't done so. Why haven't they? Their farmland has been flooded. They've asked us to send them rice instead." – (Focus group participant, Suriname)

3.2

Climate Mobility

Climate impacts are threatening people's right to stay.

Report photography captured by GCCM

For communities in the Greater Caribbean, “home” is more than where they live. It encompasses all the social and spiritual bonds and practices that tie people to one another and to their land and nature. “Home” anchors their culture and identity. As climate change alters people's relationships with their environment, it causes a deep sense of disruption and dislocation. Home no longer feels like home.

In The Bahamas, hurricanes have led to the destruction of houses, departure of relatives, displacement of whole communities, and the deterioration of ecosystems. These recurrent losses of “culture, history, dignity and identity” have left people feeling uprooted, even if they were not displaced (Focus group participant, The Bahamas). Similarly, in Suriname, Indigenous Wayana communities experience the deterioration and loss of their natural ecosystems as a form of "death".

For those who leave the place they call home, the experience can be equally painful. From The Bahamas, where Hurricane Dorian displaced over 9000 people in 2019, to Barbuda where the entire island population fled to Antigua during Hurricane Irma, to rural villages in Colombia affected by severe flooding, research respondents recount how climate events have uprooted their entire communities. Residents of Santa Lucía, Colombia, described severe flooding in 2010 as a “total event” that hollowed out their small village in its entirety. Spaces once vibrant with life were either destroyed or forcibly abandoned.

While many people have since returned to Santa Lucía, Barbuda, and the smaller islands in The Bahamas, others have been forced to relocate permanently. Such uprooting resulted in community fragmentation and loss of resilience. As people leave, heritage is lost, culture is eroded, and the fabric of communities is weakened.

Report photography captured by GCCM

A Last Resort

Climate mobility is often experienced as a form of forced mobility.

The decision to leave home is not taken lightly. Mobility in the face of climate change is experienced as an upheaval, and is rarely if ever desired. Yet, people perceive mobility differently across the region. Their perceptions are influenced by a combination of personal belief, ability to migrate, level of certainty about what lies ahead, and cultural notions of "home." Decisions are also shaped by long-standing migration strategies and political considerations.

How people view migration in the context of climate change depends on how it might improve their lives and the degree of choice they have in the decision to move. For instance, in The Bahamas, long standing emigration traditions in pursuit of education and work opportunities abroad have shaped a generally positive or pragmatic outlook on migration. As one focus group participant explained, international migration for school or jobs is about “improving your way of life” or “getting to a better way of living” (focus group participant, Bahamas). Yet, Bahamanians distinguish this type of migration from that which is climate-induced, referring to the latter as more forced, taken out of “necessity.” Similar distinctions are echoed by Barbudan respondents who conceptualize current forms of climate related “migration” separately from past forms of “emigration:”

"Barbuda has a history of emigration where a lot of people, once they reach a certain age, go to the UK or the US and send money back home. It's an important part of Barbuda's history. So, it all depends on how we distinguish between migration and emigration. Emigration is part of our history and migration is more of a necessity...This concept of home is the difference between emigration and migration. You can emigrate knowing that you always have a home to come back to. In the case of migration, the home no longer exists" – (Focus group participant, Antigua and Barbuda).

The differentiation between the forced nature of “migration” versus the voluntary nature of “emigration” made by this focus group participant is directly tied to the continuity of “home.” “Emigration” is a means to preserve home whereas “migration” is a result of the climate-related loss of “home.” The utility of mobility as a means to preserve “home” is also expressed by research respondents in Costa Rica, who explain how migration is perceived as an important life improvement strategy:

"So, if the conditions aren't right here, to live the way we want, to have a quality life, we look elsewhere. A lot of people come back with resources, they buy and extend their part of the farm, they build their own house, they buy

their car and thus improve their living conditions" – (Focus group participant, Costa Rica).

Temporary migration or partial migration of some household members is a strategy commonly used to enable households to stay in place. For farmers in Costa Rica and elsewhere in the Greater Caribbean, moving away for part of the year or sending some family members abroad has become a strategy that facilitates the ability to maintain homesteads and land connections. However, in contrast to respondents in The Bahamas and Barbuda who primarily view newer forms of climate mobility as taken out of "necessity," Costa Rican respondents explained that even traditional forms of voluntary migration (not viewed to be climate related) are now increasingly "necessary" due to the dependence on remittances that has emerged, which can trap farmers in migration cycles.

Whether climate mobility is conceptualized separately from prior forms of movement, and distinguished as forced, informs respondents' perceptions of mobility as a method or failure of adaptation. For some, leaving home results from a lack of adaptation:

"If you have to migrate it means you didn't adapt. To me, adaptation is local. You adapt to new conditions to stay in that place; you have no longer adapted, you can adapt to the new places, but you didn't adapt to your place of origin" – (Expert interview, Costa Rica).

This view, expressed in Costa Rica, contrasts with that of participants in The Bahamas, who understand mobility as a mere stepping stone in the adaptation process:

"But to answer, the question was: 'Is migration an adaptation strategy?'. That would be like for the building of shanty towns; it's kind of out of necessity in many cases. I guess that kind of is part of the whole adaptation strategy" – (Focus group participant, The Bahamas).

Report photography captured by GCCM

Complex Motivations

Climate hazards are rarely the sole driver of decisions to move.

Mobility in the context of climate change results from the complex interaction between climate hazards, existing social, economic, and political conditions, and people's adaptive and migration capacities. While climate change may influence mobility, people's reasons for migration are often deeply personal and complex. Climate change often plays a role in considering future migration, but is rarely the deciding factor. The majority of people who factor climate into their mobility intentions are also influenced by other drivers. For survey respondents who had previously migrated, family reasons and economic opportunity were the most significant reasons for their decisions to move (Figure 10).

Figure 10: Reasons for past mobility

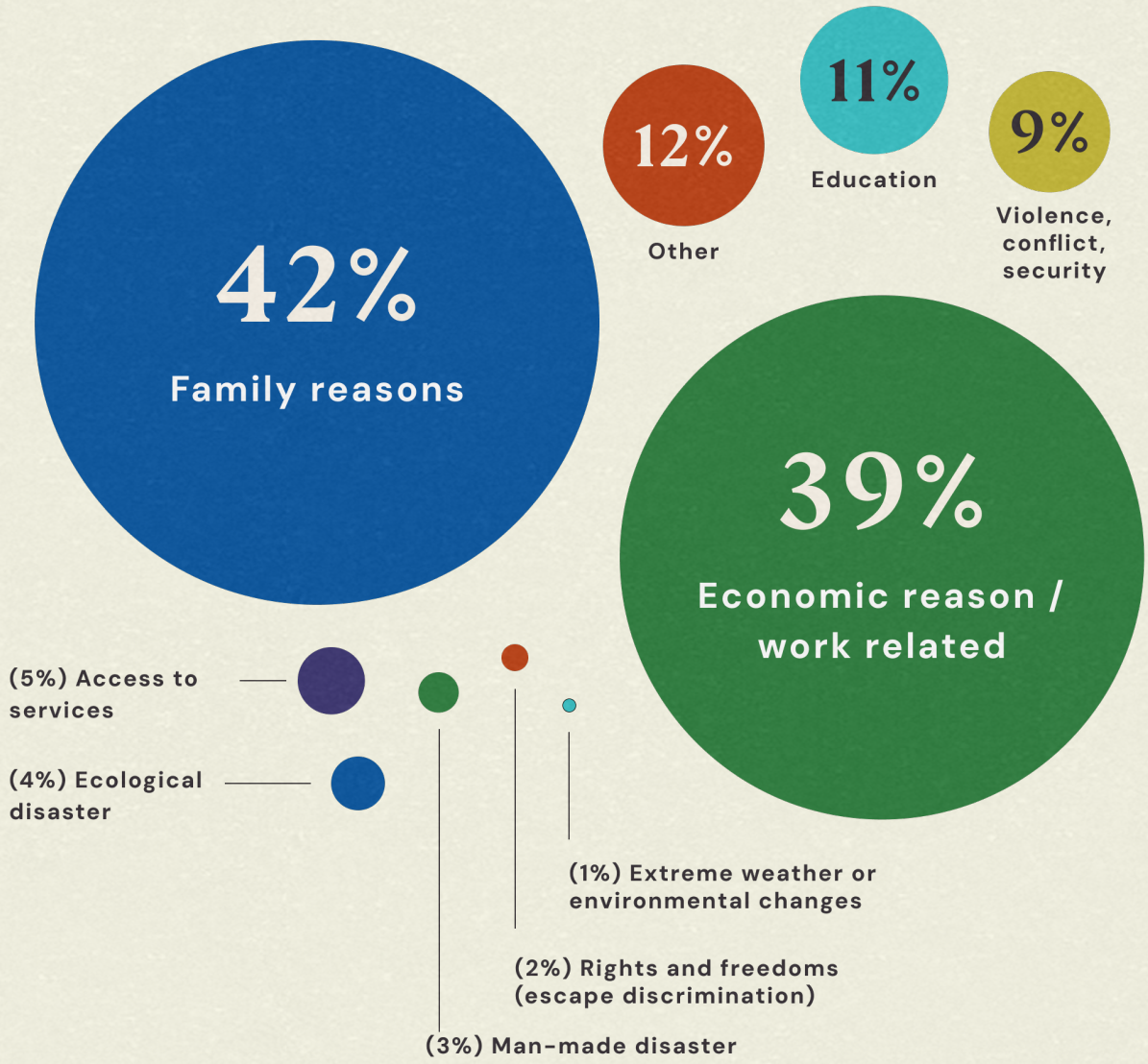


Figure 10: Survey responses to the question, "What were the main reasons you left your place of origin?
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

When considering future migration, 40% of all survey respondents indicated that climate change would play a role in their decision. However, only 7% stated that climate impacts would be the main reason prompting them to consider moving. Communities in Colombia and Suriname were most likely to list climate change as their main motivation for movement (Figure 11). Even in these cases, climate change amplifies existing social, economic and environmental drivers. For instance, changing rainfall patterns interact with environmental degradation from mining, increasing the impact of flood events for Suriname's Indigenous Wayana community. Wayana respondents described how mining on nearby land, which contrasts sharply with their traditional land management practices, limits their access to natural resources and undermines their adaptive capacity. The combination of climate and industrial impacts on the environment have in some cases displaced Indigenous community members from their land.

Figure 11: Role of climate factors in decisions to move

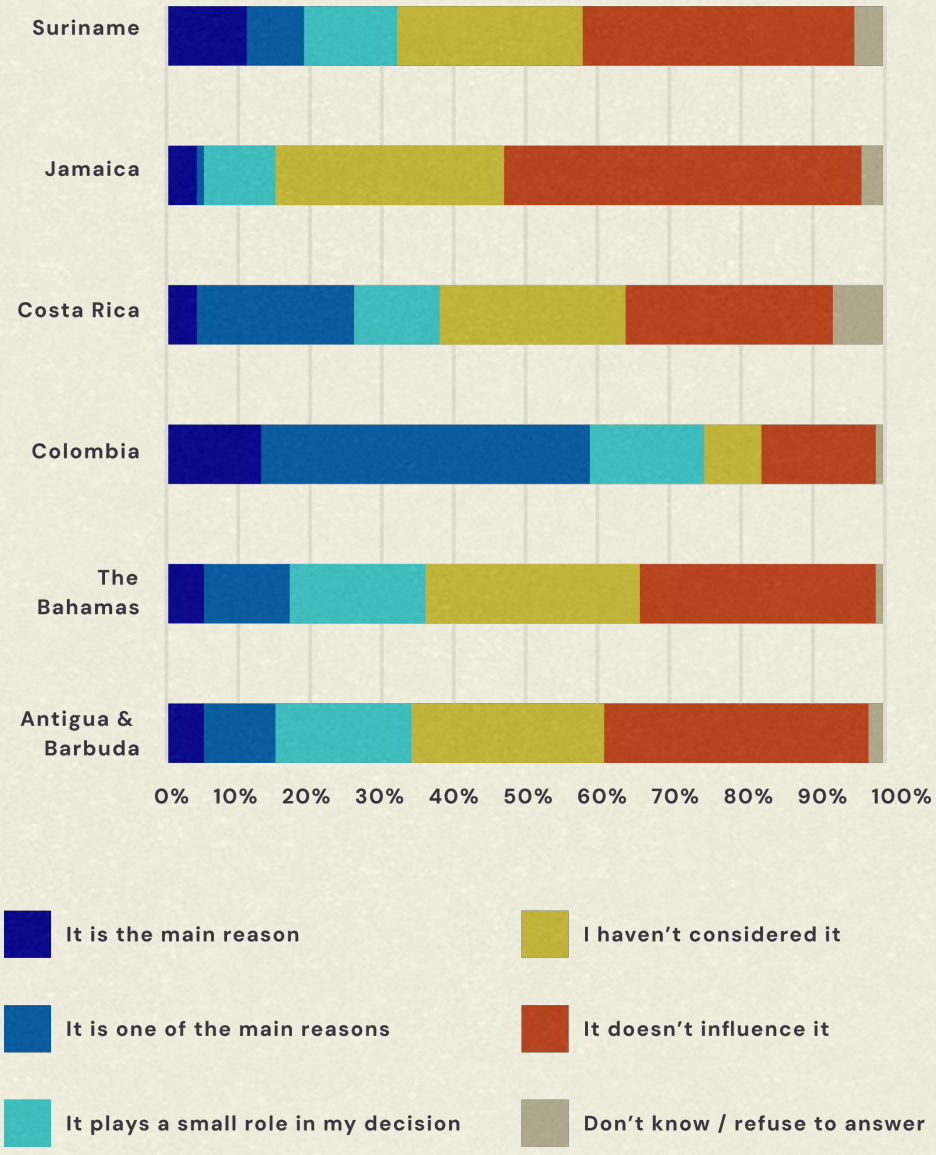


Figure 11: Survey responses to the question, "How much does climate change impact your decision to move?"
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Table 3: Climate factors that would prompt people to consider moving (by country)

Country	Increase in extreme weather events	Scarcity of resources	Changes in temperature	Health Concerns	Sea-level rise	Loss of job or income	Degradation of land or soil quality	Other
Antigua Barbuda	72%	30%	25%	40%	41%	19%	12%	3%
Bahamas	64%	32%	30%	37%	54%	39%	16%	8%
Colombia	78%	45%	55%	43%	19%	38%	26%	2%
Costa Rica	40%	46%	45%	20%	2%	28%	16%	14%
Jamaica	61%	79%	49%	35%	50%	50%	33%	1%
Suriname	51%	28%	17%	28%	20%	12%	14%	20%
Average	61%	42%	36%	34%	30%	30%	19%	8%

Table 3: Survey responses to the question, 'Which of the following climate-related factors would make you consider moving?' by country.
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Climate shocks can be a tipping point. When, in 2019, Hurricane Dorian displaced over 9,000 people in The Bahamas, prolonged disinvestment in public services like education and healthcare was already driving movement from Grand Bahama to Nassau (Expert interview, The Bahamas). Thus, people's decisions to move were influenced not only by the losses inflicted by the hurricane. Underlying migration and demographic trends were already at play, including the search for job opportunities and the chance to join family members.

While across the region, an increase in extreme weather events is most commonly cited as the "last straw" that would encourage people to leave home (Table 3), in some countries other shocks are more influential in migration decisions. For instance, in Jamaica resource scarcity was frequently cited as a reason for considering future movement.

Ambiguous Outcomes

Mobility provides a lifeline – but can also bring hardship.

Migration, whether forced or voluntary, driven by economic, climate, or other reasons can cause significant psychosocial distress. People who move at least partially due to climate impacts, often carry a dual mental burden: the loss and grief associated with losing one's home to environmental degradation and destruction, combined with the stresses that come with migrating – from parting with loved ones, to settling in a new place, to, sometimes, returning to a home that has changed.

Leaving home is a severely disruptive and dislocating experience. For Indigenous people in Suriname, climate-forced displacement is associated with a loss of "freedom," conceived as "being able to stay in your community." The loss of home and agency, combined with climate change stressors and the erosion of culture and social networks, leads to extreme grief. A similar sense of loss was described by a respondent in Colombia, who explained that in order to get to safety you have to go through the grief of losing your home: "because you have to experience the grief for your country to be able to settle where you go" (focus group participant, Colombia).

In addition to mourning the place left behind, assimilating to the place of arrival is often very mentally taxing, even when movement is not across borders but from rural areas into big cities or from one small island to the next. A respondent in Suriname describes how even moving to the town nearby can imbue emotional and cultural dislocation akin to forced deportation:

"My experience with [forced] migration. I call it deportation... because it doesn't match our art and culture. From here to Paramaribo, and when you get there, you get the chance to emigrate again to go somewhere else. But there, they don't accept you. You're there but you don't belong." – (Focus group participant, Suriname).

A similar sentiment was expressed by research respondents in The Bahamas who were forced to relocate from small islands to Grand Bahama or Nassau due to Hurricane Dorian. Arriving in Nassau was experienced as a "culture shock." Respondents felt that the social fabric of the big city was different than that of their small island communities, and some struggled to integrate economically and to access work.

Indeed, once climate displaced persons arrive in new destinations, they, like other migrants and displaced persons in the region, often face challenges with integrating into host communities. When migration and population shifts are not managed, they can place additional strain on resources in host communities. This can sometimes lead to tensions between newcomers and existing residents. In Barranquilla, respondents who had previously moved into informal settlements noted the strained encounters they faced upon arrival:

"We're looking for work and better treatment, and not everyone treats us well. At least, we're in a situation where, if we don't find work right away, at least I had to sell candies on the streets, I mean not beg, but sell candies, and not everyone helped, some ignored you, others were rude, and it wasn't easy. It's not easy at all" – (Focus group participant, Colombia).

Spotlight – Caribbean Youth on the Move

Young people are already on the move throughout the Greater Caribbean, many motivated by the pursuit of education and employment. Climate change is exacerbating these trends. Youth are more sensitive to climate disruptions to the local economy and to social services such as education and healthcare. 42% of young people (ages 18-35) attribute their migration considerations directly to the impacts of climate change, a higher proportion than reported by older age groups[66].

The departure of youth has sweeping impacts. In Costa Rica, climate-related youth migration out of rural areas has undermined the transfer of knowledge of traditional farming practices from one generation to the next. In Suriname, youth migration has affected community perceptions of mobility. For the Wayana people, moving away from the interior has traditionally been viewed as a temporary life choice, with the intention to return almost always a given. However, the economic migration of younger generations coupled with increasing rates of climate-related "survival" migration, has fueled negative perceptions of mobility among Indigenous elders. They fear it is leading to the disappearance and dissolution of the community.

3.3

Climate Immobility

Many people have a desire to stay in place. Others feel unable to move, even if they wanted to.

Report photography captured by GCCM

Across the Greater Caribbean, identities and cultures tied to land and ecosystems drive strong place attachment. Even in the face of potentially extreme climate hazards, people often choose to stay home.

A participant in Antigua and Barbuda explained, "the most important thing is the link with the land. To preserve a rich cultural heritage, you must stay in your own country."

Interestingly, research respondents in Jamaica were among the most likely to want to stay in place; 65% reported that they have no desire or plans to move (Figure 12). Yet, respondents in Jamaica were also the least likely to report that they have experienced climate hazards, indicating that for those who have experienced only limited climate impacts, permanent relocation can seem unnecessary and undesirable. Instead, focus group discussions in Jamaica highlighted how mobility is seen as a natural part of life, but one that usually involves a return home:

"The truth is that no, I've never [considered leaving]. There's no place in the world like Flagaman. It's the best community in Jamaica. People migrate to work and go to school, but eventually they come home and some of them even start businesses to help support the local economy and build the community" – (Focus group participant, Jamaica).

In Santa Lucía, Colombia, a participant recounted how he moved temporarily to Bogotá after severe flooding in 2010, and worked difficult jobs just to save enough money to return home:

"To survive, I had to recycle, and little by little, thanks to recycling, I saved my ticket and returned to my city. So, it's better to starve to death here than to die somewhere else." For many, staying or returning home is worth taking risks and enduring hardships. Indeed, the decision to stay can be just as personally difficult as the one to move. A focus group participant in Grand Bahama described her family's concern for her grandfather who refused to leave during Hurricane Dorian:

"My grandfather didn't want to leave. He was the only one living there, he must have been 78 or 79 at the time, and he didn't want to move. He wanted to stay in that big house, alone, and if anything had happened to him, I don't think he would have cared because he would have been in his house. So, it was very emotional for my family, because they didn't want anything to happen to their father. But it's, I think it's the relationship that Bahamians have with their home or the idea that they have of their home." – (Focus group participant, The Bahamas)

When identity, culture, and history are built upon a sense of place, the idea of leaving home can be unimaginable. This is true especially for older generations (Figure 13) and the region's Indigenous peoples.

Figure 12: Aspirations and capacities to move

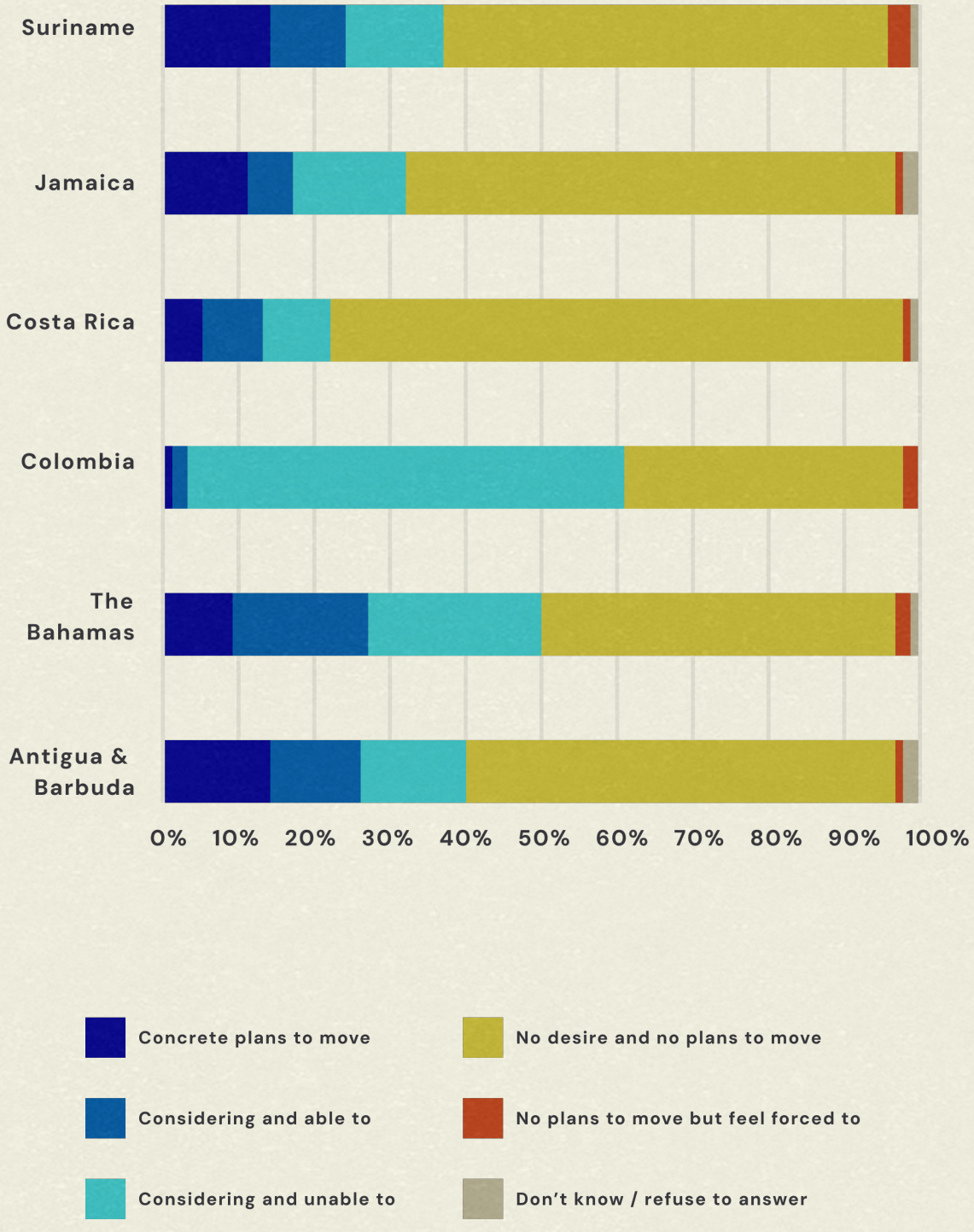


Figure 12: Survey responses to the question, 'When thinking about mobility, which of the following applies to you as an individual?'
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

The GCCMI research found that being older than 35, having no or only primary education and being born in the sampled location were all factors correlated with a preference to stay.

Figure 13: Preference to stay by age

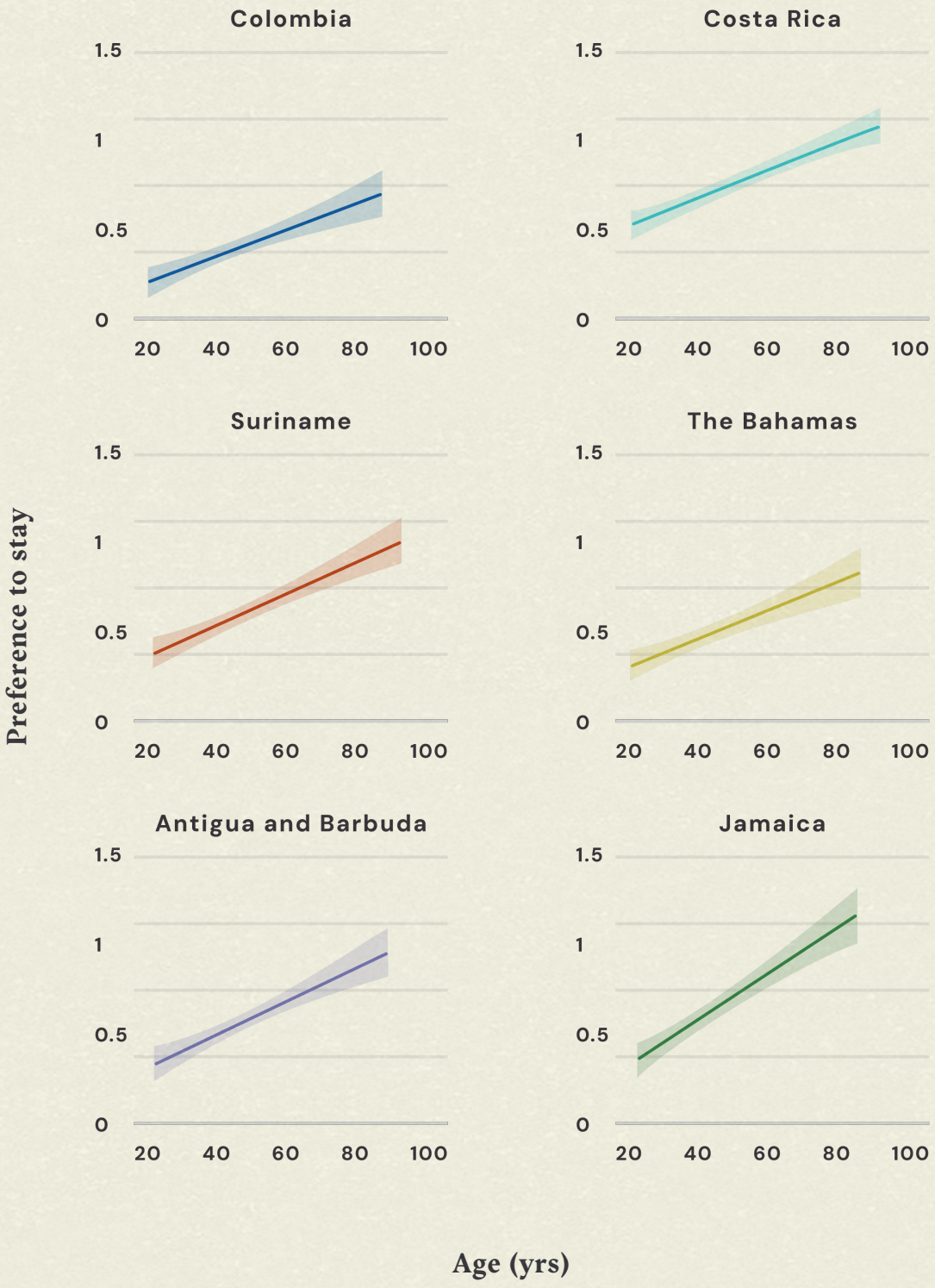


Figure 13: Preference to stay by age. Place attachment is particularly correlated to age, with older people most commonly stating a preference to stay in place.
Regression analysis of GCCMI Survey data. Preference to stay is plotted on the y-axis. The 'Preference to stay' variable is derived from the question, "When thinking about mobility, which of the following applies to you as an individual?". Respondents who answered that they have "no desire or plans to move" were assigned a value of 1. In contrast, those who are "considering moving," "have a desire to move but are unable to," "feel forced to move," or "have plans to move" were assigned a value of 0. This is plotted against respondents' age.

Trapped

Some groups – particularly women and migrants – feel unable to move, even if they wanted to.

For some people, leaving is simply not an option. Not everyone who wants to move is able to. Climate stress combined with social, economic, or political constraints can coerce some people to stay, just as it compels others to leave. For instance, during tropical cyclones the most vulnerable may be unable to leave the most affected locations, while those with greater means migrate elsewhere.[67] Leaving home is expensive. If climate impacts directly or indirectly worsen poverty or undermine access to essential services or resources, people can become "trapped" in place. Facing a difficult financial situation is correlated to a stronger preference to stay in place, with some variation across the region (Figure 14). This is especially true in Colombia, The Bahamas, Antigua and Barbuda, and Jamaica.

In the GCCMI research sample, women, people over 35, and those with no education or only primary education, reported feeling unable to move. Involuntary immobility was also reinforced by several interrelated conditions including, poverty, a lack of formal and safe housing options, unprotected land rights, and precarious livelihoods. As a result, it particularly affects the already marginalized.

Overall, female research respondents were 10% more likely than men to report that they have the desire to move but find themselves unable to. They were 6% more likely to weigh climate change as a factor when considering future migration plans. Women's intention and capacity to migrate when faced with climate impacts is shaped by traditional gender roles and the gender selectivity of historical forms of economic migration. The gendered impacts of mobility patterns are often most visible in small rural villages, where large portions of the male population migrate either temporarily or permanently in search of employment. For instance, research respondents in Costa Rica explained how successive waves of male migration to the United States since the 1980s had rendered Dota, a coffee-growing village, into "the city of single women." Far from shifting gender roles, climate change impacts on the coffee industry have reinforced these trends by continuing to push young men to migrate in order to support their families through remittances, while women stay home to care for the family, home, or property.

The field research also revealed a complex relationship between past migration experience and the desire and capacity to move in the future. In Colombia, Costa Rica, and Jamaica, being born outside one's current place of residence was correlated with lower migration capacity, meaning that those who had already moved might now find themselves resource-constrained. Respondents in Colombia were the most likely to have the desire to move, but indicate that they are unable to (65%). This result is likely reflective of the reduced migration capacities of Venezuelan migrants, who made up a quarter of respondents (26%) in Colombia. In The Bahamas, undocumented Haitian migrants living in informal settlements on Abaco Island were reluctant to leave during Hurricane Dorian for fear of deportation due to their documentation status. In both Colombia and The Bahamas, housing informality and migration status play a role in discouraging movement.

Figure 14: Preference to stay by financial situation

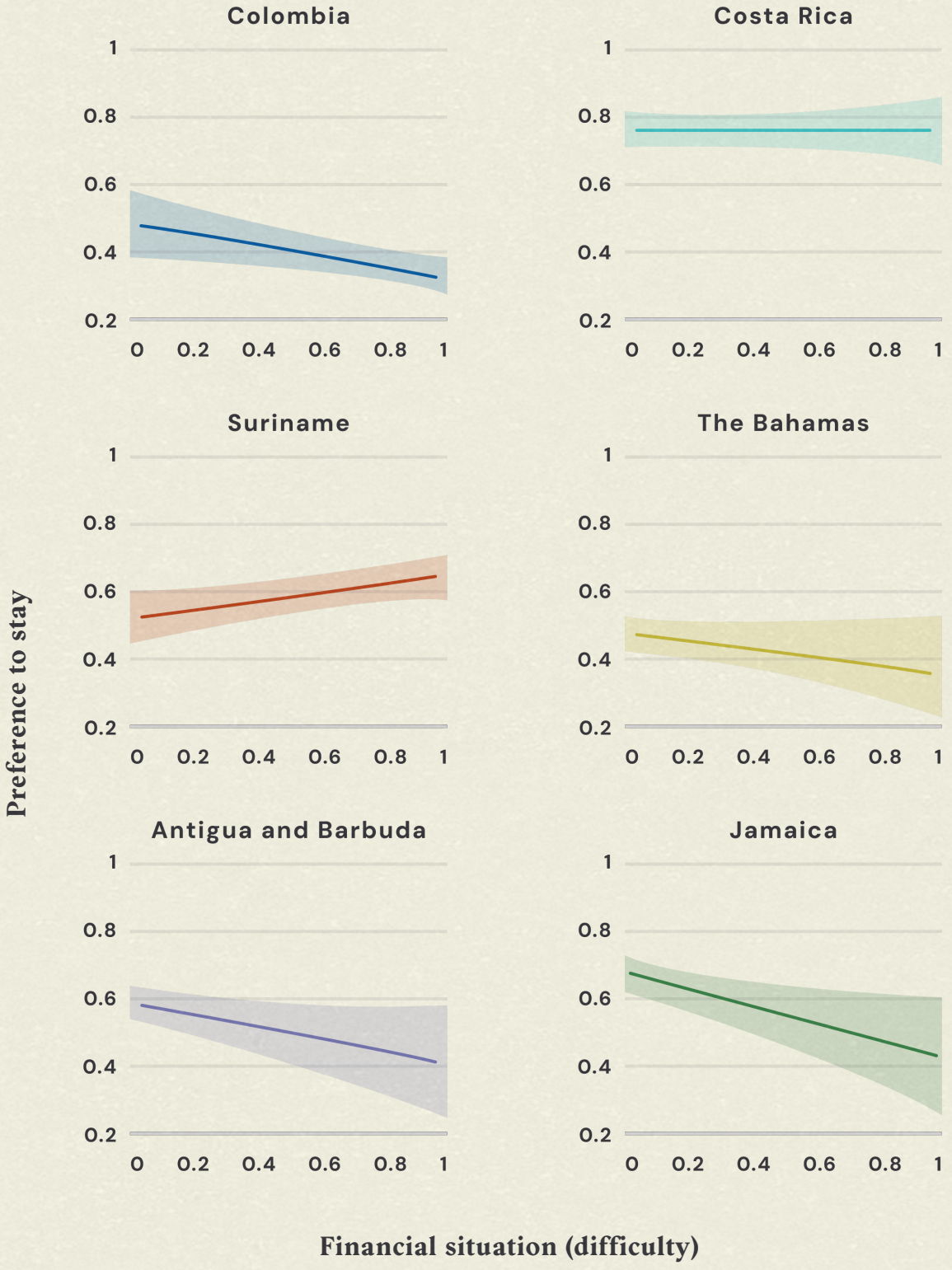


Figure 14: Preference to stay by financial situation. Facing a difficult financial situation is correlated to a stronger preference to stay in place, with some variation across the region. This is especially true in Colombia, The Bahamas, Antigua and Barbuda, and Jamaica.

Regression analysis of GCCMI Survey data. Preference to stay, plotted against respondents' age. In this regression, preference to stay is plotted on the y-axis (see Figure 13 explanation). The x-axis corresponds to respondents' reported financial situation. The respondents who indicated that it is 'difficult' or 'very difficult' to get by financially, were assigned a value of 1. Those who reported that their households are living "very comfortably," "comfortably," or have a "neutral" financial situation were assigned a value of 0.

Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Table 4: Summary overview of case study findings

Antigua & Barbuda

Setting:
Coastal, urban and rural

Main livelihoods:
Manufacturing, tourism, agriculture

Current main climate-related events:
Tropical cyclones, drought, flooding, sea-level rise

Impacts of climate-related stressors:
Produce and fish stock quality damage, food and water insecurity, health problems

Main responses to impact of climate-related events or processes:
Adaptive agricultural practices, environmental conservation efforts, upgrading infrastructure, community solidarity

Mobility linked to climate-related events:
Moderate levels of migration mostly linked to family and economic reasons

Mobility status:
Temporary mobility, majority have no intention or desire to move

The Bahamas

New Providence, Grand Bahama

Setting:
Urban coastal, island

Main livelihoods:
Tourism, agriculture, fisheries

Current main climate-related events:
Sea-level rise, hurricanes, storms, flooding, coastal erosion

Impacts of climate-related stressors:
Loss of livelihoods and homes, damaged infrastructure, water insecurity

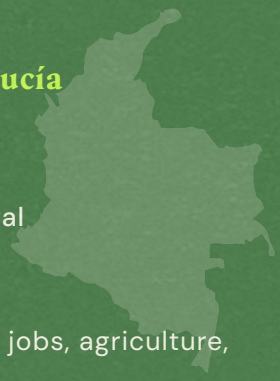
Main responses to impact of climate-related events or processes:
Rebuilding of homes, home gardening, migration

Mobility linked to climate-related events:
High levels of movement linked to extreme climate events like hurricanes, extreme heat and search of better economic prospects

Mobility status:
Temporary mobility, majority have no intention or desire to move

Table 4: Summary overview of case study findings (1/3)

Colombia
Barranquilla, Santa Lucía



Setting:
Coastal urban, inland rural

Main livelihoods:
Informal sector, seasonal jobs, agriculture, fishing

Current main climate-related events:
Heavy rains and flooding, extreme heat, droughts

Impacts of climate-related stressors:
Damaged infrastructure, high risk of mosquito-borne diseases and other health concerns, threat to certain livelihoods like agriculture, fishing

Main responses to impact of climate-related events or processes:
Attempts to protect homes from heavy rains and flooding, educational initiatives on climate mitigation strategies

Mobility linked to climate-related events:
Moderate to high levels of temporary migration, mostly for economic reasons

Mobility status:
Mobility and immobility as a climate response, majority considers moving but unable to do so

Costa Rica:
Santa Maria de Dota, Tarrazú

Setting:
Rural inland

Main livelihoods:
Coffee production

Current main climate-related events:
Earthquakes, heavy rains, flooding, landslides, hurricanes and storms

Impacts of climate-related stressors:
Adverse effect on livelihoods (because of dependence on single crop), food security, cultural practices and social relations

Main responses to impact of climate-related events or processes:
Crop diversification, community-based financial support mechanisms

Mobility linked to climate-related events:
Seasonal migration to work in coffee plantations, climate-displacement mostly linked to floods and landslides

Mobility status:
Majority have no intention or desire to move

Table 4: Summary overview of case study findings (2/3)

Jamaica:
Flagaman, Negril and Orange Bay, Portland Cottage

Setting:
Inland, coastal

Main livelihoods:
Tourism, transportation, agriculture

Current main climate-related events:
Hurricanes, storms, flooding, coastal erosion

Impacts of climate-related stressors:
Water insecurity, adverse effect on tourism sector, health concerns

Main responses to impact of climate-related events or processes:
Desalination, improved water storage systems, replanting/forestation, adaptive agricultural practices

Mobility linked to climate-related events:
Temporary climate mobility, migration generally driven by gang violence and economic reasons

Mobility status:
Majority have no intention or desire to move

Suriname
Paramaribo, Brokopondo & Para

Setting:
Coastal urban, rural inland

Main livelihoods:
Agriculture, fishing

Current main climate-related events:
Sea-level rise, heavy rainfall, flooding, droughts

Impacts of climate-related stressors:
Food shortage and high food prices because of poor crop yield, erosion of cultural practices, disproportionate impact on Indigenous communities

Main responses to impact of climate-related events or processes:
Adapting agricultural practices, educational initiatives for climate mitigation, planting mangroves, community-based climate adaptation processes

Mobility linked to climate-related events:
Climate-induced mobility linked to access to services, temporary or cyclical migration for employment and education opportunities.

Mobility status:
Majority have no intention or desire to move

Table 4: Summary overview of case study findings (3/3)

Section 4

Climate Mobility Future Scenarios

Report photography captured by GCCM

The GCCMI worked with the Luxembourg Institute of Socio-Economic Research (LISER) and the Center for International Earth Science Information Network (CIESIN) at Columbia University to develop the Greater Caribbean Climate Mobility Model. The model anticipates the economic impacts of climate hazards in the region, and the extent to which those impacts will contribute to mobility within countries and across borders and also drive immobility. Model projections were generated for three future scenarios, providing insights into potential future population shifts in the region, driven by the permanent, economically motivated migration of adults, that can be broken down by age, gender, and educational attainment. Results are generated for the short-term (by 2030) and the medium-term (2050).

Modeling Approach

Geography - The model is a spatial general equilibrium model (CGE) that divides the world into countries that are further decomposed into 5x5km grid cells, labeled "pixels." Pixels are intended to represent local population demographics including residents' age, gender, and education level, individual consumption profiles, production technology, initial climate conditions and future climate shocks. Each pixel is characterized by one production sector – agriculture, industry or services – and refers to a single, uniform wage rate for all workers across education levels.

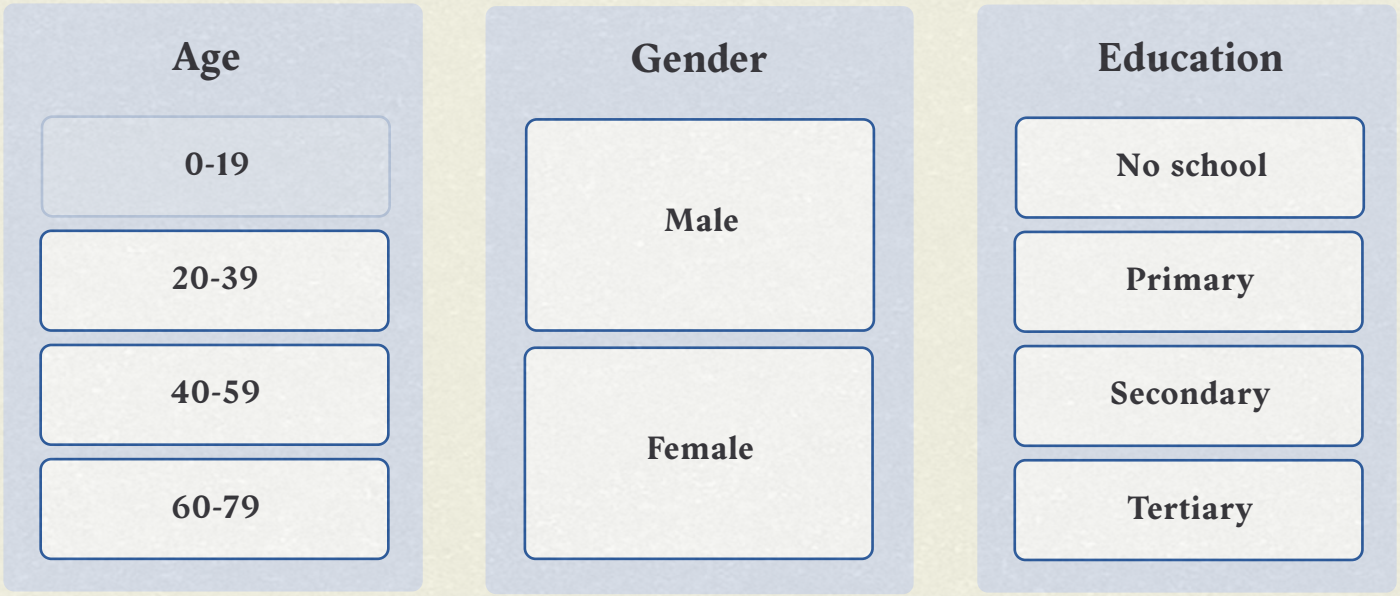
People - Individuals are sorted into three age groups (20-39, 40-59, and 60-79), two gender groups (male and female), and four education groups (no school, primary, secondary, and tertiary). Importantly, the model assumes that people under the age of 20 do not move, because they are not considered economic agents making their own decisions. This is a limitation of the model that does not reflect the reality or likely future of climate mobility in the Greater Caribbean, where children and young people are more likely to migrate than in other world regions.[68] Considering that children and young people will likely move on their own and with their adult family members by 2050, the size of the mobile and immobile population in the region is likely to be larger than projected under all climate scenarios.

Migration - Migration costs in the model are individual-type-specific, varying by gender, age and education groups. Thus, when climate change has negative impacts on local economies, people are motivated to migrate to places with higher wages. Yet, climate change can also discourage movement. When climate damages to wages in potential destinations are higher than migration costs, migration to such places becomes less attractive and people are deterred from leaving their homes. Climate immobility captures the number of people who are forced to stay in place due to climate impacts on potential destinations, who would otherwise be likely to move in a world without climate change.

Importantly, the model captures permanent shifts in population distribution over 20 year intervals, for 2030 and 2050. It does not project circular, seasonal, or temporary migration and displacements that may occur within those time frames. Rather than capturing the dynamic nature of large mixed movements, it provides a snapshot of people who have permanently resettled based on the considered economic factors.

Figure 15: Model features

People belong to one of 24 adult groups:



Adults decide about:

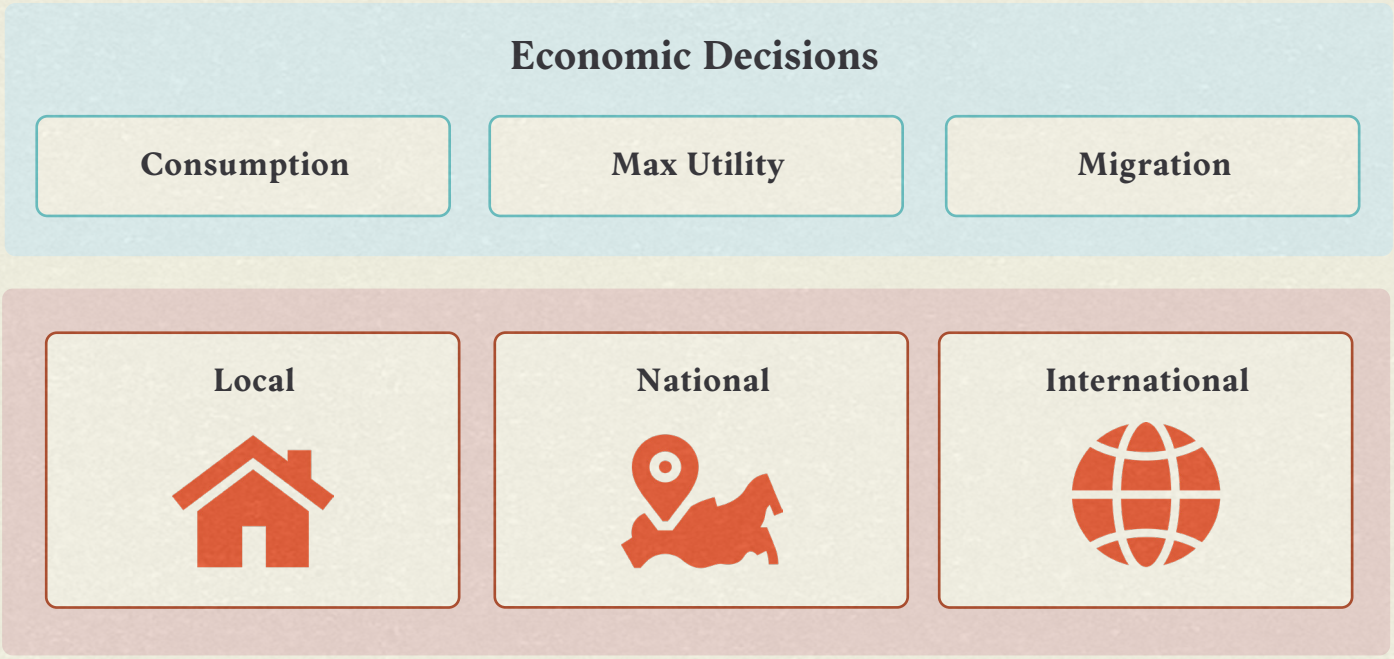


Figure 15: The model sorts adults into three age groups, two gender groups, and four education groups. Movement is projected across three scales: local, national, and cross-border moves.

Economic Impacts of Climate Hazards - The model assumes that climate hazards accrue damages to four different economic variables including, 1) employment, 2) productivity, 3) amenities and 4) wages. These assumptions are applied across three different sectors: agriculture, industry, and services. The following climate hazards and their interaction with economic damages are incorporated into the model to determine the location and size of movement:

1. Crop yields:
Climate damages are assumed to impact land productivity, which reduces the capacity to generate yields and the overall efficiency of production across the affected areas.

2. Temperature:
Losses in labour productivity due to rising temperatures are proxied through a sector-specific labour productivity loss rate combined with annual temperature distributions.

3. Sea-level rise:
The impacts of rising sea level are proxied through a combination of a) permanent land productivity loss assumed in areas that will be permanently flooded and b) forced displacement of people from permanently flooded areas.

4. Disasters:
Disasters including droughts, floods, cyclones, and heatwaves are assumed to affect individual utility functions, since individual property-loss in disasters constitutes the main factor causing people to leave disaster prone areas. Although disaster impacts on production capacity can be severe in the short term, the model assumes no direct linkage between disasters and production capacity, assuming that capital can be rebuilt and the methods of production (know-how) are preserved.

5. Oceanic changes:
Oceanic changes are proxied through the impact that coral bleaching has on the tourism sector in coastal zones, depending on local tourism reliance on the reefs (such as through diving activities).

Report photography captured by GCCM

The climate scenarios - When considering how the world might reach the goals of the 2015 Paris Agreement and prevent warming beyond 2°C, the Intergovernmental Panel on Climate Change (IPCC) proposes a framework that combines possible global socioeconomic development futures, called shared socioeconomic pathways (SSPs), with different greenhouse gas emission scenarios, called representative concentration pathways (RCPs).[69] The Greater Caribbean Climate Mobility Model considers climate mobility under three of the five IPCC SSP/RCP scenarios, representing different development outcomes for the Greater Caribbean region in tandem with global emissions projections.

Global temperature is mitigated to below 2°C:

"The "Green Road" SSP1-RCP2.6: This is a "sustainability" scenario. In this scenario, there is global and regional cooperation on the adoption of low carbon technologies and a rapid transition away from fossil fuels. The target of the Paris Agreement to keep global warming to 1.5°C is achieved in the near to medium term. Equitable and inclusive development enables the reduction of inequality between and within countries in the Greater Caribbean region.

"Middle Road" SSP2-RCP4.5: This is a "business as usual" scenario. In this scenario, development and population growth follow a trajectory that resembles historical patterns. There is some, albeit slow, progress towards the Sustainable Development Goals. Warming remains below 2°C by 2050. However, inequality persists between and within countries in the Greater Caribbean region. Addressing the root causes of climate vulnerability remains a challenge and climate change continues to disproportionately impact some groups.

Global temperatures rise exceeds 2°C:

"Rocky Road" SSP3-RCP7.0: This is a "regional rivalry" scenario, in which national action turns inwards, primarily focused on domestic and regional security agendas rather than broader international goals. The world fails to mitigate emissions and warms beyond 2°C, which has serious implications for the ecosystems and economies of Greater Caribbean countries, especially SIDS. Economic development is slow and inequality remains high. As cooperation on environmental issues slows, degradation continues in some areas of the Greater Caribbean.

Each scenario is compared to an RCP0.0 scenario where climate conditions are assumed to remain as they were in 2010 (also referred to as "no climate change" scenario), but in which the SSP varies. In other words, results for SSP1-RCP2.6 are compared to SSP1-RCP0.0, results for SSP2-RCP4.5 are compared to SSP2-RCP0.0, and the results for SSP3- RCP7.0 are compared to SSP3-RCP0.0. This means that, for a given grid cell, if more people leave in the climate affected scenario than under the "no climate change" scenario, there is climate mobility. If more people stay in the climate affected scenario than under the "no climate change" scenario, there is climate immobility.

Figure 16: Climate scenarios

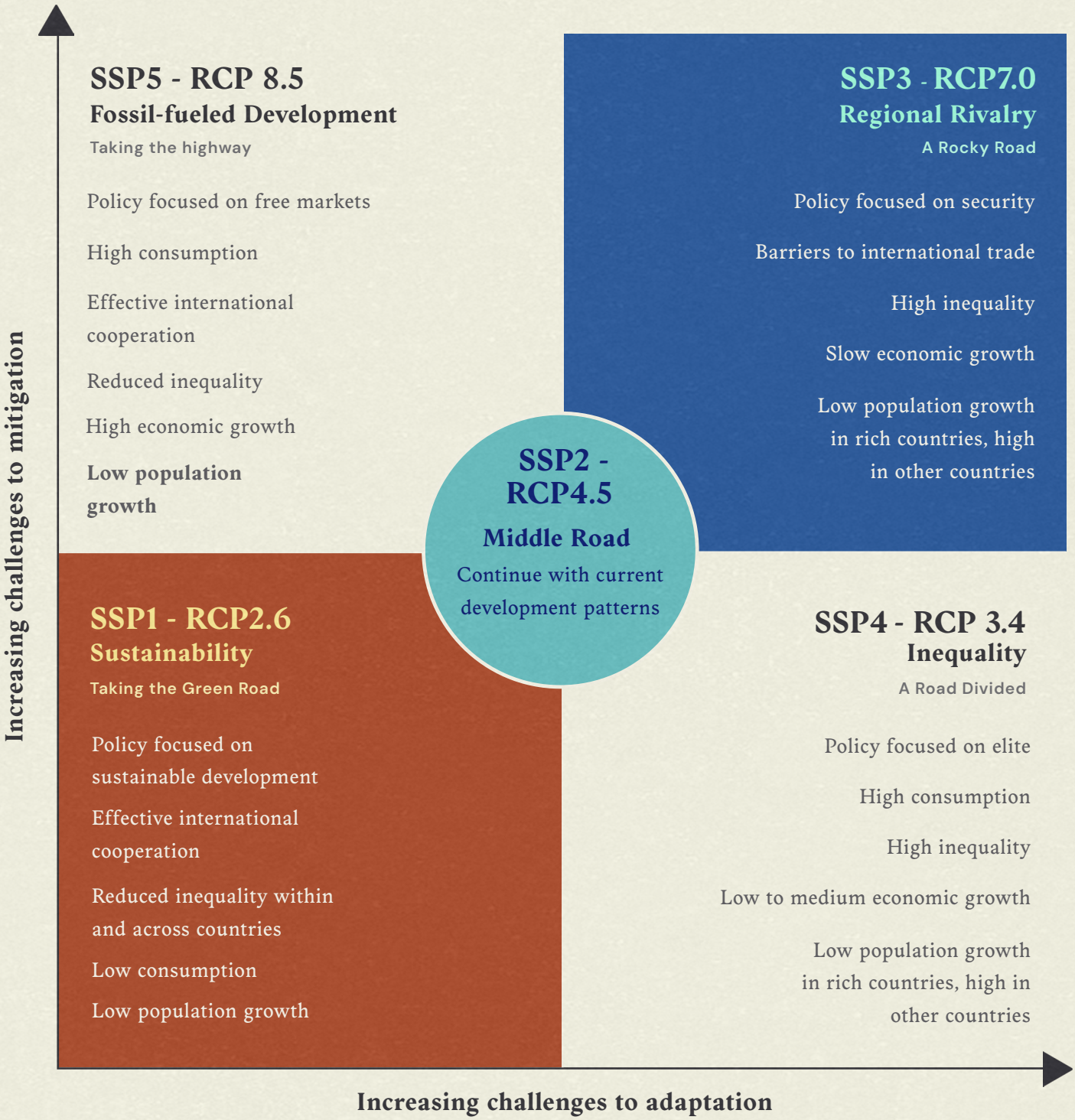


Figure 16: The Greater Caribbean Climate Mobility Model considers climate mobility under three of the five IPCC SSP/RCP scenarios: SSP1-RCP2.6, SSP2-RCP4.5, SSP3-RCP7.0.
Source: Adapted from Figure 1 in Understanding Shared Socio-economic Pathways (SSPs). (n.d.). ClimateData.Ca. Retrieved November 10, 2024, from https://climatedata.ca/resource/understanding-shared-socio-economic-pathways-ssps/

The following discussion of the modeling results primarily focuses on projections for the "Middle Road" scenario, as the scenario that countries in the region are already working towards, and the "Rocky Road" scenario, which represents the "worst case," providing a glimpse of potential future challenges that loom if emissions remain on their current trajectory, hampering sustainable development, and eroding the trust needed for global cooperation.

4.1

Shifting Fortunes

Climate impacts will affect the landscape of economic opportunities in the Greater Caribbean, shaping where people choose and are able to live.

Report photography captured by GCCM

Figure 17: Map of climate impacts on GDP per capita by 2050

Figure: 17: Change in GDP per capita by 2050 under the Rocky Road scenario (SSP3-RCP7.0).
Source: GCCMI Greater Caribbean Climate Mobility Model, 2024

Climate impacts will lead to economic losses for all Greater Caribbean countries. By 2050, warming above 2°C under the Rocky Road scenario could reduce GDP per capita by an average of 20% across the region. This is 7% higher than the projected losses under the Middle Road scenario, which keeps warming within the 2°C guardrail set by the Paris Agreement.

The economic impacts of climate change will not be evenly distributed, with some places experiencing more extreme losses than others. Northern South America, particularly Venezuela, Suriname, Guyana, and Trinidad and Tobago, are projected to see losses of between 23-33% of GDP per capita under the Rocky Road scenario (Figure 18).

Low lying areas may experience an even more dramatic decline of more than half of GDP per capita, including in the Yucatan peninsula and northern Colombia, eastern Cuba, The Bahamas, Venezuela, and coastal Suriname and Guyana. Some of the lowest-income countries in the region, such as Antigua and Barbuda, Suriname, The Bahamas, and Nicaragua will also be hard hit, with declines of over 20% of GDP per capita by 2050.

Figure 18: Percent changes in GDP per capita by country by 2050

Figure 18: Percent changes in GDP per capita by country for the Middle Road (SSP2-RCP4.5) and Rocky Road scenarios (SSP3-RCP7.0). GDP impacts will not be evenly distributed. Some countries will see disproportionately high losses. Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

Figure 19: Impact of climate change on GDP and prices

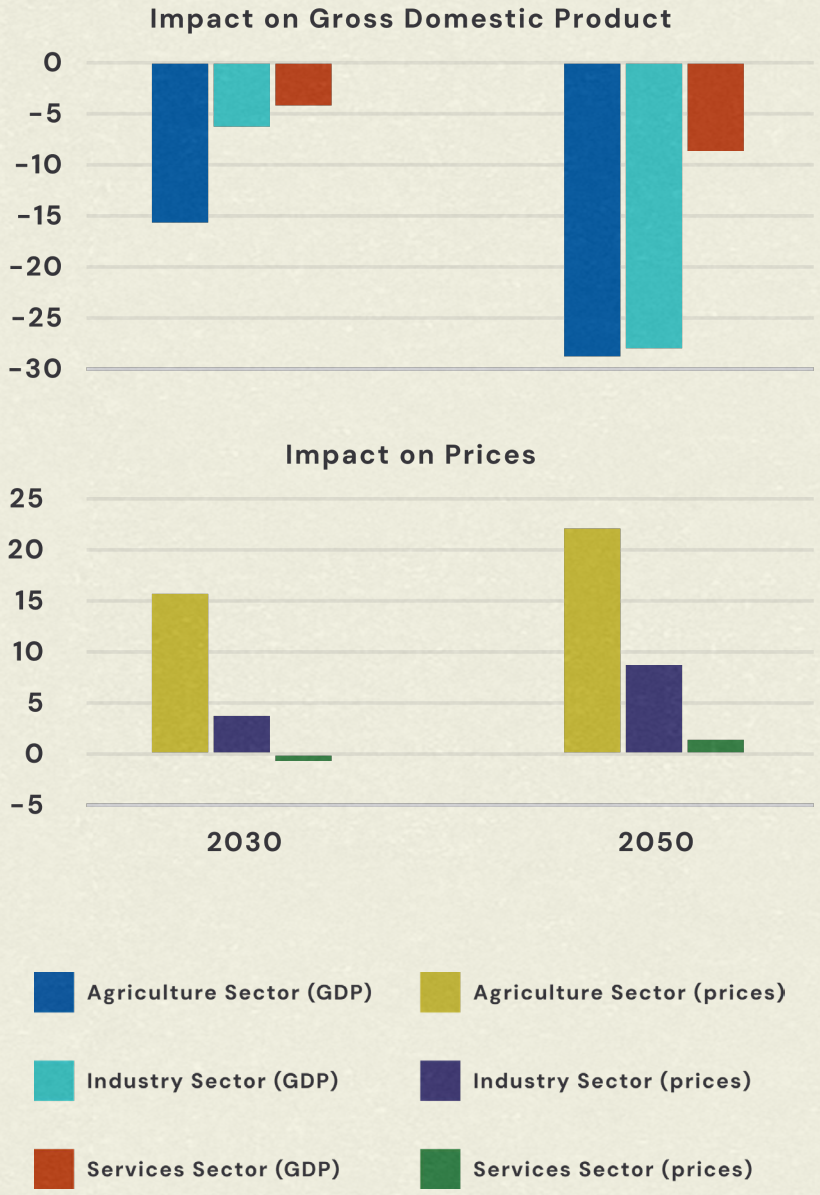


Figure 19: Impact of climate change on GDP and prices. Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

As climate change accelerates, some economic sectors and populations will fare worse than others. Climate change is projected to deepen poverty in the Greater Caribbean, as both agricultural productivity and industry decline. By 2050, climate change could push between 2 (Rocky Road scenario) and 2.5 million (Middle Road scenario) additional adults into poverty. While the projection of greater poverty under the Middle Road scenario might seem counter-intuitive, this scenario is characterized by uneven regional development and persistent income inequality across most countries, which could mean that lower income nations do not see the growth needed to combat poverty. In contrast, the Rocky Road scenario considers the breakdown of international and regional cooperation, where many states increasingly become economically self-reliant, potentially leading to greater capacity to reduce poverty.

Figure 20: Map of net climate mobility under the Rocky Road scenario (SSP3-RCP7.0) by 2050

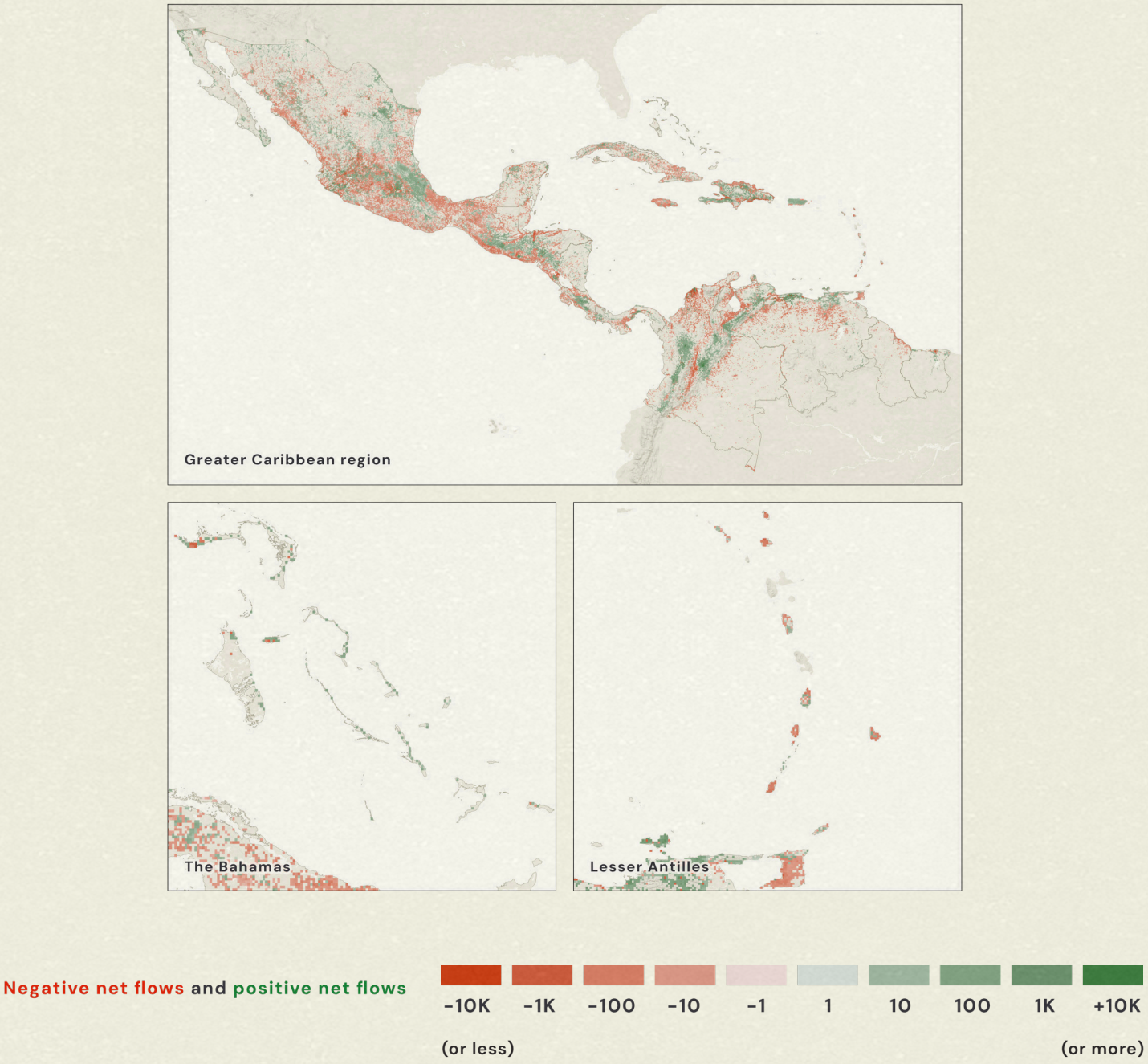


Figure 20: Map of net climate mobility under the Rocky Road scenario (SSP3-RCP7.0) by 2050. Net climate mobility captures the number of people leaving minus the number of people arriving. Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

By 2050, modeling projections indicate that between 6.4 million (Middle Road) and 8.2 million people (Rocky Road) could move permanently due to climate change impacts in the Greater Caribbean. The projected 28% increase in climate mobility between the Middle Road and Rocky Road scenarios underscores the dramatic impact that global warming over 2°C could have on mobility in the Greater Caribbean. To reach the Middle Road scenario, solidarity by the international community and among countries in the region must go beyond mitigating greenhouse gas emissions. Regional cooperation on people-centred adaptation and risk mitigation strategies is imperative for protecting people's right to stay in place. In both scenarios, people are projected to leave rural and low-lying coastal areas, resettling in-land and in large cities.

Rural Plight

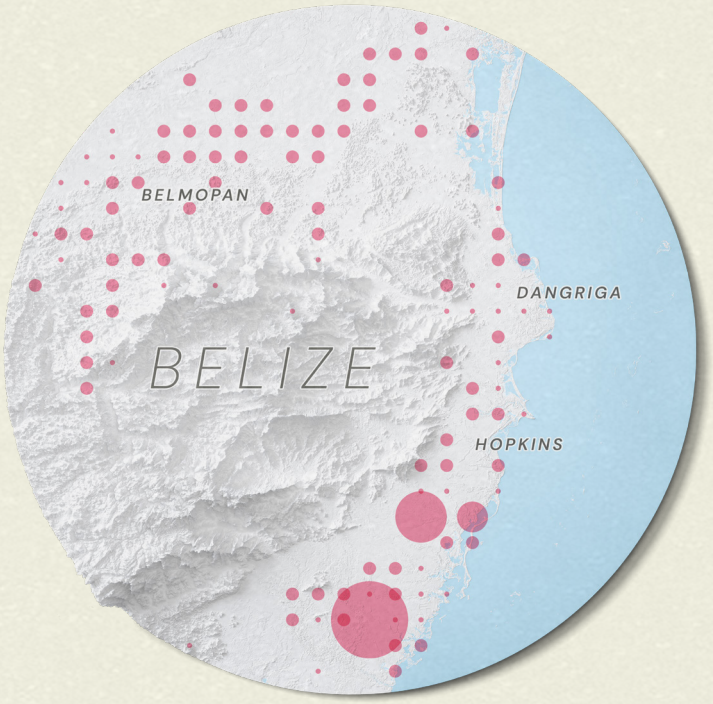
Agrarian areas will see the heaviest impacts from climate change resulting in population decline.

Agriculture is the bedrock of livelihoods in rural communities. Without significant measures to enhance adaptation and promote economic diversification, climate change could be disastrous for the region's agricultural sector. As a result, all countries in the region are projected to experience population movements out of rural areas by 2050. Of the 2.5 million people who could be pushed into poverty by 2050 (Middle Road), 2.2 million are projected to live in rural areas.

Climate change is already altering the quantity and quality of harvests, and is shaping where and how crops are cultivated. For example, farmers in Antigua and Barbuda report adding more synthetic nutrients to the soil to combat the effects of extreme heat and have lost yields from groundwater salinization. Rocky Road scenario projections indicate that losses in the sector could amount to almost 30% of regional GDP per capita by 2050. In each country, except Dominica, the impact to per capita GDP in agrarian areas will far outpace the national average. Economic devastation in rural areas is especially marked in Mexico, Colombia, Cuba, Belize, Guatemala, St. Lucia, and St. Vincent and the Grenadines. The decline in agricultural output also exacerbates food insecurity for rural households, which is already a driver of migration.

As people flee flood and drought-prone farmlands, settlement patterns in the region will be reshaped. Guyana is projected to see the most significant rural exodus with nearly 10% of its rural population projected to move by 2050, followed in size by Belize (Figure 22). Some agricultural villages and towns could be replenished by people newly arriving from other parts of the country that experience climate hazards. This could occur in Suriname, The Bahamas, Haiti, and Costa Rica, particularly as coastal populations turn to the countryside to escape hazards such as tropical cyclones and sea-level rise.

Figure 21: GDP per capita impacts in Belize by 2050



GDP loss

Pink circles represent projected GDP per capita loss due to climate change impacts under the Rocky Road Scenario (SSP3-RCP7.0) by 2050, ranging from 7% (smallest circles) to 86% (largest circles).

29%

By 2050, Belize could lose an average of 29% of its GDP per capita in rural areas (Rocky Road scenario). The Stann Creek and Toledo districts could be hotspots for agricultural decline. The Indigenous Garífuna and Maya populations in these districts, many of whom rely on subsistence farming, could be particularly vulnerable to climate impacts in these areas.

Figure 21: GDP per capita impacts in Belize by 2050

Figure 22: Comparison of climate mobility in rural areas under the Middle Road (SSP2-RCP4.5) and Rocky Road (SSP3-RCP7.0) scenarios by 2050

Figure 22: Comparison of climate mobility in rural areas under the Middle Road (SSP2-RCP4.5) and Rocky Road (SSP3-RCP7.0) scenarios by 2050

Coastal Retreat

Over 75% of projected climate mobility in the region will be out of coastal areas.

The Greater Caribbean's marine ecosystems and bountiful coastline have prompted settlement along the water's edge. In the Caribbean islands, nearly three in four people live along the coast or participate in industries directly reliant on its natural resources, from fishing to tourism.[70]

These areas are also the most at-risk from climate change, and the impacts are already being felt. Sea-level rise is causing erosion of the shoreline, while higher sea surface temperatures and ocean acidification endanger coral reefs and other aquatic ecosystems. Rainfall variability and saltwater intrusion are straining groundwater resources, while increasingly dangerous hurricanes and storms hammer in from the sea. In Costa Rica, for example, the lack of potable drinking water is threatening the success of key economic sectors like tourism and agriculture. Overall, coastal zones will experience a worse economic decline than inland areas–especially in larger countries like Venezuela, Honduras, Colombia and Mexico.

By 2050, up to 6.2 million people could move in coastal areas (Rocky Road scenario). Most climate out-migration in the region will be away from the coast (Figure 25). Temperature change and disasters will be the main drivers of out-migration from coastal communities. Rising sea-level will account for almost all climate mobility in The Bahamas (95%) (Figure 23), and for 60% in Suriname and Belize. Coral bleaching will have a significant influence on people leaving coastal areas in Cuba, Costa Rica, Haiti, Colombia, Venezuela, Dominica, and Antigua and Barbuda.

However, not all countries will experience total retreat from the shoreline. For instance, Haiti, the Dominican Republic (Figure 24), and Venezuela, home to large coastal cities, will see a redistribution of residents along the coastline, as people move out of smaller coastal villages and into larger coastal cities.

Others won't be able to move. By 2050, up to 2.2 million people (Rocky Road scenario) living in coastal areas could face immobility as a result of climate impacts. Though they are also at higher risk of falling into poverty, they will fare better than their rural counterparts. The rural poverty rate will be three times higher than that of the coast, while extreme poverty will be ten times higher.

Figure 23: Hotspots of people leaving due to sea-level rise in The Bahamas

People Leaving

Green circles represent people leaving due to sea-level rise under the Rocky Road scenario (SSP3-RCP7.0) by 2050 (1 - 2,794 people).

14 Thousand

In The Bahamas, sea-level rise is projected to displace 14 thousand people by 2050 (Rocky Road scenario). The western part of Grand Bahama, particularly around Freeport, will be a potential hotspot for people moving away due to rising seas.

Figure 24: Climate mobility in coastal Dominican Republic

People Arriving

People Leaving

Light blue circles represent people arriving due to climate change under the Rocky Road scenario (SSP3-RCP7.0) by 2050 (1 - 19,756 people). Dark blue circles represent people leaving due to climate change under the Rocky Road scenario (SSP3-RCP7.0) by 2050 (1 - 46,393 people).

357 Thousand

Over 357,000 people (Rocky Road scenario) could retreat from the coast in the Dominican Republic, leading to net population decline in these areas by 2050. However, some coastal areas could see new arrivals. The Dominican Republic ranks second in the region (Rocky Road scenario) after Venezuela in terms of the proportion of the population that could move into coastal zones, due to the economic prosperity of the coastal city Santo Domingo.

Figure 23: Hotspots of people leaving due to sea-level rise in The Bahamas
Figure 24: Climate mobility in coastal Dominican Republic

Figure 25: Comparison of climate mobility in coastal areas under the Middle Road (SSP2-RCP4.5) and the Rocky Road (SSP3-RCP7.0) scenarios by 2050

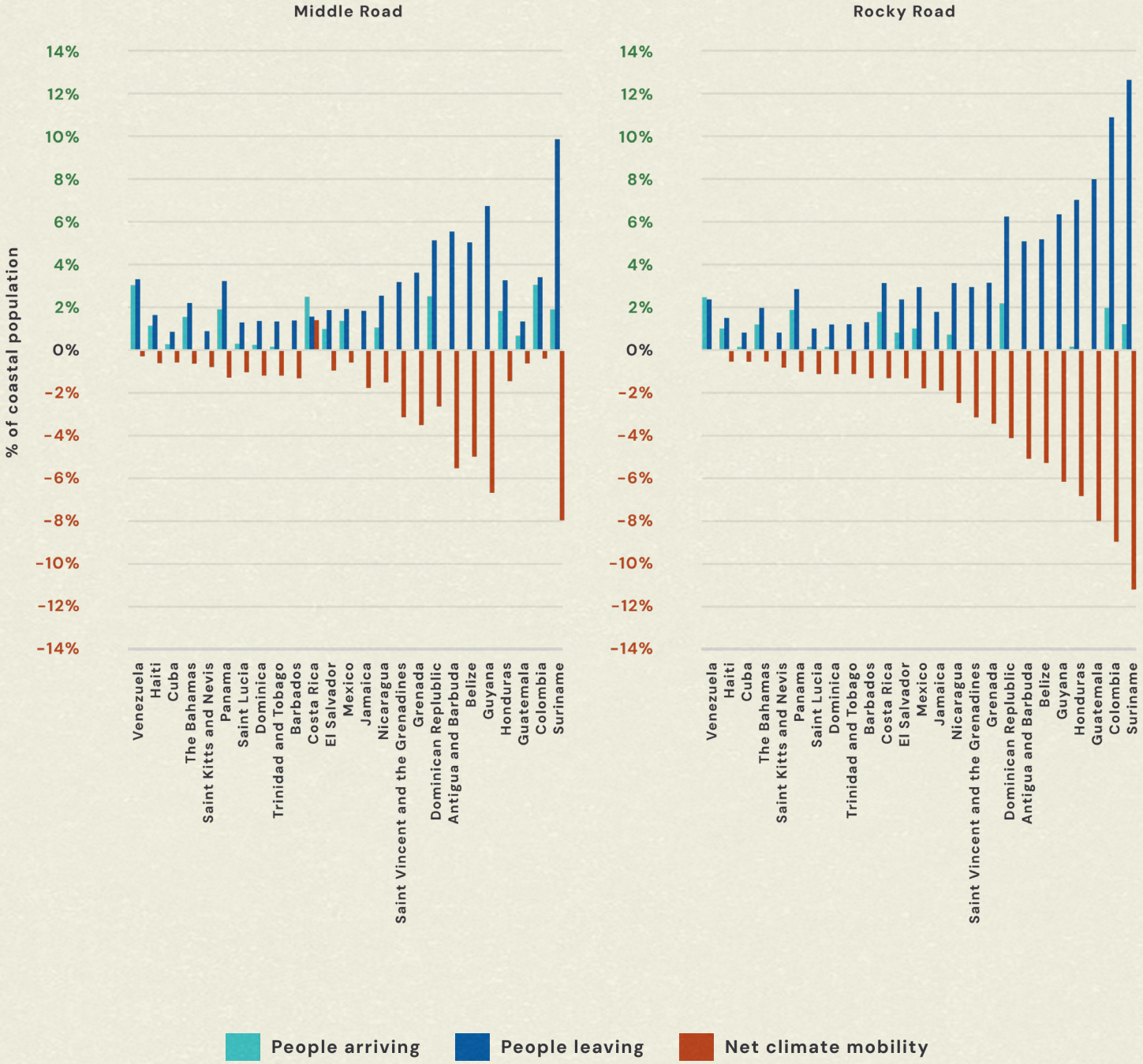


Figure 25: Comparison of climate mobility in coastal areas under the Middle Road (SSP2- RCP4.5) and the Rocky Road (SSP3-RCP7.0) scenarios by 2050.
Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

Urban Resilience

Large cities will attract climate mobility while smaller cities could lose population.

The cities of the Greater Caribbean region have long provided refuge and a place to resettle. A significant portion of the Greater Caribbean population lives in cities. Of the sub-regions in the Greater Caribbean, Central America is the most consistently urbanized, with an average of 62% of national populations living in urban areas.[71] Mexico, larger countries in northern South America including Colombia and Venezuela, and in the Caribbean islands including the Dominican Republic, The Bahamas, and Cuba are all between 75-85% urbanized. St Lucia is the least urbanized (19%) in the region.[72] A majority of urban population growth has been driven by rural-urban migration over the last forty years. While these trends are still strong in the Caribbean islands, they have waned in Central America and Mexico.[73] Even still, urban areas across the region continue to serve as important destinations for both people moving internally and across borders.[74]

Figure 26: Map of Greater Caribbean cities that will gain population by 2050

Figure 26: While many cities across the region will serve as important destinations for climate mobility, the region's 11 largest cities shown here, are the only cities that will see overall population growth due to climate mobility. Other cities are likely to see more residents leaving than arriving, particularly as people move across borders.
Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

Climate change will reinforce these trends. Cities are already important destinations for climate mobility, particularly for those looking for employment amidst declines in agriculture. Research respondents in Colombia and Costa Rica described finding work in a city as a helpful temporary stopgap measure and a more permanent strategy for (usually) young men who seek to support their family's income. In The Bahamas and Colombia, rural populations affected by tropical cyclones and floods had no choice but to relocate to cities. Over the next several decades, the economic diversification of large cities could provide some insulation from climate impacts, making them a destination of choice for people leaving rural areas. In particular, the region's 11 largest cities (labeled in Figure 26) are projected to attract climate displaced persons. In Central America, with the exception of Belize, more people are expected to arrive in metropolitan areas than leave them. The same is true for Colombia.

However, urban growth will not be uniform across the region. Many of the region's smaller cities will lose population due to climate impacts. Some will serve as points of origin for international migration as people flee climate damage and seek employment and education opportunities abroad. SIDS, Mexico, Suriname and Guyana are all projected to see overall population decline in urban areas due to climate impacts. Already today, urban residents face significant climate challenges, including flooding (reported by 70% of urban residents included in the GCCMI research), tropical cyclones (62%) and droughts (56%). These risks are compounded by legacy challenges related to urban housing and infrastructure, stemming from the region's rapid urbanization process.

Although the region's urban population living in slums has declined by over 10% since 2000,[76] informal housing continues to be one of the most pressing issues in city centers.[74] The proportion of urban populations living in informal settlements varies across countries but is highest in Haiti (50%) and Colombia (38%).[77] The only land available for new settlements is often in high-risk locations, such as in low-lying areas or along river banks on the outskirts of cities. Lacking drainage infrastructure and built from improper materials, informal settlements tend to be highly vulnerable to heavy rainfall and flooding.[78] Over the coming decades, the region's large cities will face the dual challenge of protecting current residents from climate hazards while preparing to integrate new ones.

Figure 27: Map of climate mobility in the greater Medellín area by 2050

People Arriving

Light blue circles represent people arriving due to climate change under the Rocky Road scenario (SSP3-RCP7.0) by 2050) (11 - 15,760 people). There is no significant out-migration due to climate change under the Rocky Road scenario (SSP3-RCP7.0) by 2050.

650 Thousand

Home to several of the largest cities in the Greater Caribbean, Colombia could see over 650,000 people move into urban areas by 2050. This growth will mostly occur in its three largest cities, including Medellín, Cali, and Bogotá. As an economic stronghold with a temperate climate, the Medellín area is projected to be a key destination for people fleeing climate impacts.

Figure 28: Map of climate mobility in the greater Barranquilla area by 2050

People Arriving

People Leaving

Light blue circles represent people arriving due to climate change under the Rocky Road scenario (SSP3-RCP7.0) by 2050 (15 - 16,170 people). Dark blue circles represent people leaving due to climate change under the Rocky Road scenario (SSP3-RCP7.0) by 2050 (58 - 22,223 people).

354 Thousand

Cities in Colombia will also continue to face their own climate challenges. As a result, over 354,000 people are projected to move away from smaller cities in Colombia. Located in a low-lying coastal area, Barranquilla and its surroundings are prone to extreme flooding. Although its port economy will likely continue to draw in-migrants, the Barranquilla area could see overall population decline due to climate change by mid-century.

Figure 27: Map of climate mobility in the greater Medellín area by 2050
Figure 28: Map of climate mobility in the greater Barranquilla area by 2050

4.2

No Exodus

Climate impacts will drive most people to stay or move within their home countries; far fewer will leave the region.

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Figure 29: Climate mobility across different scales in the Greater Caribbean by 2050

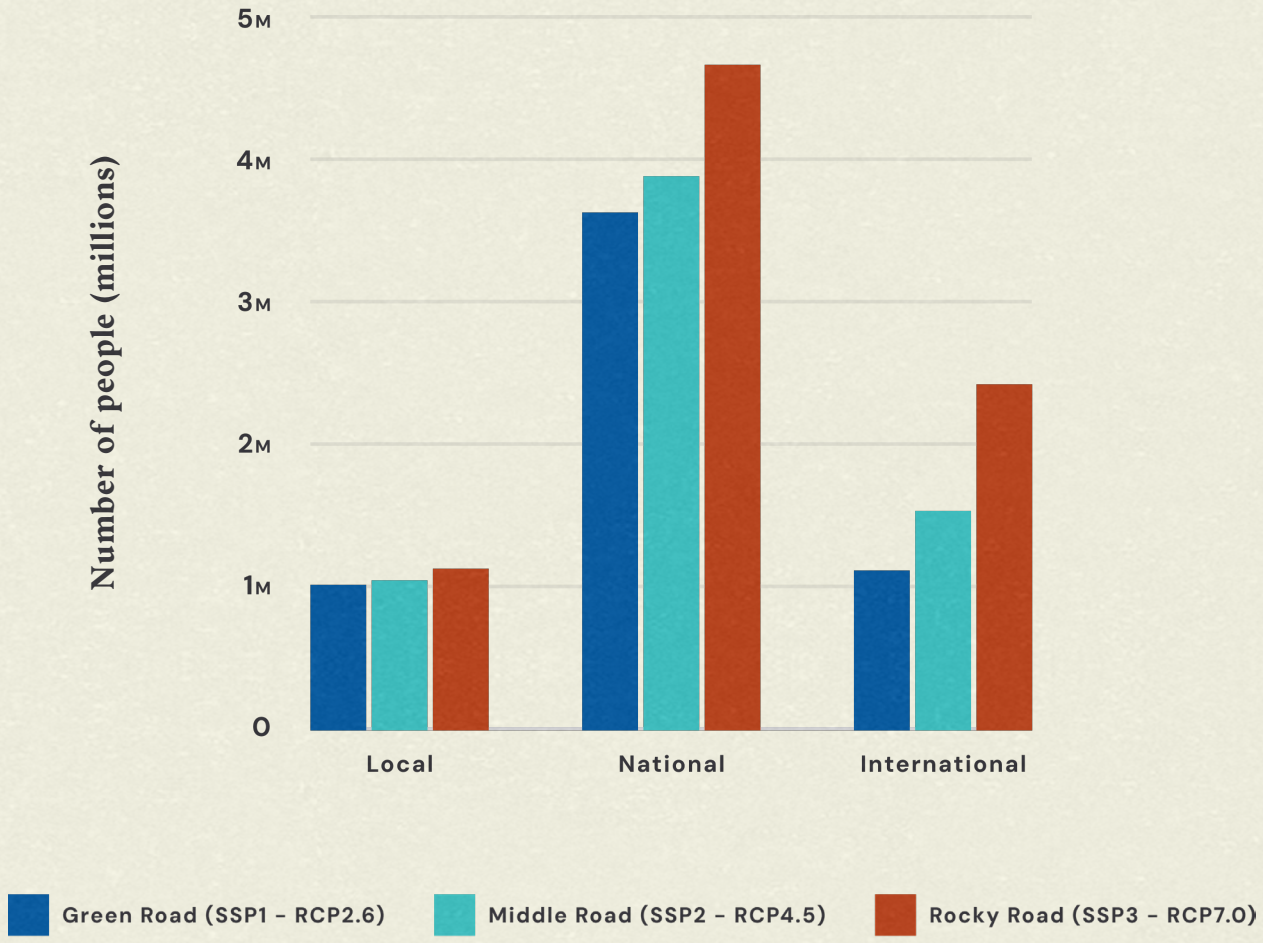

Figure 29: Climate mobility across different scales in the Greater Caribbean by 2050.
Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

Of the 8.2 million people who could be forced to move due to climate change, almost 6 million will resettle in their home countries. In terms of the number of people moving, internal mobility will be most important in large countries such as Mexico, Colombia, and Venezuela, where people can escape climate hazards without crossing a national border. However, smaller nations, like Suriname and The Bahamas, will see a larger share of their population relocate. Venezuela and the Dominican Republic place in the top 5 countries in the region in terms of total internal climate displacement (in thousands of persons) and the highest rates of climate displacement as a share of their population.

Familiar Routes

People who move across borders will mainly go to traditional destination countries outside the region.

Climate change will also contribute to cross-border mobility. By 2050, 30% of people who move permanently due to climate change in the Greater Caribbean, will resettle abroad, amounting to 2.4 million people (Rocky Road scenario). If warming is limited to below 2°C, the number of international movers decreases to 1.5 million under the Middle Road scenario.

Although most climate displaced persons in the region move within their home countries, cross-border climate mobility will be highly relevant for many countries across the region. For instance, most climate displaced persons from the SIDS are projected to move across borders. Plus, in Suriname and Guyana, international climate mobility is expected to lead to significant population loss — approximately 5% of their projected 2050 populations. In absolute numbers, the highest portion of cross-border climate mobility from the Greater Caribbean will come from Mexico; yet, most climate discplaced persons in Mexico will relocate internally.

Figure 30: Top destinations for cross-border climate mobility by 2050

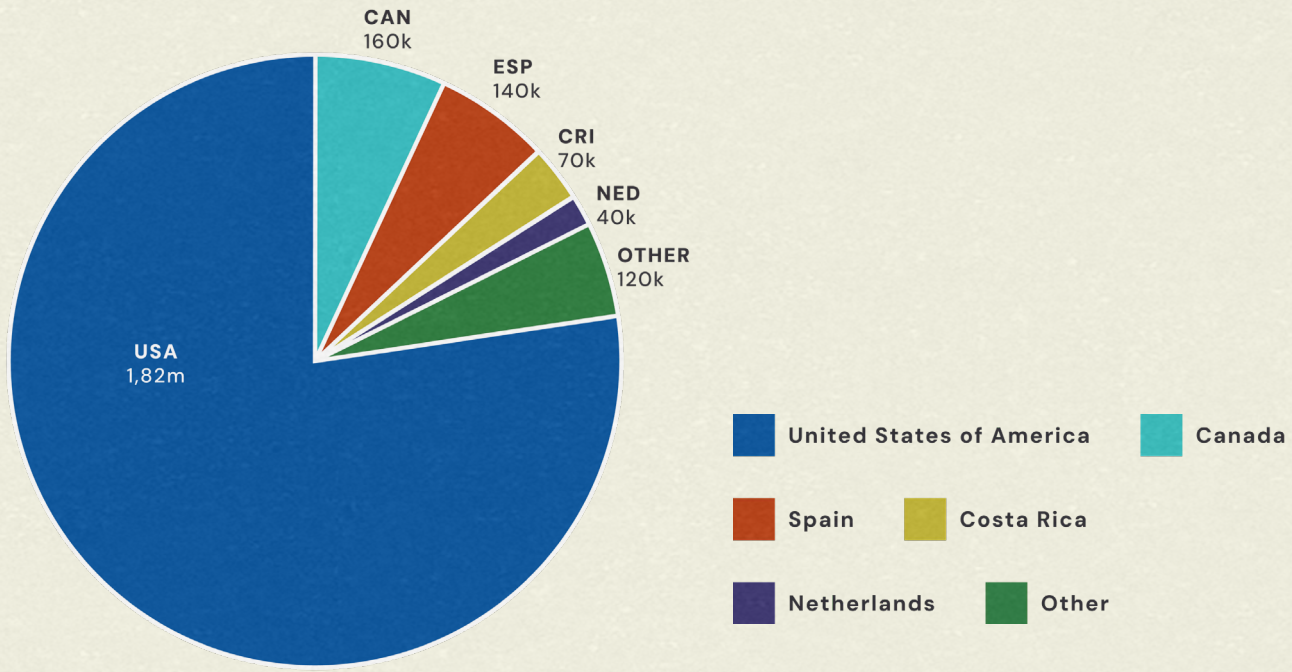

Figure 30: Top destinations for cross-border climate mobility by 2050. The destinations that will receive most people are outside of the region.
Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

Most people who move across borders due to climate change will leave the region, following historically significant migration channels to countries in North America and Europe. The United States will be the top destination for cross-border mobility due to climate impacts, followed by Canada and Spain. For those who move across borders but remain in the Greater Caribbean, Costa Rica will be the top destination. Yet, climate-related movement will still remain a small fraction of total international migration by 2050. For instance, although the United States is projected to receive over 70% of climate mobility from the Greater Caribbean, the modal suggests that these movements will account for less than 10% of the total economic migration from the region to the US by 2050.

Report photography captured by GCCM

Immobility

Climate impacts will deter many from migrating as economic conditions in potential destinations worsen.

Although some places will fare better than others in the face of climate change, no place will be untouched. Climate impacts on businesses and job opportunities in destination communities will make migrating there less attractive and deter people from leaving their homes. Almost 6 million people in the region could be immobile as a result. This deterrence effect will be particularly strong at the national level, as people determine that wages in neighboring towns or cities are no longer high enough to outweigh migration costs. Disadvantaged groups, for whom migration costs are higher in proportion to their earning potential in destination communities, will be the most likely to become immobile.

Figure 31: Climate immobility in the Greater Caribbean by 2050

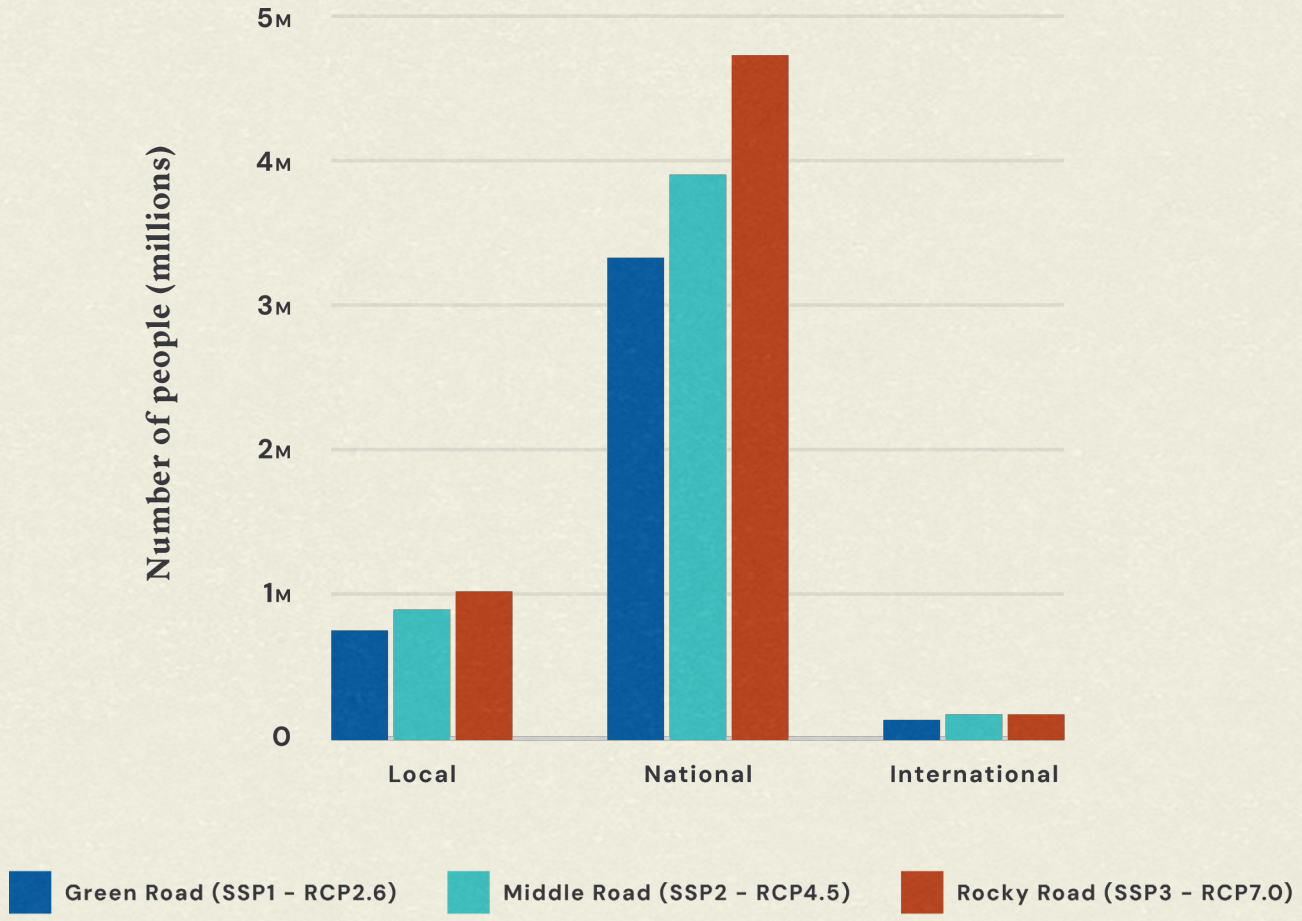

Figure 31: Climate immobility in the Greater Caribbean by 2050
Source: GCCMI Greater Caribbean Climate Mobility Model, 2024.

4.3

Who Will Move

Not everyone can and wants to move; unequal uptake of mobility could shape future climate vulnerability.

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Women Upfront

Women are both more likely to move and to be immobile due to the economic impacts of climate change.

Modeling projections confirm that future climate change will accelerate some of the demographic impacts of climate mobility uncovered by the fieldwork. Over the next several decades, climate change will continue to disproportionately impact women, widening gender inequality and contributing to gendered mobility patterns. By 2050, women will be overrepresented among climate displaced persons. 170,000 more women than men are projected to move across the region, with eight countries seeing higher rates of female climate mobility. At the same time, women are also overrepresented in immobile populations with 190,000 more women than men becoming immobile across the region. Higher rates of female immobility are projected in all except six Greater Caribbean countries. Barbados leads the region with the largest gender differences in both migration and immobility: nearly 40% more women than men will migrate, and nearly 30% more women than men will face immobility.

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Figure 32: Gender shares of immobility per country by 2050

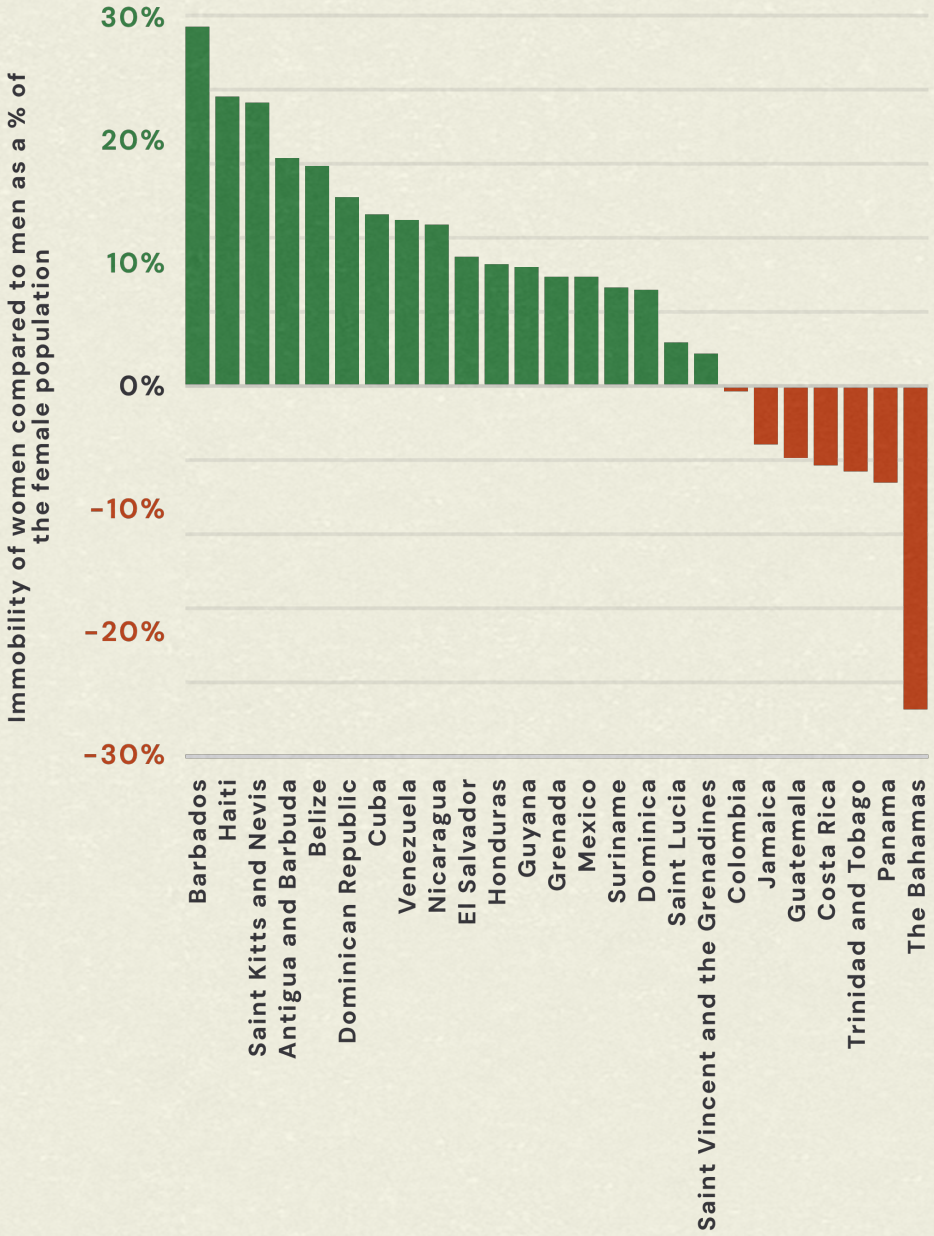

Figure 32: Gender shares of immobility per country by 2050. Results shown as the % difference in share of women that are immobile versus share of men that are immobile under the Rocky Road scenario (SSP3-RCP7.0) by country.
Source: GCCMI Greater Caribbean Climate Mobility Model, 2024

The overrepresentation of women among both the climate displaced and people who are immobile confirms the disproportionate economic impacts of climate change on women. They leave at higher rates than men and are also more sensitive to climate impacts in destinations, inducing them to stay at higher rates. While women's vulnerability to climate change is far from monocausal, these projections confirm the role that gender-segregated employment will play in shaping whether women stay or leave in the context of climate change. For instance, representing almost 60% of the labor force in accommodation and food service,[79] women are more sensitive to the impacts of oceanic changes on the tourism industry. Climate change will also widen the economic inequality between women and men in the region; in 2050, 6.3% of women are expected to be in poverty compared to 6% of men, and 2% of women are expected to be in extreme poverty compared to 1.6% of men.

The Young Depart

Young people are most likely to leave the region.

Climate change will continue to accelerate the departure of young people, primarily to international destinations. This could lead to aging populations across the region. By 2050, young people (ages 20-39) will migrate at higher rates than those over 40 in all Greater Caribbean countries, with the largest differences in migration rates between youth and other age groups occurring in Guyana and St. Vincent & the Grenadines. Youth will be particularly more represented in flows to international destinations such as the United States.

Report photography captured by GCCM

Left Behind

Populations that stay in place could be left behind in other ways.

People whose age, health, cultural norms and values or financial situation prevent them from leaving communities facing worsening climate hazards could fall further into poverty, dampening their adaptive capacity. For instance, severe climate impacts on agricultural production mean that poorer farmers with lower migration capacities, will likely face higher poverty rates as climate change wreaks havoc on their communities. By 2050, a third of those employed in the agriculture sector could be living in poverty, compared to the regional poverty rate of 6.2%. One in 10 people in rural communities will be relegated to extreme poverty (Middle Road scenario).

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Section 5

Stepping Stones

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5.1

Local Solutions

Adaptive capacities and tested solutions already exist in the region.

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The climate crisis is changing the Greater Caribbean. Communities on the frontline of its impacts are developing their own solutions, combining scientific, Indigenous, and local knowledge of the natural environment to adapt. While their approaches will not be sufficient in isolation, they provide important stepping stones for other communities to follow suit and for locally anchoring national and regional strategies for climate resilience.

Figure 33: Perceptions of adaptation at the community level

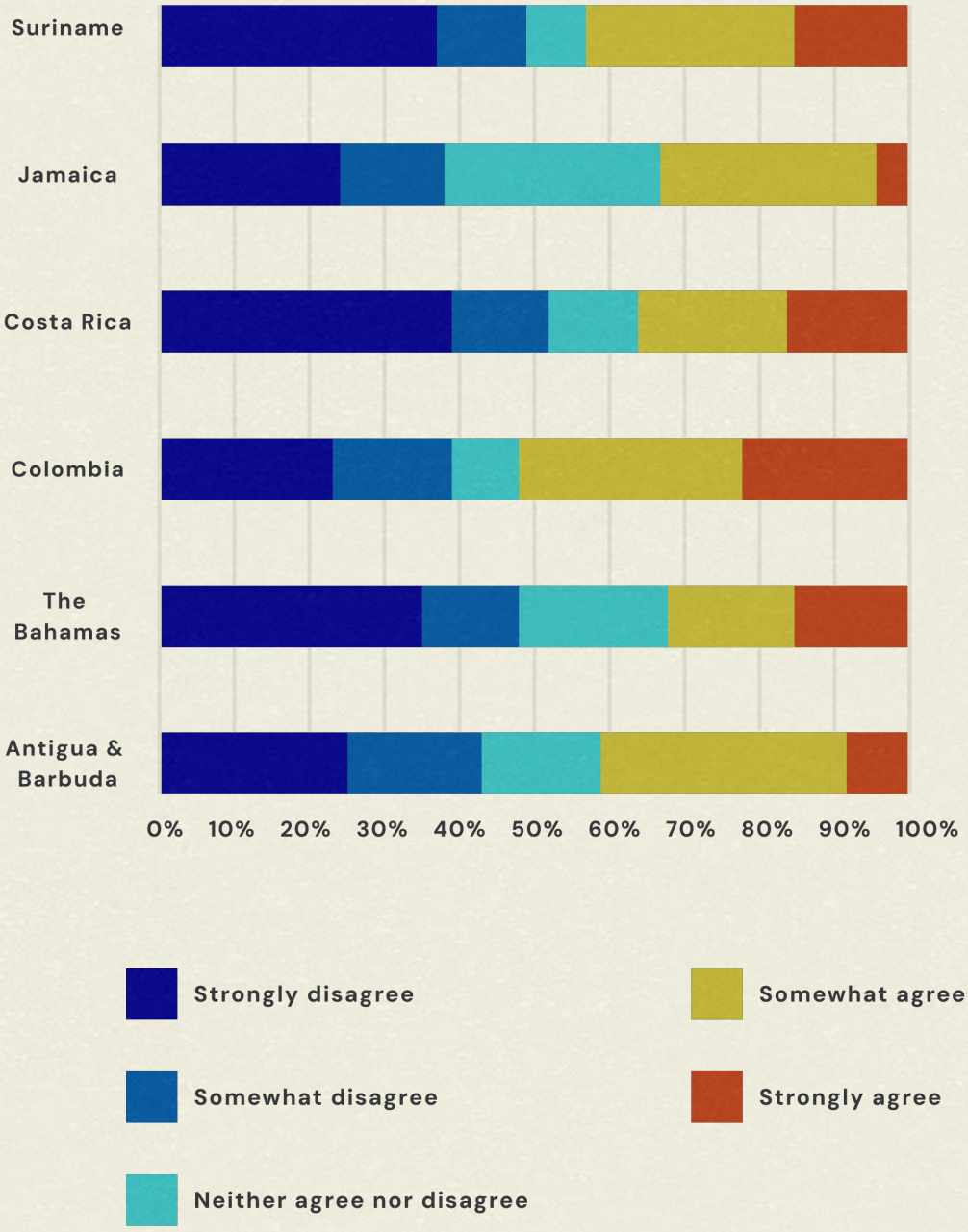

Figure 33: Survey responses to the question, "How much do you agree with the statement: 'My community takes steps to adapt or prepare for the impacts of climate change'."
Source: GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

Agriculture Responses - Agrarian communities are innovating with new, more resilient modes of production in response to climate impacts. In Costa Rica and Jamaica, for example, research respondents have begun to move away from monocultures and embrace mixed farming techniques and crop diversification, including drought-resistant varieties.

Drought Response - Drought and saltwater intrusion were identified among research respondents as significant challenges to livelihoods in the agriculture and tourism sectors. In Antigua and Barbuda, responses to water resource threats have included the adoption of hydroponics and water catchment tanks that can mitigate the impacts of both dry spells and flooding. Similarly in Jamaica, communities have come together in joint efforts to improve water storage and manage water usage for multiple purposes. These strategies have been particularly effective at alleviating the economic impact of water scarcity on agriculture in Jamaica.

Spotlight– Indigenous Wayana, Suriname: Community-led Adaptation

In order to address climate threats to food security, the Wayana community is working to introduce climate-sensitive food systems while adjusting the different segments of the agricultural value chain. Through engagement with local schools, the approach is designed to incrementally introduce more sustainable and climate-sensitive farming and production practices, to encourage behavior shifts in younger generations:

"What we're trying to do - with this little project with the school - is not the traditional way of farming, new ways of farming so that they have food, so teaching them to plant in pods close to their house, because traditionally their farm would have to be far away, teach them to use natural fertilizers of course, if they cut the leaves, they can use dry leaves for composting, so no bad fertilizers, but it's not easy, because they don't believe in this way, so it will take years before they have this mindset" (Expert interview, Suriname).

While the inclusion of Indigenous leadership in climate adaptation, risk mitigation, and economic development should be broadly championed at different governance levels across the region, the community-led approach enacted by the Wayana people is exemplary of transformation made possible when adaptation is planned and led by local communities.

Flood Response - Flooding is among the most reported climate hazards affecting daily life in the region. This is particularly true in Colombia, where one respondent from Barranquilla explained that to bring her child to school she would have, "to buy a canoe to cross the stream." Overcoming floodwaters has taken many forms. For example, raising buildings or covering homes in tarps. In some places, walkways and streets have been filled with sand and cement to prevent water intrusion. Some Indigenous communities in Suriname have gradually returned to traditional community planning methods. A Wayana Indigenous leader looks to the past as a guide for future-proofing homes, stating:

"Wayana villages are built on higher ground – my ancestors saw mobility in the future – you will never see them flooded...the name of my village literally means higher ground, hoping that it won't be moved so far because of flooding."

In Jamaica, research respondents noted how ecosystem rehabilitation projects are increasingly recognized as essential to reducing flood risk. For instance residents of Portland Cottage joined forces with the local environmental agency to restore mangroves along riverbanks to control flooding.

However, communities and people are not equally positioned to respond to loss and damage and adapt to climate risks. Historic and current patterns of exclusion, discrimination, and persecution - often linked to colonial legacies - are reflected in the regions' modern social, economic, and political systems. In the face of climate stressors, the resulting inequalities can severely reduce the adaptive capacities of marginalized groups.[80] National land management systems - anchored in colonial notions of tenure, access, and property rights[81] - have been shown to negatively impact the climate resilience of nature-based, agrarian, and Indigenous communities, undermining disaster recovery[82] and adaptive capacity.[83] When climate change threatens land holdings, constraints to the acquisition of new land can force desperate smallholder farmers to adopt maladaptive practices:

"Climate unpredictability leads local farmers to make risky decisions, gamble their livelihoods, take risks by using certain methods or fumigation, etc. which can lead to loss of income or soil degradation, which are exacerbated by moisture-related diseases and rainfall." – (Focus group participant, Costa Rica)

Climate adaptation projects enacted without regard to the local community's needs can erode future resilience. In Colombia, community members indicated concern that flood management is not in line with the needs and interests of local farmers and fishermen, imposing undue trade-offs between accessing water to support livelihoods, and reducing flood risk. Community members argue that capping farmers' and fishermen's access to water that sustains their livelihoods is not an appropriate adaptation: "Here, in [town] fishing will come to a halt, so to speak ... the project is not designed with the reality of the town in mind" (focus group participant, Colombia).

Inclusive, and participatory planning strategies can help ensure that local livelihoods are not unduly sacrificed in the name of adaptation and risk mitigation.

Diaspora Ties

With proper support, mobility can unlock opportunities for adaptation and community resilience.

Future cross-border climate mobility could provide a lifeline for sustaining living standards and building resilience in communities facing climate threats. The Greater Caribbean diaspora already makes sizable contributions to household resilience and the regional economy through remittances. In 2022, remittances were equivalent to over 20% of GDP in several countries in the region, including Honduras, El Salvador, and Jamaica.[84] As a diversified income source, remittances are credited with contributing to the reduction of poverty and inequality in origin communities.[85] A study of Mexico and Central America found that a 10% increase in remittances could reduce poverty by 6.7% (measured by the poverty line of USD 1.90 per day).[86] Remittances also improve household disaster resilience by providing a safety net for mitigating disaster risk, preparing for costs, and recovering from damages.[87]

Figure 34: Remittances as percent of GDP in three Greater Caribbean sub-regions

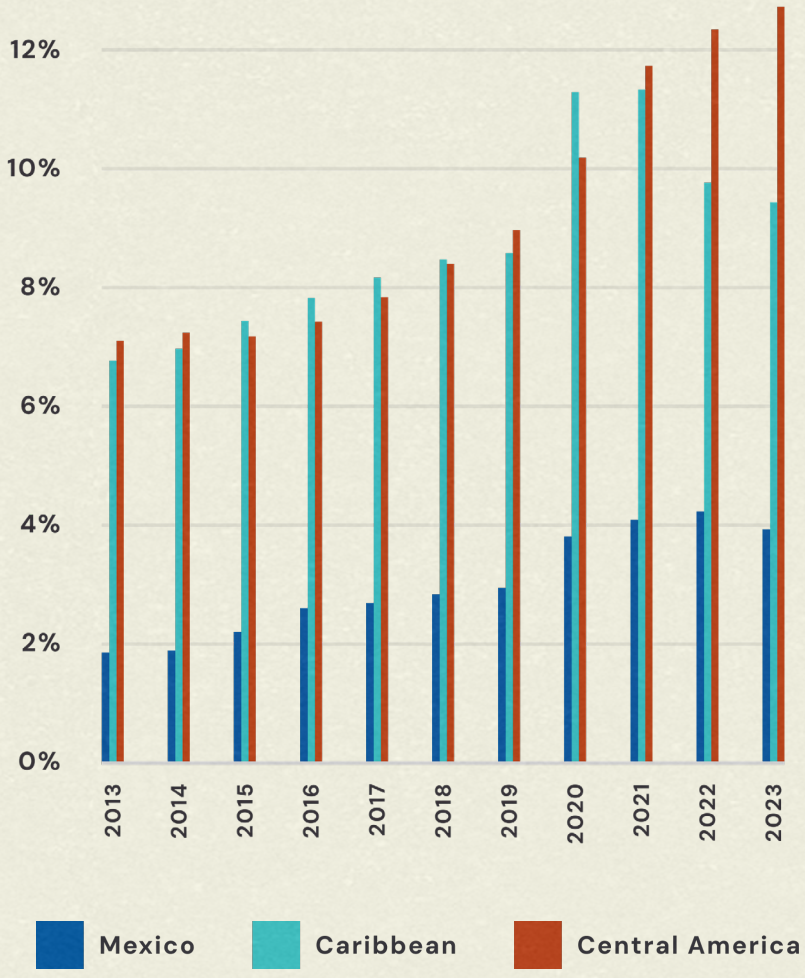

Figure 34: Remittances as percent of GDP in three Greater Caribbean sub-regions.
Source: Author's adaptation of Figure 4 in Maldonado, R., & Harris, J. (2023). Remittances to Latin America and the Caribbean in 2023. IDB Publications. https://doi.org/10.18235/0005270

Yet, as climate change accelerates cross-border mobility in the region, the economic benefits will need to be weighed against numerous trade-offs. Already, the negative impacts of emigration on the labour force and tax base in origin communities have been shown to offset the positive impacts of remittances in the region.[88] "Brain drain" is particularly acute in the Caribbean islands, which lose significant numbers of skilled migrants to certain industries abroad, such as healthcare.[89] Emigration also leads to the less visible loss and disruption of culture, heritage, and community networks with negative effects for social cohesion and mental health.[90]

New kinds of partnerships and climate mobility pathways will be needed to shift the balance of benefits around international migration for the region. New pathways must ensure the safety and dignity of climate displaced persons and provide them with secure legal status. Skills partnerships provide a blueprint for enhancing the benefits of labour mobility by investing in the skills of those who move as well as training for domestic labour markets in countries of origin.[91] Remittances can support climate resilience and adaptation, but are often funneled towards maintaining climate-vulnerable livelihoods instead.[92] If the Greater Caribbean diaspora is to contribute to adaptation in their origin communities, facilitating the transfer of financial and knowledge resources, promoting financial literacy and inclusion in origin communities, and linking remittances to insurance products all present viable options. Governments can also provide incentives for climate-smart investments that complement public support for adaptation, climate resilient development, and disaster risk reduction in frontline communities. By creating a safe and enabling environment for climate displaced persons and diaspora contributions, countries in the region can harness mobility for climate-resilient development while protecting their people's ways of life.

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5.2

Stepping Up

Governments recognize the impacts of climate change on human mobility, and now must act.

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National policies across the region indicate an emerging awareness of climate mobility as both an adaptation and migration issue. However, this has yet to translate into widespread policy action. A mapping of government responses across climate, disaster risk reduction, migration, refugee and development policies reveals that adaptation policies currently include the most complex understanding of climate mobility, reflecting the spectrum of factors and dynamics that shape the impact of climate change on human mobility. In contrast, current migration policies primarily consider and respond to sudden-onset disasters, offering temporary and event-specific movement opportunities and protections.

As of 2024, 11 of the 25 members of the Association of Caribbean States refer to climate mobility in either their National Adaptation Plan (NAP) or Nationally-Determined Contribution (NDC). For instance, Mexico's update to its National Climate Change Strategy includes recognition of international and internal migration resulting from climate change, and calls for rights-based approaches to both climate adaptation and migrant integration. In Costa Rica, a pending bill, initially proposed in 2021, calls for changes to national refugee laws to include the consideration of climate drivers alongside religious, ethnic, gender and political persecution as the basis for protection. Colombia's highest court has ruled that the impacts of climate change can be legally considered causes of forced displacement and urged the Colombian Congress and the national government to develop a legal framework to address the issue. A draft bill on internal climate displacement, proposed in 2023, is currently making its way through the Congress. It calls for a national registry of climate-displaced persons, as well as resources for their protection.

From a migration governance perspective, there is significant precedent across the region of employing existing immigration laws and categories to respond to cross-border movement related to environmental and climate hazards. Yet, ongoing efforts to address climate displacement as a separate protection category and to develop common regional positions on the issue also attest to the growing recognition that current migration pathways aren't sufficient to ensure safe mobility and dignified relocation for everyone who might need to move in the face of climate change.

5.3

Greater Ambition

Regional policy frameworks are looking for solutions at scale.

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Across Latin America and the Greater Caribbean region, climate mobility is increasingly recognized as a collective action problem. The 1984 Cartagena Declaration enshrined the region's commitment to international refugee law. It also broadened the scope of the refugee definition by including additional grounds for protection, such as generalized violence, internal conflicts, human rights violations, and other circumstances that have seriously disturbed public order. Since then, the Cartagena Process has served to periodically update the region's protection commitments. In 2024, it raised the impacts of climate change and environmental degradation to the top of the displacement agenda. The Chile Declaration and Plan of Action, adopted in December 2024, includes a dedicated chapter (Chapter 3) on actions to address displacement in the context of disasters and the adverse effects of climate change.[93]

In July 2025, the Inter-American Court on Human Rights issued an Advisory Opinion on the Climate Emergency and Human Rights, which clarifies state's obligations in the context of climate change.[94] The Court affirmed the responsibility of states to uphold conditions that enable people to stay in place by mitigating risks, addressing the underlying drivers of mobility, and taking measures to reduce the particular vulnerability of certain groups. The Court also maintains that people moving across borders in the context of climate change could be eligible for protection under existing international law and principles of non-refoulement and calls for the development of special migration categories for facilitating safe and dignified movement.

Existing regional Free Movement Agreements (FMAs), such as the Central America-4 and the Organization of Eastern Caribbean States (OECS) FMAs, have provided de facto climate mobility pathways in situations of disaster. Although such agreements are designed to enable unrestricted economic mobility across an integrated market, they have served to facilitate movement related to climate hazards. For instance, the OECS FMA enabled the rapid relocation of displaced populations from Dominica during Hurricane Maria in 2017. CARICOM's recent decision to expand the scope of its FMA could further enhance the potential of free mobility regimes in the region to provide a 'safety valve' in case of disasters. However, free movement agreements alone will not be sufficient to provide durable solutions for climate displaced populations, challenging the region to develop more comprehensive policy frameworks.

In 2023, the OECS took a first step in this direction by adopting the Ministerial Declaration on Migration, Environment and Climate Change. The Declaration emphasizes a comprehensive approach, from actions that minimize the need for vulnerable communities to relocate, to measures that enhance the benefits of migratory responses.

There are thus a number of promising stepping stones in place for further advancing regional cooperation and policymaking in the Greater Caribbean, including through the development of a comprehensive Regional Framework for Climate Mobility.

Section 6

Seven Actions for a Positive Transition

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Agenda for Action

Key actions towards a positive transition in the region.

The Greater Caribbean Climate Mobility Initiative (GCCMI) set out to create a common evidence base to enable governments at all levels, affected communities and relevant partners to plan for the shifts ahead.

Across the region, climate adaptation will be an ongoing process. No single action can mitigate risks and ensure the safety of communities indefinitely. Risk levels and perceptions are bound to evolve. So will people's calculations around whether to stay or move. It is therefore important that adaptation actions are guided by an ongoing dialogue between the government and communities. Governments must provide clear guidelines and set expectation horizons based on continuous risk monitoring to inform and guide community decisions. By seeking out information, participating in risk monitoring, and organising collectively, communities can play an active role in designing their adaptation journeys. In this way, the Greater Caribbean can build resilience from the bottom up.

The GCCMI recommends an Agenda for Action that is guided by three core tenets: Adapt Locally, Protect Rights & Act Together. The Agenda proposes seven key Actions to prepare for climate mobility. Anchored in regional precedents, including the Escazú Agreement, the Cartagena Declaration, and rulings by the Inter-American Court of Human Rights (IACHR), the Agenda directs climate mobility responses in line with meeting the 2030 deadline of the Sustainable Development Goals and the Paris Agreement.

The Agenda for Action outlines concrete measures to advance each of the seven Actions through concerted efforts across sectors and levels of governance by Greater Caribbean leaders, stakeholders, and international partners to:

1. Ensure Access to Climate Risk Information
2. Enable Positive Adaptation Journeys
3. Protect the 'Right to Stay' & Support Relocation in Dignity
4. Advance Rights-based Climate Mobility Responses
5. Respond Collectively to Loss and Damage
6. Integrate Climate Mobility into Regional Development Strategies
7. Strengthen International Solidarity with the Region

6.1

Adapt Locally

Enable local planning and capacities for adaptation.

Report photography captured by GCCM

Across the Greater Caribbean, climate impacts aren't evenly felt. The severity of the challenge in any given community depends on the size of the hazard they face, but also on their capacity to adapt — the economic, technological, financial, and institutional resources on hand. Climate adaptation must be place-based and grounded in local knowledge, priorities and capacities. It must also be enabled by cross-border collaboration and international support.

The countries in the Greater Caribbean have barely contributed to global carbon emissions. International solidarity and action are therefore imperative to support adaptation efforts. These should be led by communities in the countries and cities affected, and encompass a wide spectrum of engagements: from the co-creation of climate risk data and inclusive adaptation planning to improved access to financial support.

Action 1: Ensure Access to Climate Risk Information

Recognize climate literacy and the availability and accessibility of relevant climate risk information as fundamental to protecting people's rights and agency in the context of the climate crisis, including for their individual and collective adaptation and mobility decisions.

Action 2: Enable Positive Adaptation Journeys

Support frontline communities in protecting their homes from climate hazards and strengthen their adaptive capacities and agency in decisions to move by scaling up participatory planning, institutional capacities, and investments for climate adaptation, taking account of differences in local exposure and vulnerability to climate hazards.

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Risk Anticipation:

- Strengthen regional climate risk and impact monitoring, assessments and forecasting, including insights about projected future climate-related population shifts that can be integrated into National Adaptation Plans, disaster risk reduction and sustainable development policies.
- Expand multi-hazard early-warning systems to cover all countries in the region.
- Support Indigenous and local governance and public information systems for adaption, disaster response, risk reduction, and recovery.

Inclusive Knowledge:

- Leverage Indigenous Traditional Ecological Knowledge (TEK) and local knowledge in combination with scientific data to co-develop bottom-up adaptation and disaster risk reduction practices.
- Bolster data collection on the gendered impacts of climate change and the disproportionate climate risk faced by women and girls, including to their physical safety, security and well-being.

Access to Information:

- Ensure that data about macro-level changes in weather patterns or climate disturbances is translated into actionable information on local impacts, and communicated in ways that are conducive to non-expert understanding and sensitive to local culture, language, and communication processes.
- Reduce barriers to information access by selecting communication channels, messaging and languages to reach vulnerable communities and population groups, including rural and remote areas and Indigenous people, women, the elderly, children and young people, migrants, refugees, and displaced populations, slum dwellers, and people with disabilities.
- Raise public awareness about the relationship between climate change and human mobility beyond the sudden-onset disaster context.

Action 2: Enable Positive Adaptation Journeys

Support frontline communities in protecting their homes from climate hazards and strengthen their adaptive capacities and agency in decisions to move by scaling up participatory planning, institutional capacities, and investments for climate adaptation, taking account of differences in local exposure and vulnerability to climate hazards.

Resources & Livelihoods:

- Resource the right to stay of voluntarily immobile communities through support for locally-led adaptation and livelihood diversification strategies that prioritize the development of culturally sensitive and locally controlled economic activities, including the adaptive management of natural resources such as forests, soils, crops, fish and livestock.
- Ensure equal opportunities for men and women in education, job training and financing for livelihood diversification and in emerging green sectors, such as renewable energy and ecotourism.
- Promote the wider adoption of climate risk insurance mechanisms and share experiences and lessons learned across the region.

Urban Planning & Housing:

- Promote urban planning and disaster recovery that is well-informed by data about future climate risks and population shifts, through strategies such as adaptive land use, and sustainable, nature-based, and equitable infrastructure and housing solutions.
- Include internally displaced people, refugees, and migrants in urban climate risk mitigation and adaptation strategies, with a particular focus on improving their physical safety through sustainable and affordable housing solutions.

Ocean & Marine Resources:

- Institute a joint observatory to monitor the localized manifestations and impacts of sea-level rise in the region in order to develop a coordinated action plan for coastal protection & adaptation.
- Reinforce efforts to protect and preserve marine and coastal ecosystems as a basis for sustainable livelihoods and to reduce disaster risk and increase resilience through nature-based solutions in coastal communities.

Circular Migration & Mobility:

- Expand labour migration pathways, in consultation with key constituencies such as employers' and workers' organizations, to mitigate the livelihood impacts of climate change and ensure the protection of migrant workers' rights and their ability to return.
- Facilitate diaspora contributions to development and climate adaptation through skills transfer and financial infrastructure that enables faster, safer and cheaper transfer of remittances, especially in anticipation of and following disasters.
- Promote gender-responsive financial literacy in origin communities to support sustainable and strategic remittance use and investment.

6.2

Protect Rights

Protect the ‘right to stay’ and support relocation in dignity.

Report photography captured by GCCM

Climate impacts are already making people's lives harder and contribute to undermining basic rights, including their "right to stay" in the places they call home. Without proper support for adaptation, risk mitigation, and responding to loss and damage, communities that choose to stay can face deepening poverty and further environmental harm. To prevent immobility from becoming a trap, governments have a duty to help communities take informed action.

Governments should put clear procedures and safeguards in place to support communities that are ready to pursue planned relocation. They should also develop policies and agreements that provide for safe and legal climate mobility pathways across borders.

When people move out of desperation or in the midst of disaster, they are vulnerable to abuse and exploitation. The presence of organized crime networks in the region engaged in kidnappings, extortion and human trafficking exacerbates the risk for refugees, displaced and stateless persons, migrants and their families. The urgency to protect people on the move — and to create regular pathways for migration — increases alongside global temperatures and regional vulnerability to the changing climate.

Trailblazing legal and policy initiatives by individual states and regional bodies should be encouraged, shared and emulated. Greater Caribbean States have the opportunity to lead from the front by developing a regional framework for climate mobility that will protect the rights of climate displaced persons, ensure safe and orderly mobility and advance economic integration and shared prosperity.

Action 3: Protect the "Right to Stay" & Support Relocation in Dignity

Address the threat that climate change poses to people's attachment to place, their land rights, and potentially to the habitability of entire regions and countries by creating legal protections and predictable procedures to define State responsibilities and guide their conduct in situations where people's right to stay is threatened.

Action 4: Advance Rights-based Climate Mobility Responses

Establish rights-based responses to climate mobility, anchored in people's right to stay, and the protection of those who are forced to move due to climate impacts, whether internally or across borders, individually or as a community, to uphold their human rights and promote positive outcomes, especially for vulnerable groups.

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Continued Statehood, Sovereignty and Citizenship:

- Support and advocate for the Principle of Continuity of Statehood amidst climate change related sea-level rise as a principle of international law to ensure that the rights, prerogatives and privileges of affected countries are never challenged, doubted or diminished and that their people are guaranteed continued nationality, citizenship and self-determination.

Land & Due Process Rights:

- Protect the Rights of Indigenous peoples, including Indigenous and local land rights, to uphold their right to stay and ability to return, and seek the Free, Prior, and Informed Consent (FPIC) of Indigenous peoples before implementing climate adaptation, economic development, or relocation actions, ensuring their ability to mitigate and adapt to climate impacts with dignity.

Planned Relocation:

- Remove barriers to movement for involuntarily immobile, or "trapped," populations through gender-responsive financial support and participatory planned relocation that considers the vulnerabilities of relocated persons and the integration capacity of the destination community.
- Protect the right to self-determination and non-discriminatory integration of Indigenous peoples in destination contexts, with a particular focus on preserving cultural identity, language use, and social structures in resettlement communities.
- Adopt legal and policy frameworks to clarify rights and responsibilities in the context of planned relocations and consider installing an Ombudsperson at a national or regional level to provide guidance for policy development and monitor policy implementation.

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Internal Displacement:

- Monitor people's outcomes in the context of evacuations, including the duration of their displacement and their ability to find sustainable solutions, and treat evacuations as a form of internal displacement that requires a long-term response.
- Recognize environmental and climate factors as drivers of internal displacement and codify and protect the rights of internally displaced persons (IDPs) under regional frameworks and national laws that support return and reconstruction, as well as durable solutions where return is not possible.

Refugee & Humanitarian Protection:

- Incorporate the expanded refugee definition recommended in the 1984 Cartagena Declaration on Refugees into domestic legal frameworks and recognize that the effects of climate change and disasters interact with different elements of this expanded refugee definition, particularly under the grounds of massive violation of human rights or circumstances that seriously disturb public order, thereby qualifying some climate-displaced individuals for refugee protection
- Advance the implementation of the Chile Declaration and Plan of Action (2024-2034) coming out of the Cartagena+40 process, in particular its provisions related to climate and disaster displacement.
- Create and implement clear guidance for officers conducting asylum or international protection screenings and adjudications on considering climate factors in the determination process, recognizing the importance of gender and other intersectional vulnerabilities for assessing protection needs.

Climate Mobility in Dignity:

- Establish complementary pathways under national immigration law and policy such as humanitarian visas, temporary protection programs, family reunification, and labor mobility, tailored to the needs of climate-displaced individuals, ensuring these pathways are provided in addition to access to asylum, offer a durable solution, and preserve fundamental human rights.
- Establish dedicated frameworks and agreements that anticipate and enable the movement and permanent resettlement of people and the protection of their rights in the context of slow-onset and irreversible climate impacts where permanent return is not an option.

Local Inclusion:

- Support destination communities so they can provide safe and non-discriminatory access to basic services to all residents, including migrants and displaced persons, and implement economic and social integration strategies that respect the rights and cultural identity of Indigenous peoples and combat racism, xenophobia, and other forms of discrimination.

6.3

Act Together

Address loss & damage, harness mobility and build consensus.

Report photography captured by GCCM

Collective action in the region is needed. The Greater Caribbean Climate Mobility Initiative seeks to mobilize regional and international actors - from governments and intergovernmental organizations to academia and expert institutions to business, civil society and the grassroots - to develop a common understanding, narrative and agenda for action on climate mobility in the region.

The Greater Caribbean Shifts report documents current realities of climate vulnerability and displacement as experienced by affected communities. It presents possible future scenarios for climate mobility within and across countries. It marshalls this evidence to make the case for advance planning for climate mobility. Governments should integrate climate mobility into regional, national and local strategies for adaptation and resilient development, including through Nationally Determined Contributions and National Adaptation Plans. By enabling people to participate in decisions about their future –whether to adapt in place or relocate with dignity– governments can promote positive adaptation journeys for their countries and communities.

Countries throughout the region can harness climate mobility to adapt and develop under the strain of climate change through investing in resilience and strong institutions. By working together around a common agenda for action in regional forums, the Greater Caribbean countries will be able to elevate their mutual priorities on the global agenda. They can take the lead in advancing structural reforms that avail more resources for climate adaptation and set normative standards to protect people's right to stay and ensure regular, safe and dignified climate mobility pathways for those who move. This is essential to safeguard the integrity of peoples' cultures, heritage, and statehood amidst the climate crisis.

Action 5 - Respond Collectively to Loss & Damage

Document, assess, and respond to all forms of loss and damage while elevating the visibility of non-economic loss and damage, particularly for Greater Caribbean countries and communities to whom climate change poses an existential threat, such as Small Island Developing States (SIDS) and Indigenous peoples.

Action 6 - Integrate Climate Mobility into Regional Development Strategies

Build a regional ecosystem that plans for, builds capacities, and addresses climate mobility in the Greater Caribbean by developing common approaches across existing regional cooperation and integration mechanisms, pursuing a division of labor and pooling of resources, and by building public-private partnerships, and embracing the leadership of cities across the region.

Action 7: Strengthen International Solidarity with the Region

Scale up international support for countries of the Greater Caribbean that have historically contributed little to climate change but find themselves on the frontlines of its impacts, resourcing their capacities to adapt and address loss and damage, and enabling people from the region to use mobility to pursue opportunities and strengthen their resilience.

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Document Loss & Damage:

- Develop and implement a regional approach for disaggregated data collection, funding needs tracking, and quantification of loss and damage from climate change and climate mobility in the Greater Caribbean.
- Undertake concerted efforts to document, measure and address non-economic losses and damages, such as damages to people's health and well-being, biodiversity and ecosystem services loss and their link with the loss of Indigenous knowledge and culture, forced displacement and loss of sense of place, and the loss of heritage, historic and cultural, and sacred sites.

Mitigate Loss & Damage:

- Pursue international partnerships to expand and strengthen the capacities and skills of health systems to respond to escalating climate change impacts on people's mental and physical health and prevent a shortage of critical vaccines, medications, and health workers.
- Assess the scope of loss and damage to key economic sectors, such as agriculture, tourism, real estate and transportation in consultation with affected businesses and pool public and private resources for mitigation strategies.
- Facilitate effective and inclusive engagement with frontline communities in order to prevent loss and damage from governments' actions for climate adaptation, disaster risk reduction and development, and ensure accountability for the affected people.
- Pursue strategic litigation to hold polluters accountable for loss and damage and mobilize resources for the remediation of harm.

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Institutional Resources:

- Forge a coalition of member states working to strengthen synergies and complementarity across regional cooperation mechanisms like the OAS, ACS, SICA, CARICOM, OECS etc. to effectively address the impacts of the climate crisis in the Greater Caribbean region.
- Ensure the representation of climate vulnerable groups and populations in regional forums, including Indigenous people, cities & local governments, and migrants, refugees and displaced persons.

Human Resources & Mobility:

- Assess businesses' skills needs, existing skills development efforts, and the aspirations of young people in the region with a view to increasing the provision of training, skills development and mentorship that would allow more businesses to fill jobs and more young people to access opportunities closer to home.
- Harness Free Movement Agreements in the region to facilitate mobility in the context of slow and sudden-onset climate hazards and exercise continued solidarity with countries undergoing disasters, including by allowing for the entry and temporary stay of evacuees.

Connectivity:

- Expand the region's digital infrastructure to ensure connectivity as a backbone for continued public service delivery, entrepreneurship, and job creation in the context of climate calamities.
- Build a partnership for cities in the region, connecting large urban hubs with smaller regional cities and partners to strengthen capacities for urban adaptation planning and migrant reception and to support the development of a pipeline of projects for inclusive urban climate adaptation.

Action 7: Strengthen International Solidarity with the Region

Scale up international support for countries of the Greater Caribbean that have historically contributed little to climate change but find themselves on the frontlines of its impacts, resourcing their capacities to adapt and address loss and damage, and enabling people from the region to use mobility to pursue opportunities and strengthen their resilience.

Emissions Mitigation:

- Phase out fossil fuels causing greenhouse gas emissions to prevent further rise in global temperatures leading to more loss of human life and irreversible loss and damage to Greater Caribbean ecosystems, communities, and economies.

Climate Mobility Pathways:

- Expand legal migration pathways between Greater Caribbean countries and destination countries outside the region to protect the human rights of all migrants in the context of climate change and to ensure the dignified resettlement of those who are forced to move due to climate hazards.

Financial Support:

- Work with countries in the region to prevent the accumulation of further unsustainable debt in the context of disaster risk reduction, recovery and climate adaptation, including by promoting innovative approaches, such as debt-for-nature and adaptation swaps and sharing experiences and technical know-how in this regard across the region.
- Address the shortcomings of the current climate finance architecture, including by increasing funding for adaptation and loss and damage, simplifying and accelerating procedures, and prioritizing a greater proportion of grants and highly concessional finance for low-income countries, SIDS, and community-led climate action.

Technical Support & Technology Transfer:

- Strengthen and localize technical support and technology transfer to support climate adaptation priorities in the region and for addressing loss & damage, including solutions for urban resilience, displaced people, and the preservation of culture and heritage.

A Greater Caribbean

Advancing a common narrative and agenda for action.

The Caribbean Sea unites a region of great linguistic, cultural, political and economic diversity. As a shared resource, it is the source of countless livelihoods. It is also increasingly a wellspring for sea-level rise, storm surge, and other climate hazards. People across the region face mounting threats to their homes, health, culture and livelihoods.

The Greater Caribbean Climate Mobility Initiative (GCCMI) set out to create a common evidence base to enable governments at all levels and their partners to plan for the shifts ahead.

Sea-level rise and other slow onset hazards are predictable. Ample preparation can make anticipating sudden disasters easier. People's decisions to move are harder to anticipate, yet generally follow opportunities, established migration paths, and existing social networks. By projecting future hotspots of climate mobility, governments and other stakeholders can begin to engage affected communities and prioritize adaptation measures.

When climate impacts are experienced as random and unpredictable, they are paralyzing. When communities have the right information and time to plan, they have greater agency and choice. By anticipating risks and planning for climate mobility, governments can enable a positive transition for their communities, countries and the region.

Appendices

A.1. The Greater Caribbean Climate Mobility Model

A.1.1 Introduction to the Model

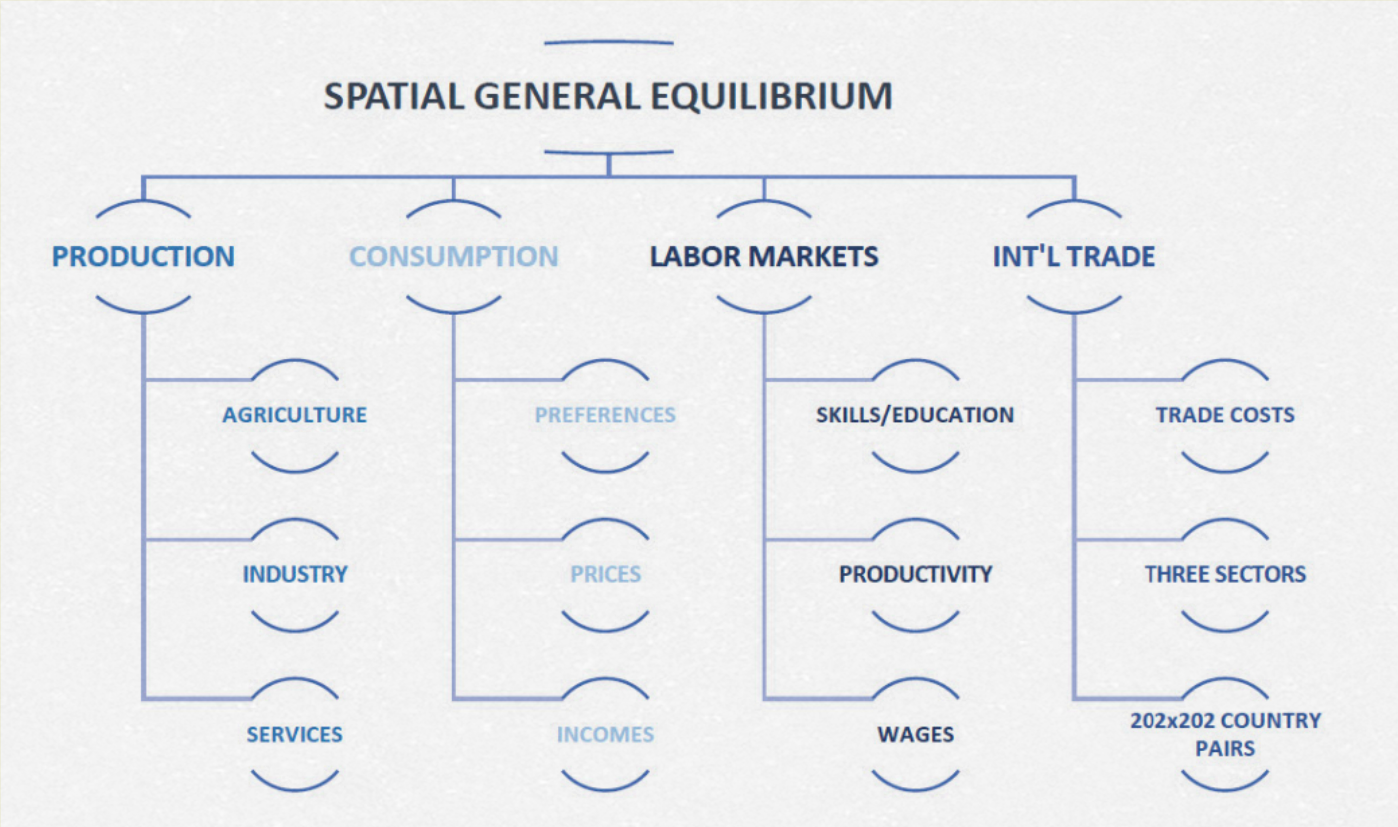
The model developed for GCCMI is a theoretical model of the world economy i.e. a global spatial general equilibrium model (CGE). The model allows the anticipation of likely future patterns of mobility and immobility by considering historical and current mobility patterns in response to climate stressors. It is divided up into more than 7 million grid cells that are roughly 5km on a side. All pixels differ in terms of their initial allocation of the types of individuals residing there (by age, gender and education levels), their consumption profiles, production technology, initial climate conditions and future climate shocks. Each pixel hosts one production sector (agriculture, industry or services), and offers specific wage rates for all workers of four education levels.

Figure A.1 Map of Member States to the Association of Caribbean States (ACS)

The GCCMI model particularly focuses on the Member States part of the Association of Caribbean States (ACS-AEC). However, the model excludes several territories and islands that are external dependencies of the United States (Virgin Islands), the United Kingdom (Anguilla, British Virgin Islands and Montserrat), France (French Guiana, St. Martin, Martinique and Guadeloupe), and the Netherlands (Curaçao and Sint Maarten), even when they are associate members of the ACS. This is due to the fact that for these dependencies there is no separate reporting of economic statistics; in other words, all data associated with these dependencies are for the country of which they are a part.

The basic premise of the model is that individuals will tend to move from their current location if the wage differential between that location and areas that maximize individuals' utility passes a threshold that exceeds the cost of moving (de Sherbinin et al. 2022). More local moves are less costly than more distant moves, so migration is broken into three categories: moves within administrative units but across grid cells, moves across administrative units (in this case admin units which equate to states or provinces), and international moves across country borders. Individuals are grouped by age (20-39, 40-59, and 60-79), gender, and education (no school, primary, secondary, and tertiary).

Figure A.2 Economic Components of CGE Model



Climate damages affect employment, productivity, amenities and wages in different sectors, and their effects vary across the landscape. The first dimension of climate damage includes losses in land productivity across agricultural pixels. These losses reduce the capacity to generate yields and affect the overall efficiency of production across the affected areas. Second, rising temperatures make workers less productive. Sector-specific damage functions that translate the daily temperatures into losses in labor outputs, are combined with actual annual temperature distributions, which enables the computation of labor productivity loss generated by high levels of temperatures. Third, the projected rise in sea levels leave some areas fully or partially flooded. This permanent flooding translates into a direct loss in productivity (as if the capital installed in the area was permanently lost), and forcibly displaces people residing in the flooded areas. Fourth, climate disasters include droughts, floods, cyclones, and heatwaves. The model assumes that the expected losses from disasters affect only individual utility functions, since the individual losses from property lost due to disasters constitute the main factor that causes people to leave disaster prone areas. The model assumes no direct linkage between disasters and production capacity, assuming that capital can be rebuilt and the methods of production (know-how) are preserved. Finally, bleaching of coral reefs affects the tourism sector differentially, depending on the degree to which the tourist economy is dependent on reef-related tourism such as diving.

Production technology is vulnerable to climate damage which affects production capacity in a direct and indirect way. For example, some coastal areas become permanently flooded destroying production potential, or crop yields drop as a consequence of changing climatic conditions. Workers achieve lower levels of efficiency when air temperatures rise. Lower factor productivity translates into lower wage rates for workers, who suffer income losses. As a consequence, some of these people become motivated to look for more prosperous places to live and work. Workers migrate as a strategy to adapt to future changes in the economic landscape and to flee areas that are exposed to severe climate damage. People can move short, medium, or long distances, labeled as local (within administrative units), regional/national (within country) and international (across country borders) migration. Moving is costly, and migration costs are individual-type-specific (varying by gender, age and education groups).

The model also takes into consideration that climate damages affect the costs of commodities consumed by people in the Caribbean. Since trade is global, declines in production of goods (including food) in other parts of the world would increase commodity prices, reducing the purchasing power of people in the Caribbean. The model finds prices of agricultural commodities, in particular food, rise much more steeply than the prices of industrial products or service sector goods due to climatic factors. The effect of declining wages and increased costs of living leads to increasing impoverishment of people, who are more prone to migrate out of the areas that are under severe economic pressures. There is, however, a constraint on migration, insofar as a fixed fraction of income is required as the cost to migrate.

Finally, the model incorporates population dynamics. Basic assumptions that determine the dynamics of the model are full rationality in all economic decisions reached by agents (firms and individuals) and perfect information about all relevant elements that affect economic decisions.

Model Modules

The general equilibrium theory is composed of several modules that interact through key model mechanisms. First, firms in each country operate in one of three sectors of economic activity: agriculture, industry and services. Firms produce final goods using labor as the only factor of production, taking the level

of productivity and the evolution of production technology as given. By solving their cost minimization problem, firms decide about the best combination of inputs (which is labor force of different education types) and set prices equal to marginal costs of production. Hence, firms' profits in the equilibrium are equal to zero.

Second, people decide to consume all available types of sector-specific goods to fulfil their love-for-variety preferences. The latter implies that people choose to consume all available types of goods instead of consuming greater volume of a single type of good. People's consumption decisions are subject to price levels set by firms and determined by the costs of production, as well as trends in sectoral composition of preferences that evolve with economic growth. Here, we assume that as countries develop, people tend to weight agricultural products less relative to industrial goods and services.

Third, production technology is vulnerable to climate damage which affects production capacity in a direct and indirect way. For example, some coastal areas become permanently flooded destroying production potential, or crop yields drop as a consequence of changing climatic conditions. Subsequently, workers can achieve lower levels of efficiency when air temperatures rise. Lower factor productivity translates into lower wage rates for workers, who suffer income losses. As a consequence, some of these people become motivated to look for more prosperous places to live and work.

Fourth, the movement of people is conceived as a strategy to accommodate future changes in the economic landscape and to flee areas that are exposed to severe climate damage. People can move short, medium, or long distances, labelled as local (within administrative units), regional (within country) and international (across country borders) migration. Moving is costly, and migration costs are individual-type-specific.

The fifth element of the model is the dynamic structure of the population, which includes: fertility that decreases with economic development, probability distribution of children's education attainment which becomes more high-skilled intensive as countries become richer, and people's probability of survival, which increases with countries' income levels. All these characteristics are individual-groups specific. Thus, fertility decreases with education levels, while the probability of survival significantly drops with age and is non-negligibly affected by education levels.

Heterogeneity of Model Objects

Individuals. It is a well established fact in the literature that patterns of individual behavior and economic decisions differ across various socioeconomic groups. For example, people in poorer countries tend to spend relatively more on consumption of basic goods such as food and beverages. Younger and more educated persons have higher propensity to migrate, while older people prefer to stay in their place of residence even after experiencing a significantly negative utility shock. These heterogeneous behaviours crucially impact the demographic composition of future generations in countries receiving immigrants and those seeing emigration.

Therefore, in this model we divide the population in all spatial areas into 26 groups. First, we consider four groups spanning a range of 0-20, 20-40, 40-60 and 60-80 years of age. Then, we consider two gender groups within each age group. Finally, adult groups (all except for 0-20) are further divided into four education classes: no education (E1), primary educated (E2), secondary educated (E3) and people with completed tertiary education (E3). This leaves us with two groups for children aged 0-20 and twenty four groups for adults aged 20+.

Firms. Firms are active in one of three sectors: agriculture, industry and services. Each sector is characterized by a specific production technology

(i.e. substitution patterns between and relative productivities of workers of different education levels). Furthermore, technology parameters are subject to country- region- and area-specific factors that significantly alter the spatial distribution of economic activity through climatic shocks and additional external effects. The latter include knowledge spatial spillovers and skill-biased technical change.

Spatial Dimension. The world is divided into a hierarchical grid of layers. We single out 202 countries, which are divided into 2,311 administrative level-one regions (e.g. states in the US or cantons in Switzerland). The third layer of spatial division comes from dividing regions into pixels, areas equivalent to 2.5 arc minutes squared, which corresponds to approximately 5x5 km squares on the Equator. All pixels differ in terms of initial allocation of all types of individuals, production technology, climate conditions and future climate shocks. Each pixel hosts one production sector (agriculture, industry or services), and offers specific wage rates for all workers of four education levels. The detailed resolution allows a deep assessment of the spatial distribution of human settlement, economic activity and climate heterogeneity, which (co-interacting together) fundamentally impact the future patterns of migration at all geographical scales.

Climatic Factors. Climate imposes heterogeneous consequences for the economic landscape. The first dimension of climate damage includes losses in land productivity across agricultural pixels. These losses reduce the capacity to generate yields and affect the overall efficiency of production across the affected areas. Second, rising temperatures make workers less productive. Sector-specific damage functions that translate the daily temperatures into losses in labor outputs, are combined with actual annual temperature distributions, which allows to compute the labor productivity loss generated by high levels of temperatures. Thirdly, the projected rise in sea levels leave some areas fully or partially flooded. This permanent flooding translates into a direct loss in productivity (as if the capital installed in the area was permanently lost), and forcibly displaced people residing in the flooded areas, mechanically increasing the number of climate displaced persons.

Scenarios

The formation of the scenarios is based on the commonly used Intergovernmental Panel on Climate Change (IPCC) scenario framework which couples shared socioeconomic pathways (SSPs), representing development scenarios, with representative concentration pathways (RCPs), representing the radiative forcing of greenhouse gas emissions in terms of Watts per square meter change from pre-industrial levels by the end of the century (van Vuuren at al. 2014). Specifically, the modeling applies the following scenarios, with different development outcomes coupled with RCPs ranging from low to high emissions:

- SSP1-RCP2.6: This is a “sustainability” scenario with widespread adoption of low carbon technologies, a rapid transition away from fossil fuels, and relatively low levels of warming.
- SSP2-RCP4.5: This is a “Middle Road” scenario in which there is a future of uneven global economic progress in the developing world based on current patterns and moderately high emissions.
- SSP3-RCP7.0: Termed “regional rivalry”, this is a world of rising inequality, increasing barriers to south-north migration, and high emissions. It represents a worst-case scenario in the context of this modeling work.

All of these scenarios are compared to an RCP0.0 scenario where climate conditions are assumed to remain at their 2010 values (also referred to as “no climate change” scenario), but in which the SSP varies. In other words, results for SSP1-RCP2.6 are compared to SSP1-RCP0.0, results for SSP2-RCP4.5 are compared to SSP2-RCP0.0, and the results for SSP3-

RCP7.0 are compared to SSP3-RCP0.0. This means that, for a given grid cell, if more people leave in the climate affected scenario than under the "no climate change" scenario, then there is climate displacement. If more people stay in the climate affected scenario than under the "no climate change" scenario, then there is climate immobility.

A.1.2 Model Calibration

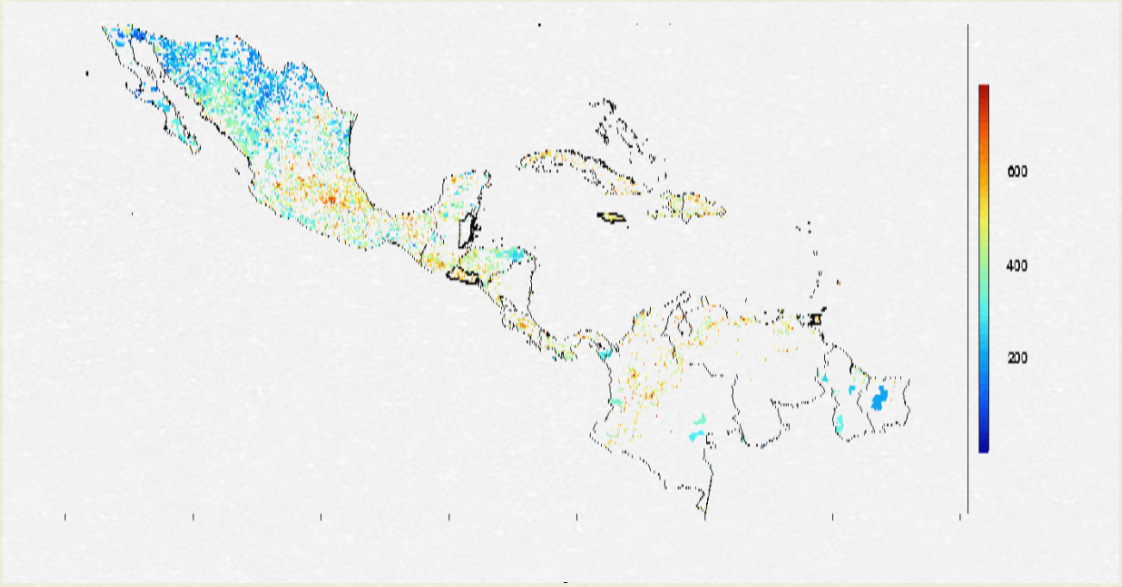
The model calibration followed a stepwise approach and addressed the following elements:

1. Administrative Regions and Borders
2. Population
3. Gross Domestic Product (GDP) by Admin Unit
4. Urbanization
5. Education Shares
6. Damage Functions
7. Agriculture Productivity
8. Total Factor Productivity (TFP)
9. Prices and Trade
10. Utilities by Pixels
11. Migration Data and Imputations
12. Migration Costs
13. Sea-level rise
14. Disasters
15. Coral Reef Losses and Impacts on Tourism
16. Fertility, Mortality, Education and TFP Trends

Projections

The calibration commenced with the creation of a standardized database of all countries and administrative units in terms of names, ISO codes, and respective maps (shape files). It was followed by the production of global, national and admin-unit raster maps (i.e. pixelized maps) of populations by age and two gender groups in 2010 by 5x5km pixels. The third step focused on computing the aggregated values of GDP for each of 2,311 administrative units in the model for 2010. For this, the main data source was the 1x1km raster of GDP values provided by Kummu et al. (2018)[95] for 2010.

Figure A.3 Gross Domestic Product in 2010 in millions USD

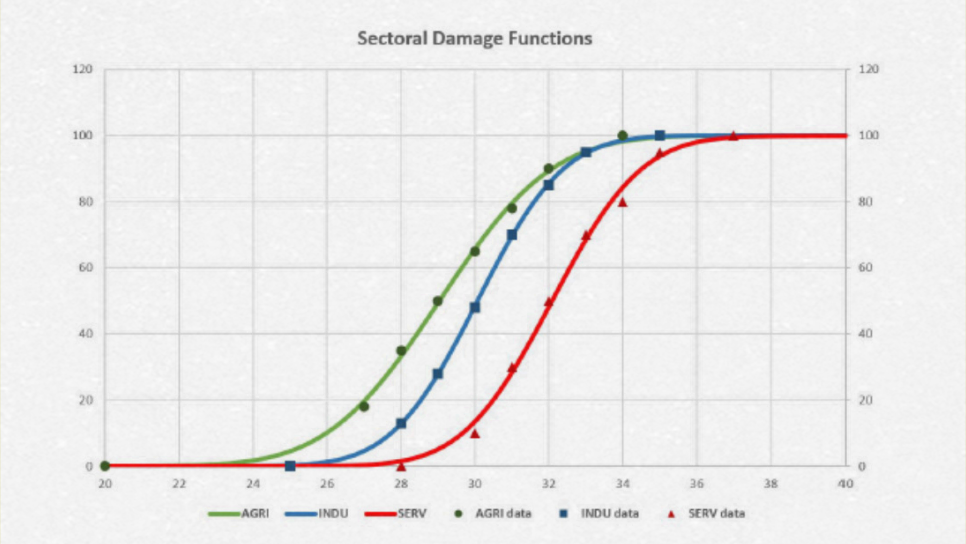


The next step focused on the generation of global rasters of urbanization rate and the distribution of economic sectors across pixels. The three economic sectors included agriculture, industry and services. The resulting output were global maps of urbanization rates by pixels, country and admin unit specific distribution of employment and GDP, as well as the spatial distribution of three sectors by pixels at the world level by 2010. All numbers were consistent with country-specific data on sectoral employment and GDP distribution by the World Bank.

In the Education Shares step the main goal was: (i) to provide a database of admin unit-specific distributions of education shares in 2010; (ii) to construct a database of country- and sector-specific distributions of education shares in 2010; and (iii) to create pixel maps indicating the spatial distribution of education rates for 2010. The country-specific distributions of education attainments from the Barro-Lee database (Barro and Lee, 2013)[96], micro data from IPUMS international, Labor Force Surveys (LFS) and country censuses, aggregated at the administrative unit, reflecting the distributions of education across sectors, and the education distribution database from the International Labor Organization (ILO), World Bank WDI for GDP per capita, were some of the datasets used for this step.

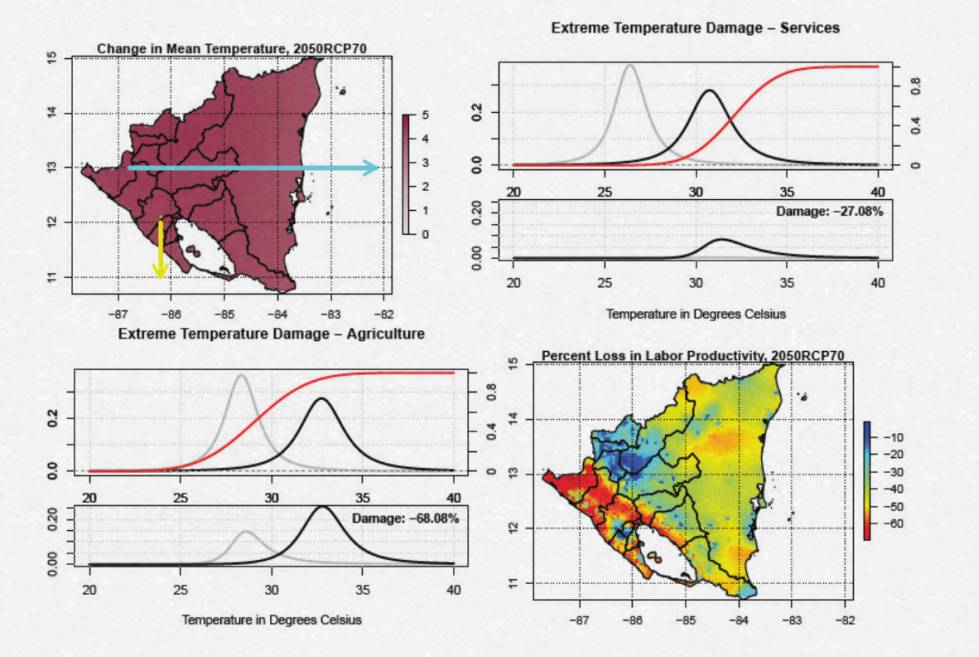
Once the education shares had been computed, focus was put on the damage functions, with the specific objective of: (i) computing pixel-specific distributions of annual temperatures for all scenarios; and, (ii) deriving global maps of damages to labor productivity for all scenarios. Data provided by WorldClim.org was used in this step, being the reference source for the historical climate data (Fick and Hijmans, 2017)[97] at 2.5 arc minutes (5 km on the Equator) that cover the last three decades of observations. Additionally, future climate projections that originate from CMIP6 were used. The model scenario is an average of 22 models (i.e. ACCESS-CM2, ACCESS-ESM1-5, BCC-CSM2-MR, CanESM5, CanESM5-CanOE, CMCC-ESM2, CNRM-CM6-1, CNRM-CM6-1-HR, CNRM-ESM2-1, EC-Earth3-Veg, EC-Earth3-Veg-LR, GISS-E2-1-G, GISS-E2-1-H, INM-CM4-8, INM-CM5-0, IPSL-CM6A-LR, MIROC-ES2L, MIROC6, MPI-ESM1-2-HR, MPI-ESM1-2-LR, MRIESM2-0, UKESM1-0-LL), four periods: 2021-2040, 2041-2060, 2061-2080, 2081-2100 (representing 2030, 2050, 2070 and 2090 respectively) and four RCP scenarios (jointly modeled with SSP scenarios): RCP2.6, RCP4.5, RCP7.0, and RCP8.5. Additionally, the calibration made use of workers' productivity losses generated by heat exposure (Kjellstrom et al., 2018)[98] (see figure below).

Figure A.4 Labor Productivity Losses due to Heat Stress by Kjellstrom et al. (2018)



This step was decisive for the development and calibration of the model. The observations about the temperature levels and losses in workers' productivity (Figure above) was combined with the construction of annual temperature distributions i.e. annual mean temperature, temperature seasonality (standard deviation x100), max temperature of warmest month, min temperature of coldest month, mean temperature of warmest quarter, and mean temperature of coldest quarter, for each scenario and time period (averaged across all models). This allowed the calculation of pixel-specific damages as the integral of products between the distribution of temperatures and the damage functions.

Figure A.5 Derivation of Labor Productivity Losses (Exemplified in Nicaragua)

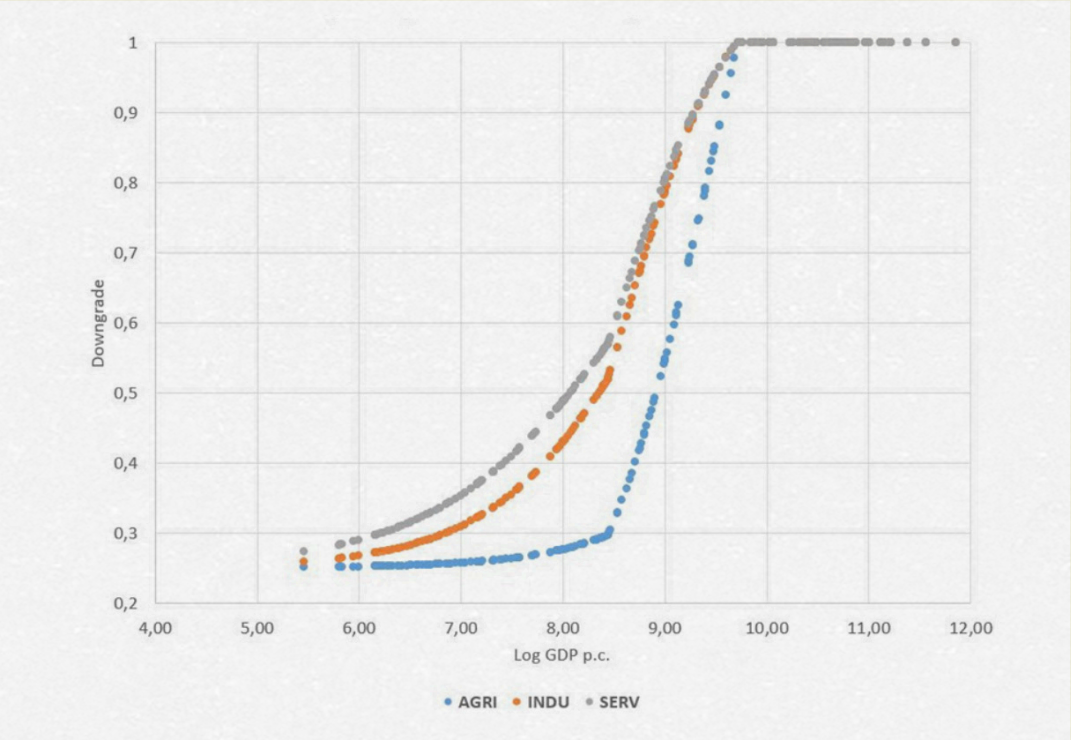


The computation of agricultural productivity for all scenarios and time periods was conducted by first computing the 2010 production shares of each crop for 2010. Then, computing productivity changes for each crop in all scenarios and time periods relative to 2010. Finally, calculating the agriculture productivity losses as a weighted average of crop-specific losses weighted by crop shares. The key data source used was the gaez.fao.org web page published by FAO and the International Institute for Applied Systems Analysis (IIASA). The model considered yields of each crop in 2010 by pixel, percent of land irrigated in 2010 by pixel, and production of each crop type in all future climate scenarios by pixel. Only the 14 most popular crops in the world were used for the computation i.e. bananas, barley, cassava, maize, potatoes, rapeseed, sunflower, soybean, sugarbeet, sugarcane, sorghum, rye, wheat, and yam. The average world prices of each crop were calculated based on 2010 crop prices from FAO and as a sum of country inputs.

All model outputs produced in the previous steps, were used for the computation of the Total Factor Productivity (TFP) and the reference wage rates for each sector and worker type by 2010. The methodology followed included: (1) setting the basic technological parameters; (2) imputing wage rates by sector and education level for all 202 countries; (3) determining the parameters of sector-specific production functions by country; (4) setting the TFP residuals by pixels; (5) computing sectoral TFP values and wage rates in 2010 by pixels for all education groups; and, (6) aggregating the wage rates at the country level.

For the computation of all macroeconomic indicators that relate to international trade and consumption price indexes, the model made use of the International Comparison Program (ICP) 2011, a part of the World Development Indicators database by the World Bank, the WITS database run by the UN, WTO and the World Bank, and the dataset on sectoral consumption and production aggregates from the World Bank. Afterwards, efforts were put in the computation of the utility function (see figure below), which included group-specific elasticities of utilities with respect to wage rates, disutility related to informal employment and congestion externality, as well as the spatial distribution of utility values (for all individual groups) along with their aggregates across administrative units and countries.

Figure A.6 Utility Downgrades due to Informality in Labor Market



The model used as main sources of migration data the following:

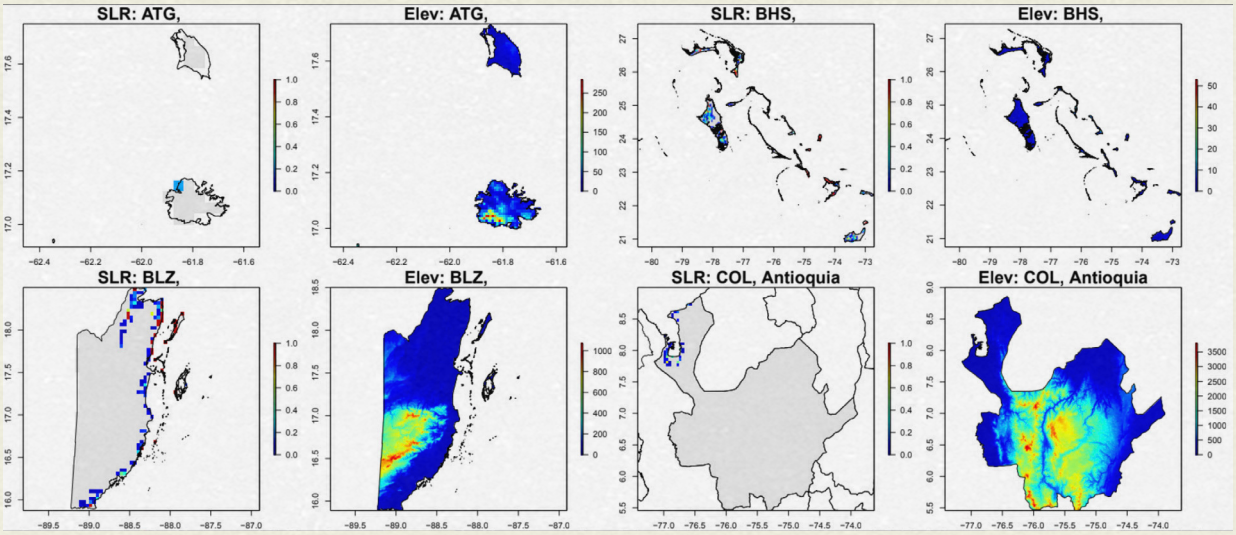
- International migration: Database on Immigrants in OECD and non-OECD Countries, DIOC, migration data from United Nations Population Division (UNDP) and Abel and Cohen (2019).
- Internal migration: censuses published by respective national statistical offices and IPUMS international.

These datasets allowed the computation of complete migration matrices at three spatial levels: international flows, within-country across administrative unit flows and within admin units flows. It included all 24 adult individual types (3 age x 4 education x 2 gender groups) and 20-year net flows that range between 1990 and 2010.

The migration cost matrices were computed for all individual types (24 groups) and are country-pair-specific (aggregated into global matrices) for international migration and admin-unit-specific for internal migration (aggregated into country-specific matrices covering both across and within admin unit movement costs). At the global level, the model final computation leads to approximately 207 million climate displaced persons at the local scale, almost 566 million climate displaced persons who move across admin units at the national scale, and approximately 100 million climate displaced persons who move across borders, considering net flows over 20 years (calibrated on the data spanning from 1990 until 2010).

The next steps of the model calibration focused on , disasters and coral reef losses. The model computed projections of (SLR) over all times and scenarios in the future by developing hazard maps of coastal flooding. For that step the following data sources were used: (i) world elevation map at 1 x 1km grid downloaded from SEDAC NASA, and (ii) data on SLR and storm surge, which are probabilistic projections for all times and scenarios in the future compiled by Tebaldi et al. (2021)[99]. In particular, the model used the data provided by Kirezci and et al.(2020)[100].

Figure A.7 Sea-level Rise and Elevation Maps



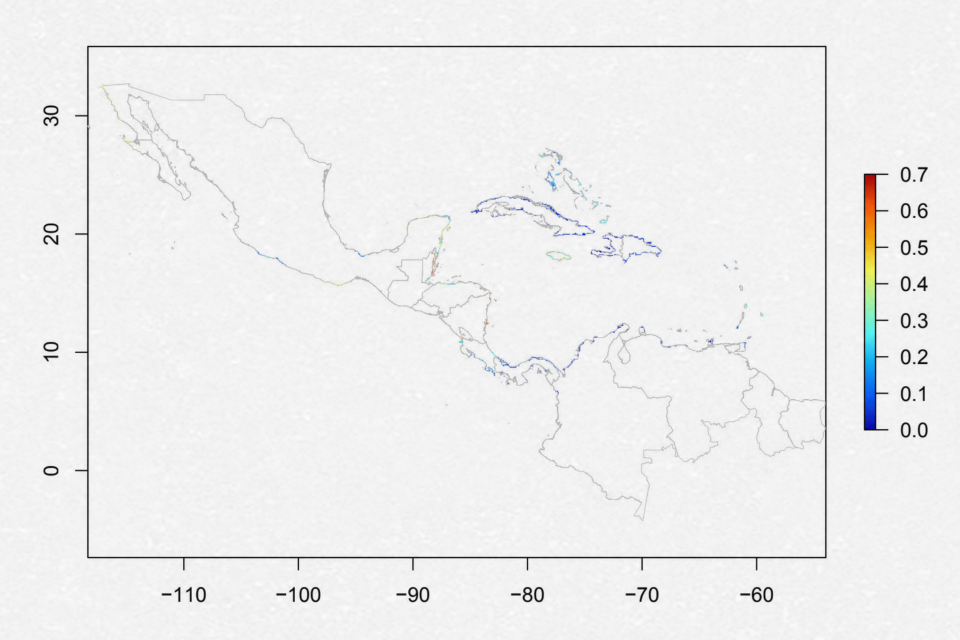
The computation of the expected damages caused by disasters, i.e. floods, droughts, cyclones and heat waves, focused on the production of global maps of expected losses to productivity caused by changing frequency and intensity of these extreme events. The main climate data source was WorldClim.org, from which the model made use of historical monthly weather data, containing information on min. and max. temp as well as precipitation ranging from 1960-2010, being the CRU-TS 4.06 (Harris et al., 2020)[101] downscaled with WorldClim 2.1 (Fick and Hijmans, 2017), as well as, the 2.1 version of historical climate data for 1970-2000 i.e. the average temperatures (min and max), and precipitation measures (Fick and Hijmans, 2017), and finally, projections of temperatures and precipitations for all RCP scenarios and times for CMIP6.

Computations were also made for the losses generated by bleaching of coral reefs that constitute a key element of coastal habitats and consequential gains from tourism in many places of the world. In this step, a raster map of GDP losses for the tourist sector was built with the use of the following data sources: (i) data on projected timing of annual severe coral bleaching compatible with CMIP6 models, via unepgrid.ch and created in cooperation with NOAA Coral Reef Watch, and (ii) aggregates provided by Spalding et al. (2017)[102], allowing to obtain GDP losses caused by coral bleaching using estimates on the total value added generated from reef-related and non-reef-related tourism in 64 most affected countries.

Table A.1 Imputation of Losses to Tourism Due to Coral Reef Bleaching (Global Sample)

ISO	Country	shareGDP	ISO	Country	shareGDP	ISO	Country	shareGDP	ISO	Country	shareGDP
ABW	Aruba	46,4%	DOM	Dominican	1,8%	LCA	St Lucia	21,4%	QAT	Qatar	0,1%
ARE	UAE	0,8%	ECU	Ecuador	0,1%	LKA	Sri Lanka	0,5%	SAU	Saudi Arabia	0,1%
ATG	Antigua	29,4%	EGY	Egypt	2,6%	MDG	Madagascar	1,3%	SDN	Sudan	0,1%
AUS	Australia	0,7%	FSM	Micronesia	7,9%	MDV	Maldives	63,7%	SLB	Solomon	6,4%
BHR	Bahrain	1,2%	GRD	Grenada	11,7%	MEX	Mexico	1,1%	SYC	Seychelles	27,5%
BHS	Bahamas	26,1%	HND	Honduras	1,8%	MMR	Myanmar	0,0%	THA	Thailand	1,6%
BLZ	Belize	16,9%	HTI	Haiti	0,7%	MOZ	Mozambique	0,8%	TON	Tonga	8,6%
BMU	Bermuda	10,1%	IDN	Indonesia	0,7%	MUS	Mauritius	14,7%	TTO	Trinidad	0,4%
BRA	Brazil	0,1%	IND	India	0,1%	MYS	Malaysia	1,4%	TZA	Tanzania	0,8%
BRB	Barbados	22,3%	IRN	Iran	0,0%	NIC	Nicaragua	0,2%	USA	USA Florida	0,1%
BRN	Brunei	0,6%	JAM	Jamaica	14,0%	OMN	Oman	0,7%	VCT	St Vincent	12,4%
CHN	China	0,1%	JPN	Japan	0,1%	PAN	Panama	1,3%	VEN	Venezuela	0,1%
COL	Colombia	0,1%	KEN	Kenya	0,8%	PHL	Philippines	1,1%	VNM	Vietnam	0,1%
CRI	Costa Rica	1,1%	KHM	Cambodia	1,6%	PLW	Palau	59,6%	VUT	Vanuatu	24,9%
CUB	Cuba	0,9%	KNA	St Kitts	12,2%	PNG	Papua	0,4%	WSM	Samoa	3,0%
CYM	Cayman	10,7%	KWT	Kuwait	0,1%	PRI	Puerto Rico	1,3%			

Figure A.8 Map of regional GDP losses due to coral reef bleaching under the Rocky Road (SSP3-RCP 7.0) scenario by 2050



Finally, trend projections of fertility, mortality, education and TFP were computed for all times and scenarios in the future. Data on total fertility rate by education level from Wittgenstein Centre Data Explorer was essential for the computation of fertility trend projections. A similar approach was followed for mortality. Using scenario-specific population data by gender, age (only 20-40 group considered) and education groups from wcde, the model regressed logits of education shares on log GDPpc with year as a second explanatory variable (that represents an exogenous trend), and country fixed effects. Finally, for TFP trends, the model assumed that productivity changes over time according to exogenous country specific trends that are scenario-specific. These trends were estimated using the IIASA data on GDP and population, which enables to compute GDP per capita indicators.

A.1.3. Model Validation

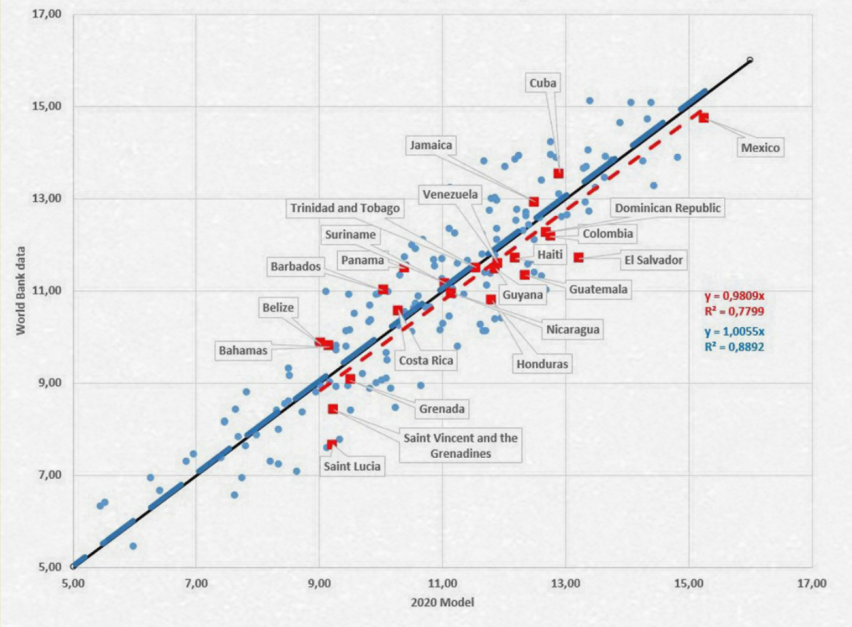
The model validation followed a two-step process that focused on the verification of the model performance to generate out of sample projections of international migration flows.

The first step focused on backcasting. An older version of the model, published in Burzynski et al. (2020)[103] was used to verify if the class of the quantitative theoretical models provides a reasonable tool for analyzing and projecting migration flows. Key differences between the new model and the backcasted model are:

1. the spatial resolution of macroeconomic analysis: countries versus pixels.
2. the structure of the economy: two versus three sectors.
3. the structure of population: six versus 26 individual type groups.

The simulation was done for year 1980 for the sample of 179 countries, including 22 Caribbean states. Important to note that the model is calibrated for 2010 and has a 30-year modeling period.

Figure A.9 Emigration in 1980 for the sample of 179 countries (blue) including 22 Greater Caribbean countries (red)



The second step focused on forward looking validation of the new model. The model results were compared with observed data of international migration flows, from the period 2010-2020. The comparison was first relative to the stocks of migrants reported by the UN Population Division for year 2020. 10-year flows from the model were compared with stock data. Additionally, the comparison was done using five different inputs of estimated migration flows data published by Abel and Cohen (2022)[104]. Both exercises provided significant arguments for claiming that the model performs well enough to be used for out of the sample estimates of international migration flows. And most importantly, the model did not yield counterintuitive results or outcomes that are against the broadly understood consensus in how migration flows could evolve in the near future. Moreover, similar technology of modelling and projecting internal migration flows gives rise to a reasonable conjecture that the pixel model offers similarly reasonable projections of regional and local migration movements.

Figure A.10 Forecasting Exercise by Destination

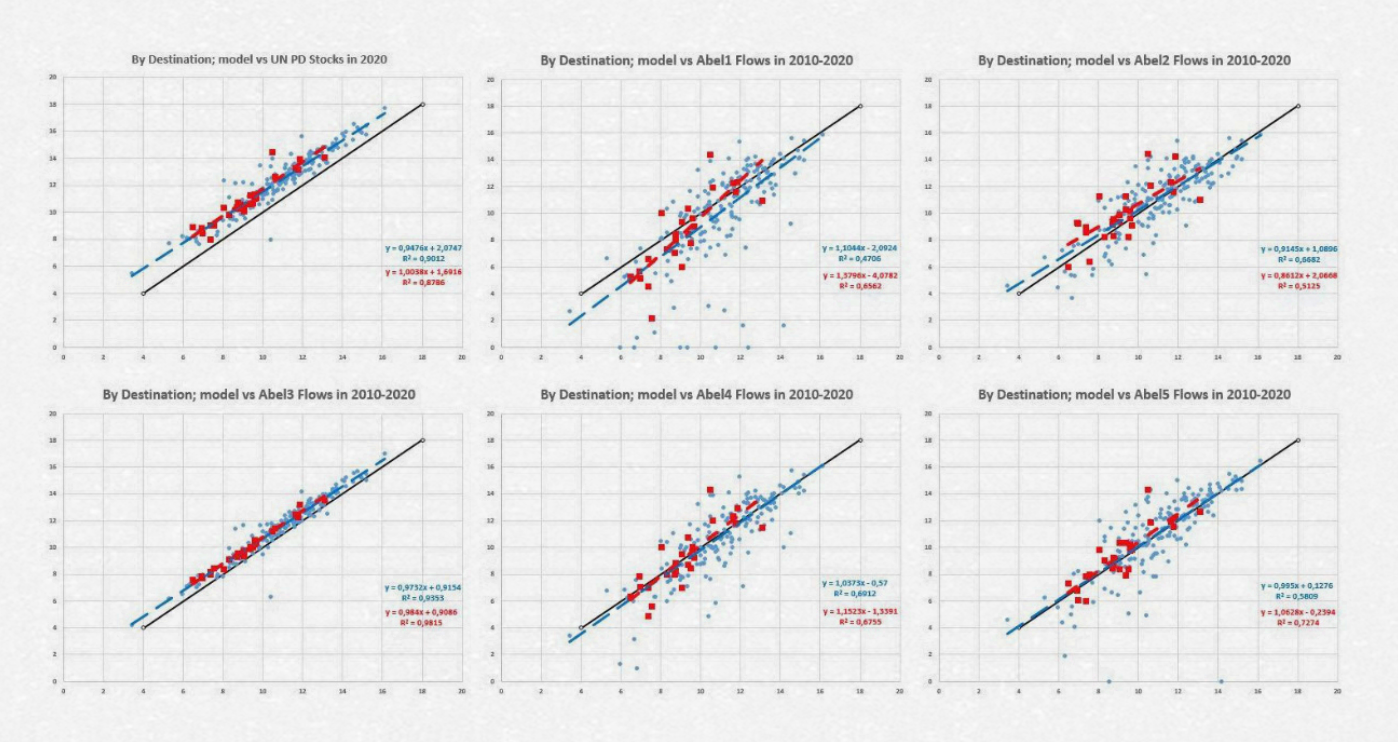
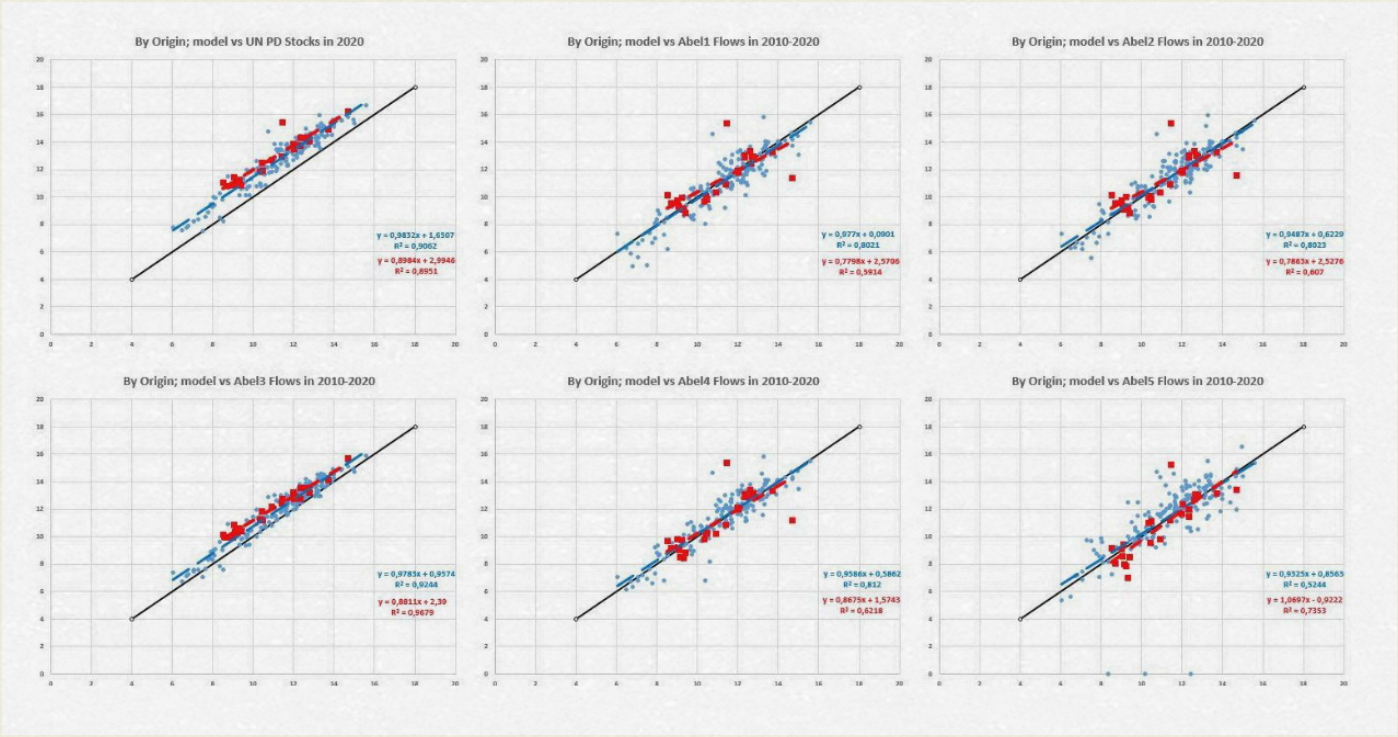


Figure A.11 Forecasting Exercise by Origin



A.2 Fieldwork Methods and Case Studies

The dynamics of climate-related mobility in the Caribbean are shaped by a multitude of factors, including socioeconomic vulnerabilities, environmental stressors, and governance frameworks.

While specific climate events drive short-term displacements, broader trends in additional migration patterns reflect complex decision-making processes influenced by environmental changes. Despite the risks posed by climate impacts, many communities in the Caribbean exhibit a resilience-driven preference for local adaptation over migration, highlighting deep-seated attachments to their homes and communities.

Addressing the climate challenges in the Caribbean must account for the diverse needs, vulnerabilities but also resilience of Caribbean populations, promoting sustainable development pathways that safeguard livelihoods and ensure equitable opportunities. To develop these strategies, GCCMI undertook field research to explore the nuanced intersection of climate change and mobility dynamics in the region, examining how local populations perceive and understand climate impacts, their awareness of environmental risks, and how these factors shape their decisions to either stay and adapt or migrate.

The main research question was: What is the relationship between mobility and climate change, and how is it experienced by individuals and households?

To be able to provide a comprehensive response, the main research question was disaggregated into three themes and sub-questions:

1. Features of Climate Mobility: How does climate mobility fit within other mobility dynamics?

- To what extent do climate variability and extremes prevent mobility, or cause patterns of immobility, and for whom?
- What else is driving migration from areas affected by climate change?
- How do climate variability and extremes interplay with other factors in the decision to move?

2. Adaptation to Climate Change: To what degree are mobility outcomes related to climate change impacts?

- How does climate change impact the habitability of areas in areas of origin, and in areas of destination? (access to services/sectoral impacts)
- Where are individual, household or community choices relating to mobility situated among other strategies to cope with and adapt to climate variability and extremes?
- To what extent does climate determine when to move, and where to move?

3. Perceptions of individuals/households: What are the perceptions of the outcome of climate mobility, by people who engage in climate mobility?

- Having moved, or having been affected by climate mobility, how do people understand changes in their capacity to adapt further and make decisions about their future?
- Having moved, how have individuals' / households' circumstances and aspirations changed?
- How does climate change impact the possibility of durable solutions, in the location of destination (local integration) or prospects of return (reintegration)?

A.2.1 Site Selection and Field Research Locations

To unravel the complexities of climate mobility in the Greater Caribbean Region, six countries experiencing a range of climate impacts were selected as part of the GCCMI field research. These included: Colombia, Costa Rica, The Bahamas, Antigua and Barbuda, Suriname, and Jamaica. In each country, two to three site locations were selected.

These are:
1. Colombia- Barranquilla and Santa Lucía
2. Suriname- Paramaribo, Brokopondo and Para
3. Costa Rica- Santa Maria de Dota and Tarrazú
4. Antigua & Barbuda- Codrington and Barbuda
5. Bahamas- New Providence and Grand Bahama
6. Jamaica- Flagaman, Negril (inclusive of Orange Bay), Portland Cottage

The country selection was based on a country profile assessment considering diverse socioeconomic factors, geography, and the impact of climate disasters. The assessment focused on each country's displacement profile, climate profile, human development profile, and aimed to capture a variety of typologies. Additionally, research access and security risks were considered (see table below).

Site locations were selected to target a sample of the population impacted by climate change or residing in climate risk areas, as well as those affected by migration patterns, either having migrated themselves or residing in areas where migration is occurring.

In the "place of origin" (area of departure), the team anticipated encountering individuals considering migration ('potential migrants') and those who chose to stay ('stayees'). In the destination locations (areas of arrival), they expected to meet individuals who had already migrated, at least partly due to climate factors, or were considering further migration ('potential migrants').

The specific site locations within each country were determined in consultation with local research teams. This approach ensured a comparative lens and captured the dynamics of migration influenced by climate change, incorporating a dynamic and locally grounded approach to location selection. The selected research sites encompassed urban, rural, and coastal environments, highlighting impacts across different economic sectors. These sites were also identified based on migration patterns, serving either as places of origin or destination.

Table A.2 Characteristics of Countries where Fieldwork was undertaken

Country/ Criteria	Type of Country	Pop. (2021)	Econ. Sectors	GDP USD per capita	HDI	Sudden-onset climate hazards	Slow-onset climate hazards	IDPs	Climate Risk Index
Colombia	Mainland	51.5 mil	Agriculture; tourism; industry	6,104	0.752	Storm, flood	sea-level rise	3,6 million	38
Suriname	Mainland	613k	Mining, Services	4,869	0.730	Flood	sea-level rise, droughts	12,800	171
Costa Rica	Mainland	5.15 mil	Tourism, Agriculture, Electrical	12,472	0.809	Storm, Flood, Wildfire	Droughts, rising temperatures	46,900	89
Antigua & Barbuda	Island	93.2k	Tourism	15,781	0.788	Storm	sea-level rise	1,468	56
Bahamas	Island	407.9k	Tourism, Agriculture, Fisheries	27,400	0.812	Storm, Wildfire	sea-level rise	18,477	6
Jamaica	Island	2.82 mil	Tourism, agriculture, manufacturing, Fisheries,	5,183	0.709	Storm	sea-level rise, droughts	7,098	54

A.2.2 Research Methodology

The field research methodology was structured as a phased approach, and as such the methodology outlined specific steps for site selection and data collection across six selected countries. This approach was designed to capture diverse migration patterns influenced by climate factors, encompassing both origin and destination locations.

Each country underwent a desk review of existing literature on climate impacts and migration patterns. This review informed the selection of specific zones for data collection based on criteria such as disaster events, socioeconomic indicators, and climate vulnerability. The phased approach plan included: 1) selecting a set of predetermined locations prior to data collection, in consultation with the local research teams, in either place of origin or destination, and 2) developing a list of potential secondary sites to be confirmed by local teams and field results.

Phase 1- Predetermined Location:
Initially, Location #1 was selected based on its significance in climate-induced mobility or as a destination for climate climate displaced persons. The final selection of the first site was determined in consultation with GCCMI partners, regional experts, and national researchers to ensure optimal research areas.

Phase 2- Local Insights:
Ahead of data collection, potential second location sites were identified in consultation with local research teams. In countries where data collection occurred in phases (Costa Rica, Suriname, Colombia), Location #2 was confirmed based on insights gathered from Location #1, ensuring coherence in capturing migration patterns and local realities effectively.

While the phased approach provided a structured framework, logistical challenges and local dynamics necessitated adaptations during implementation. For instance, initially the method was to employ a probability-based sampling since a sampling from existing lists of potential participants would only capture those displaced by acute climate disasters, not by slow-onset events. To maintain a random sample, the approach included using satellite mapping to select specific geographic zones for each enumerator. The methodology then shifted to include more purposive sampling methods in rural areas where spatial mapping proved challenging and ineffective. This adaptation ensured comprehensive coverage of climate-affected populations and relied on the expertise of local leaders, grounded in lived experience and contextual knowledge of their community. The success of this sampling approach, with local research teams designating sample areas led to its adoption for the remainder of the study.

In Suriname and Costa Rica, challenges arose in rural locations, making it difficult to generate satellite maps and assign sub-areas to each enumerator. Skilled local enumerators, familiar with the neighbourhoods, routes, and households, designed their own maps and designated locations. When the target number was not achieved, the team collaboratively identified additional locations. The resulting adapted methodology applied in the field demonstrated responsiveness to local contexts, enhancing the study's relevance and accuracy and the inclusion of a localized approach. By engaging closely with local researchers and community leaders throughout the research process, this approach ensured that the findings are grounded in local realities and conducive to meaningful policy recommendations.

A mixed methods approach was followed for data collection, utilizing both quantitative and qualitative research tools, including household surveys, focus group discussions and expert interviews, supplemented by secondary data and analysis. These tools were reviewed by GCCMI, CIESIN, and local partners, ensuring a collaborative approach that incorporated various expertise in climate adaptation and migration. Moreover, 70+ local researchers were engaged throughout each stage of the study, ensuring that the methods and findings were deeply rooted in local contexts and realities, and fostering trust with the participating communities.

Household Survey:
Survey interviews were conducted in selected locations using a combination of randomized and purposive sampling approaches. In rural areas where satellite mapping was not feasible, local leaders introduced participants, guiding the selection process. For randomized sampling, spatial coordinates directed a random walk pattern, with household members selected at random for interviews. Enumerators administered a household quantitative survey to respondents (one per household), totalling 2,200 across the six countries, averaging 370 per country with a balance between source and destination locations, allowing for a comparison between site locations. The survey focused on respondents' demographic profile, migration background, economic profile, housing and infrastructure, feelings of representation, support and wellbeing, stressors and resilience, and future migration decisions.

Focus Group Discussions:
To gain a deeper understanding of the relationship between climate and mobility, and the decisions of both individuals and their communities, four focus group discussions were conducted per country, two in each location, with four to eight participants per group. The focus group areas and participants were selected by first approaching community leaders to gain their approval, facilitation assistance, and participant referrals. Participants were selected via snowball sampling and purposive methods, either from referrals or the survey sample. Efforts were made to include a diverse group of participants, particularly those often underrepresented, such as youth, women, people with disabilities, Indigenous groups, internally displaced persons, and others highly vulnerable to climate change impacts. The discussions involved exercises that facilitated conversations on migration dynamics and climate stressors; community resource and individual vulnerability mapping; and a causal flow exercise examining the events, resources, effects, and adaptations experienced, as well as identifying solutions and implementation strategies.

Expert Interviews:
A total of 17 in-depth interviews were conducted with experts, identified by Samuel Hall as individuals with specialized knowledge of the research topic through their professional or social positions. These experts included government officials, representatives from the UN and other international organizations, civil society and grassroots organization leaders, and local community leaders. The interviews covered features of climate mobility, including climate change impacts and migration drivers, the capacities of communities and authorities to prepare for and respond to climate change and climate-induced mobility, adaptations to climate change, and whether migration is understood as an adaptation strategy in the local context, along with recommendations for future actions.

Following data collection, the datasets were validated, anonymized, cleaned, translated, and merged to create a harmonized multi-country dataset. Quantitative analysis was conducted using Stata and R. The qualitative analysis of focus group discussions and expert interviews followed a rigorous thematic coding process, allowing for a rich dialogue between the conceptual framework and emergent findings.

Table A.3 Characteristics of Survey Respondents

Country	Location	Type of location	Female	Male	Other / refused to answer	Total
Antigua and Barbuda	Antigua	Urban	111	47	0	158
	Barbuda	Rural	166	76	0	242
	TOTAL	-	277	123	0	400
Bahamas	Grand Bahama	Urban	109	46	0	155
	New Providence	Urban	107	93	0	200
	TOTAL	-	216	139	0	355
Colombia	Barranquilla	Urban	201	52	0	253
	Santa Lucia	Rural	108	43	0	151
	TOTAL	-	309	95	0	404
Costa Rica	Santa Maria de Dota	Rural	73	55	1	129
	Tarrazu	Rural	131	96	0	227
	Other	Rural	4	5	0	9
	TOTAL	-	208	156	1	365
Jamaica	Flagaman	Rural	39	98	0	137
	Negril and Orange Bay	Urban	25	16	0	41
	Portland Cottage	Rural	62	56	1	119
	TOTAL	-	126	170	1	297
Suriname	Brokopondo	Rural	67	32	0	99
	Para	Rural	63	28	0	91
	Paramaribo	Urban	117	92	0	209
	TOTAL	-	247	152	0	399
Grand Total						2220

A total of 2,200 respondents participated in household surveys and 128 participated in focus groups discussions along with 17 experts. The majority (62%) of survey respondents were women.

Demographics: The average respondent age was 44 years old. The survey demographic is skewed towards middle-aged adults, however youth (18-35) made up 33% of respondents. On average, households were composed of 4 members. The household referred to those who share resources, although there were many instances (in Colombia and Suriname in particular) where multiple families were sharing a house but were considered different households as they didn't share finances.

Socioeconomics: almost half of all respondents (55%) lived in rural (or semi-rural) areas, apart from The Bahamas where all respondents lived in urban (or semi-urban) areas. Almost half of the sample (42%) completed secondary education; 12% had no schooling. Most of the respondents surveyed (57%) were the main breadwinners, indicating their essential role in providing financial support. There are significant economic disparities observed among surveyed regions, with respondents from Colombia and Suriname generally reporting more challenging financial circumstances compared to those from island nations. Employment status varied: 46% of the respondents were working in permanent jobs, while about a quarter (24%) were not working or looking for work; seasonal and short-term work was significantly prevalent in Jamaica (40%) and Colombia (34%).

Migration Profile: The migration profile of respondents reveals diverse patterns across the surveyed regions. Colombia stood out with a significant history of migration (74%), while Jamaica showed the lowest proportion of migrant respondents (33%). Among migrants, a majority have resided at the interview location for over 20 years, except in Colombia where half (51%) have lived there for less than a decade (see figure below). The primary reasons for migration to the interview location were economic opportunities (41%) and family considerations (43%).

These findings underscore the varied motivations and settlement durations among individuals with migration backgrounds across the study regions.

A.2.4 Limitations and lessons learned

Adaptability in Sampling Methods: The initial snowball sampling approach often needed to shift to purposive sampling due to time constraints and the necessity of quick data collection on the ground. Community support was crucial for survey and focus group participation.

Local Knowledge Utilisation: Satellite mapping was frequently unfeasible in rural or informal areas. Relying on community leaders and local knowledge proved most effective for identifying and accessing target populations.

Contextualization and Flexibility: Survey tools required edits to fit local contexts, and understanding different cultural perceptions of time was vital. Flexibility in adapting surveys and methods during fieldwork ensured better engagement and accurate data collection.

Community Involvement: Engaging community leaders and members in the research process facilitated trust, participation, and impact. Their involvement was key in identifying participants and ensuring community buy-in for the study.

Training and Feedback Integration: Incorporating feedback from enumerators and national researchers during training sessions enhanced contextual relevance and effectiveness of the research tools, emphasizing the importance of localization and contextualization.

A.3 GCCMI Consultations

The Consultations phase aimed to provide a bridge between the generation of evidence and the development of recommendations for action. To mobilize regional knowledge and expertise, the GCCMI coordinated a series of virtual consultation workshops, including with academia, civil society, policymakers, representatives of regional institutions in the Greater Caribbean and international organizations, philanthropy, and the private sector. This process was critical for translating the modeling and research findings into a shared analysis and narrative that reflected the perspectives of different levels of governance, sectors and groups of actors.

The main objectives of the consultations were:

- Review and validate the modeling and research findings of the GCCMI by examining how they dovetail with existing data and other relevant research happening in the Greater Caribbean context;
- Generate a shared analysis of the implications of climate mobility for the Greater Caribbean region to support the development of the GCCMI Report recommendations and the Agenda for Action;
- Explore how the findings are relevant for and can inform policy and programme development by different policy communities, levels of governance and stakeholders;
- Connect actors and initiatives across sectors and geographies to nourish a Community of Practice that will facilitate knowledge-sharing and joint actions in support of regional efforts to address climate mobility.

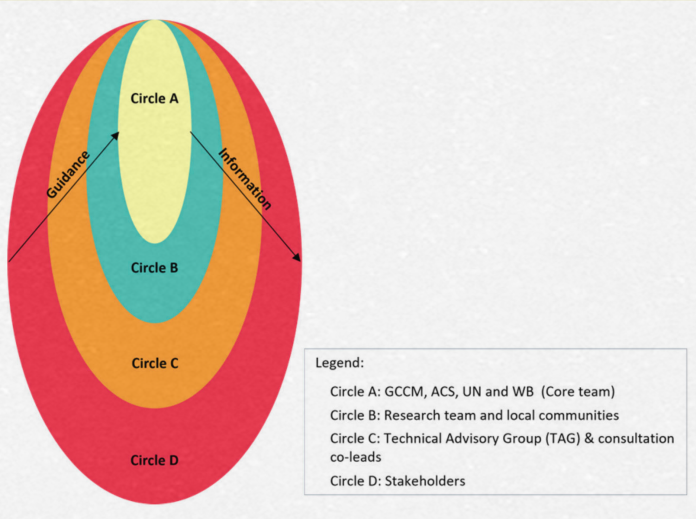
The expected outcomes of the consultations were:

- A shared cross-sector understanding of the climate mobility opportunities and challenges facing the Greater Caribbean;
- The emergence of a Community of Practice that promotes knowledge-sharing and collaboration across various sectors and actors;
- The convergence of stakeholder expectations driving political momentum for anticipating and addressing climate mobility through coordinated actions in the Greater Caribbean region.

To ensure fruitful participation of all actors at all levels, a stakeholder engagement process was designed and followed. The stakeholder engagement process started with a stakeholder mapping exercise and followed an adapted Circles of Influence approach (see figure). Ultimately, the stakeholder engagement process ensured that the consultations are informed by all engaged actors and respond to the local context and needs.

Each Consultation workshop engaged a group of around 30 to 40 participants representing a diverse range of actors and perspectives, including academic and technical experts, regional and international organizations, policy makers, civil society organizations, and the private sector. The consultations were 3 hours long and held online. All Consultations included English and Spanish mixed formats, using interpretation, and language-specific breakout sessions.

Figure A.12 GCCMI Circles of Influence approach



Constituent Consultations

The first round of workshops (Phase I) aimed at presenting and validating the results of the climate mobility model and fieldwork. The second round of workshops (Phase II) focused on developing policy recommendations and building the Agenda for Action based on participants' feedback. Consultations in both phases pursued a participatory approach combining presentations and language-specific breakout discussion formats.

1. Phase I: Modeling and Fieldwork Results
The first round of Consultations workshops was organized around relevant regional constituencies that are particularly affected by climate mobility as they emerge from the modeling and fieldwork results. Constituent groups included:
Workstream 1: Women
Workstream 2: Youth
Workstream 3: Indigenous Peoples + Nature-Based Communities
Workstream 4: Cities
Workstream 5: Coastal Communities

Each consultation included a plenary presentation of key takeaways from the modeling and fieldwork results that are relevant to the Greater Caribbean and results that are relevant to each constituency.

Questions that guided the discussion of the modeling results with stakeholders included:

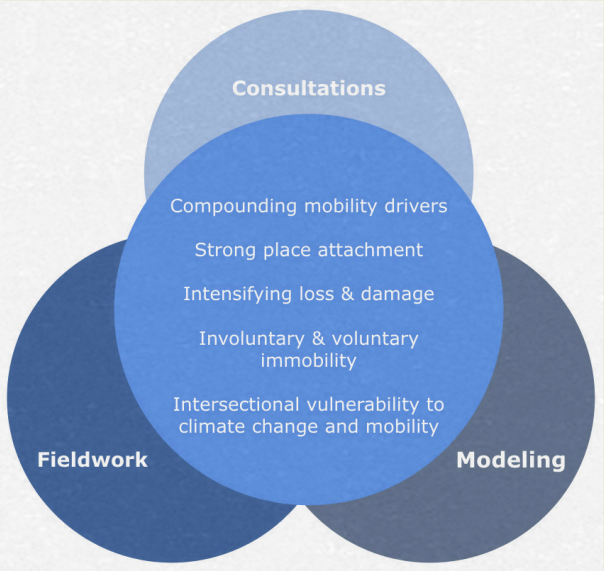
- Will climate impacts drive more people to move?
- What climate factors are most likely to affect movement?
- Which countries are likely to be top countries of origin and destination for climate mobility in the region?
- Could climate mobility come from new areas of origin?
- What are the demographic characteristics of the people who are projected to move?
- What are the implications of climate mobility for coastal, urban and rural economies?

Questions that guided the discussion of the fieldwork results with stakeholders included:

- Climate as a driver of mobility: How important is it in people's decision-making and which impacts matter most?
- Climate mobility & vulnerability: How do the two intersect in places of origin and destination?
- Climate mobility & immobility: Who moves and who stays?
- Climate mobility routes & connections: How and where do people move?
- Climate mobility & adaptation: To what extent are current movements adaptive?

After the modeling and fieldwork results were presented, Phase I consultations included breakout room discussions that were language-specific and took a deeper dive into the results in order to solicit participant feedback and engagement with key findings. This engagement served as a validation process for modeling and fieldwork results, by offering a comparison to participants' own experiences. To that end, one desired outcome of Phase I consultations was to derive a sense of shared ownership of the results, by transitioning from a presentation of information by the GCCMI to a co-creation opportunity for participants, enabling them to fit the results within their own narratives about climate mobility in the Greater Caribbean.

Figure A.13 Key Findings Across Research Inputs and the Validation Process



2. Phase II: Policy Recommendations and Agenda for Action

The second round of Consultation workshops focused on climate mobility policy in the Greater Caribbean region. Based on the results of the modeling, fieldwork, and first phase of consultations, Phase II consultations were organized around the following policy themes:

1. Nature
2. Opportunities
3. Rights Protection
4. Resilience
5. Planning and Cooperation

The discussions were informed by the key outcomes of a policy landscape mapping and analysis, conducted by the GCCM. The aim of the deliberations was to identify relevant policy areas and levers that are likely to be impacted by climate mobility and that will have an important role in shaping the dynamics and outcomes of climate mobility in the region. The feedback and recommendations that participants provided informed the GCCMI's Agenda for Action, which intends to provide a roadmap for policymakers in the Greater Caribbean at various levels of governance, as well as for their international partners and stakeholders from the multilateral system, civil society, philanthropy, and the private sector.

The Consultations in the second phase included a plenary presentation of the regional results of the GCCM policy mapping as well as an overview of key recommendations by regional intergovernmental organizations and the international community. This provided participants with an overview of policy gaps and opportunities at different scales across the region. The plenary sessions used translation so that they were accessible in both English and Spanish. After the policy mapping was presented participants had the opportunity to engage in language-specific groups with different scenario-based questions in order to contemplate the policies necessary for enabling people-positive adaptation journeys for both immobile and mobile populations. The session concluded with group priority action proposals.

Findings, Validation, and Agenda for Action

A summary of the findings, observations and conclusions from the Consultation workshops was prepared and validated with the co-leads and participants. The insights generated through the Consultations informed the development of the draft GCCMI Agenda for Action.

The Agenda for Action was consulted with GCCMI partners and experts from its Technical Advisory Group before being presented for feedback during the GCCMI Stakeholders Forum in October 2024.

List of Participating Organizations

1. A Solutions Agency
2. Adelphi
3. AGWO-FANM, Haiti
4. Alcaldía de Bogotá

5. Alcaldía Municipal de Mosquera
6. Alcaldía Villa del Rosario, Colombia
7. Altus Climate Action Now Inc., Barbados
8. Ama Earth Group
9. Amaral, Mexico
10. Amazon Conservation Team Brazil
11. Ambisa Panama
12. American Friends Service Committee
13. Amnesty International
14. Antigua State College
15. Asociación Colombiana de Geólogos y Geofísicos de la Energía
16. Asociación Coordinadora Comunitaria de Servicios para la Salud (ACCSS)
17. Asociación de Mujeres Ixpiyakok, Guatemala
18. Asociación Generaciones de Paz, El Salvador
19. Asociación Lambda
20. Asociación Municipal para el Medio Ambiente del sur de Quintana Roo (AMUSUR)
21. Asociación Pop No'j, Guatemala
22. Asociación Vainilla Peru (AVAIPE)
23. Association of Indigenous Peoples in Suriname
24. Association of Saamaka Communities (VSG)
25. Atlantic Council
26. Aurae Opus Foundation
27. Ayuda en Acción (Action Aid)
28. Ayuntamiento de Tapachula
29. Bahamas National Reparations Committee
30. Bahamas National Trust
31. Bahamas National Youth Committee
32. Bahamas Office of the Prime Minister
33. Banco Interamericano de Desarrollo (BID)
34. Barranquilla+20 Foundation
35. Belize City Council
36. Belmopan City Council, Belize
37. C40 Cities
38. C40 Youth Hub
39. Cambridge University
40. Canadian Embassy in Guatemala; accreditation Belize
41. Canada-Mathare Education Trust (CMETrust)
42. Caravana Cartonera and Rural STEAM Education
43. Care international
44. Caribbean Amerindian Development Organization (CADO)
45. Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company
46. Caribbean Community Climate Change Centre
47. Caribbean Disaster Emergency Management Agency (CDEMA)
48. Caribbean Feminist
49. Caribbean Institute for Meteorology and Hydrology
50. Caribbean Natural Resources Institute
51. Caribbean Policy Development Center
52. Caribbean Youth Climate Council
53. Caribbean Youth Environment Network
54. Carnegie Endowment for International Peace (CEIP)
55. Casa Refugiados
56. Cátedra en Migración Internacional Forzada-UdeG (MIFID)
57. Center for Gender & Refugee Studies
58. Centre for International Sustainable Development Law
59. Center for International Earth Science Information Network (CIESIN) of the Columbia University Climate School
60. Centre Caribéen pour la Réhabilitation de l'Environnement et l'Economie (CECAREE)
61. Centro de Estudios de Género INTEC
62. Centro de Investigaciones Biológicas del Noroeste, S.C
63. Centro de Investigación y Promoción de los Derechos Humanos (CIPRODEH)
64. Centro de los Derechos del Migrante; Inc.
65. Centro de Salud Max Arias Schreiber
66. Centro Latinoamericano de Estudios Ambientales (CELEAM)
67. Centro para la Autonomía y Desarrollo de Pueblos Indígenas (CADPI)
68. Centro por la Justicia y el Derecho Internacional (CEJIL)
69. Centro Regional de Defensa de Derechos Humanos
70. Centro Universitario Oriente de México
71. Center for Justice and Peace (CEPAZ)
72. Citizens' Climate International

73. Civil Society Forum, Brasil
74. Climate Change and Environmental Advisory Unit (CCEAU), Bahamas
75. Climate Education and Leadership (EDUCLIMA)
76. Climate Mobility Community Action Network
77. Climate Tracker
78. Colectivo Completa el planeta
79. Colectivo de arte Social Palenque
80. Colectivo juvenil libres de expresión, Colombia
81. Collectif des Jeunes Universitaires pour la Formation et la Recherche Scientifique qq, Haiti
82. Colorado State University
83. Columbia Program on Forced Migration and Health
84. Columbia University
85. Comisión de Acción Social Menonita (CASM)
86. Comisión Regional de Competitividad e Innovación del Atlántico
87. Comunidad indigena, Colombia
88. Comunidades Indígenas en Liderazgo (CIELO)
89. Consejería Distrital de Relaciones Internacionales de Bogotá
90. Coordinación de Resiliencia; Municipio de Juárez
91. Coopération Internationale pour le Développement et la Solidarité (CIDSE)
92. Corporación Las Marías al Aire/ U. EAFIT
93. Corte Interamericana de Derechos Humanos
94. Church World Service (CWS)
95. Danish Refugee Council - DRC
96. Dejusticia - Colombia
97. Department of Environment, Antigua and Barbuda
98. Department of Environment, At Georges Antigua and Barbuda
99. Department of Environment, St. John Antigua
100. Dominica National Council of Women (DNCW)
101. Eagle Clan Lokono-Arawaks
102. Eastern Caribbean Alliance for Diversity and Equality (ECADE)
103. Ebestchoice, Colombia
104. ECAP Guatemala
105. Ecoalianza Climática
106. ECOS Studio, Mexico
107. EcoShores Expeditions
108. Ecoshores sustainable futures network/IHO
109. Ecovybz Environmental Creatives
110. EcoYouth Jordan
111. El Derecho a No Obedecer
112. Elisabeth Haub School of Law at Pace University
113. Embassy of Canada to Colombia I Ambassade du Canada en Colombie
114. Embassy of Japan in Barbados
115. Embassy of the Netherlands in Mexico
116. Emergence Chile
117. Energy Authoritie of Suriname
118. Enrst and Young, Trinidad and Tobago
119. Enseña Peru
120. Environmental Protection Agency
121. Equality Bahamas
122. Equipo de Estudios Comunitarios y Acción Psicosocial (ECAP) Guatemala
123. Equipo de Reflexión, Investigación y Comunicación
124. Euroclima
125. European Union
126. Federal Foreign Office of the Federal Republic of Germany
127. Federation Haitienne de la Peche Sportive en Mer, Haiti
128. Fédération Parikewneh de Guyane Française
129. Felipe Travel Agency, Dominican Republic
130. FIAN Internacional sección Honduras
131. Food and Agriculture Organization (FAO)
132. Foro Indígena Abya Yala (FIAY)
133. Foundation for the Promotion of the Indigenous Knowledge
134. Foundation Piya Apetina
135. Foyer Maurice Sixto (FMS)
136. Freedom Imaginaries
137. Funcionario Público, Venezuela
138. Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean (FILAC)
139. Fundación Colombia 2050
140. Fundación Comparte por una vida Colombia
141. Fundación Comparte, Venezuela
142. Fundación Ecuador Kawsay
143. Fundación para la Justicia y el Estado Democrático de Derecho

144. Fundación Una Voz por la Infancia, Inc. (FUNINFA)
145. Galen University
146. Generation Climate Europe
147. Girl Up Latam
148. GirlsCARE
149. Georgetown University
150. Global Affairs Canada
151. Global Shapers
152. Global Water Partnership - Caribbean (GWP-C)
153. Gobernación del Atlántico, Jamaica
154. Gobierno de Nuevo León
155. Government of Antigua and Barbuda
156. Government of Canada
157. Government of The Bahamas
158. GREEN DREAMS, Ecuador
159. Green Smile, Dominican Republic
160. Grupo de Financiamiento Climático LAC
161. GTG Consultancy / EcoSeas Caribbean
162. Guardians of the Green Jamaica
163. Haitian Bridge Alliance
164. Het Openbaar Ministerie Suriname
165. Horus University
166. Immigration, Refugees and Citizenship Canada
167. Ingenieria de maquinas rotativas S.A.S., Colombia
168. International Association of Students in Agriculture and Related Sciences (IAAS)
169. Instituto de Planeación y Gestión del Desarrollo del Área Metropolitana de Guadalajara (IMEPLAN)
170. Inno'on La' oh, Belize
171. INPARQUES, Venezuela
172. Institute for Legal Studies and Research, Mexico
173. Institute of Caribbean Studies/Caribbean Futures Forum
174. Institute of Environmental Science and Technology (ICTA - UAB)
175. Institute of Marine Affairs, Trinidad and Tobago
176. Instituto Administrador de Beneficios de Veteranos y Excombatientes
177. Instituto Afrodescendiente para el Estudio la Investigación y el Desarrollo
178. Instituto Afrodescendiente, Dominican Republic
179. Instituto de Abogados para la Protección del Medio Ambiente
180. Instituto de Auditores Internos de Ecuador
181. Instituto del Café de Costa Rica (ICAFE)
182. Instituto Humboldt
183. Instituto Nacional de las Mujeres
184. Instituto Nacional para los Beneficios de los Veteranos y Excombatientes (INABVE)
185. Instituto Regenera
186. Intercultural Indigenous Language Institute, Belize
187. Internal Displacement Monitoring Center (IDMC)
188. International Association of Students in Agriculture and Related Sciences (IAAS México)
189. International Federation of Red Cross and Red Crescent Society (IFRSC)
190. International Indian Treaty Council
191. International Organization for Migration (IOM)
192. 191. International Refugee Assistance Project (IRAP)
193. International Student Environmental Coalition (ISEC)
194. International Union for Conservation of Nature
195. IOM Regional Office, Argentina
196. Island Policy Lab, University of Delaware
197. Jamaica Agricultural Society
198. Jamaica Climate Change Youth Council
199. Jamaica Prefects Association
200. Jane Goodall Institute of Canada
201. Jóvenes por el Cambio JXC Guatemala
202. Jóvenes Unidos por la Educación, Colombia
203. Justice Peace and Integration of Creation (JPIC) Franciscanos
204. Julian Cho Society
205. Junta Asesora de Juventudes de la Unión Europea
206. Justice Corp, Guyana
207. Justice in Motion
208. Juventud Latinoamericana sin Fronteras - Perú
209. Kalinago People
210. Karloagrozoot, Guatemala
211. Kee Farms
212. Khose foundation
213. Kukki aquaculture, Guyana
214. La fábrica Cafetería and SUSTENTA MX

215. La Ruta del Clima
216. Latin American Faculty Social Sciences Institute (FLASCO)
217. Latin American Youth Climate Scholarship (LAYCS)
218. Luxembourg Institute of Socio-Economic Research (LISER)
219. Martinique Ambassadors Club
220. Massachusetts Institute of Technology (MIT)
221. Maya Leaders Alliance
222. Mayor & City Council of Georgetown, Guyana
223. Mennonite Social Action Commission (CASM)
224. Mesa Ambiental Nacional Escazú por Colombia
225. Meteorological Service, Antigua and Barbuda
226. Migration Youth and Children Platform (MYCP)
227. Ministerio de Ambiente de Panamá
228. Ministerio de Ambiente y Desarrollo Sostenible, Colombia
229. Ministerio de Ambiente y Recursos Naturales, Guatemala
230. Ministerio de Ambiente, Panamá
231. Ministerio de Medio Ambiente y Recursos Naturales, El-Savador
232. Ministry for Environment, New Zealand
233. Ministry of Climate Resilience the Environment and Renewable Energy, Grenada
234. Ministry of Climate Resilience, Grenada
235. Ministry of Economic development, Belize
236. Ministry of Environment and Natural Resources, Mexico
237. Ministry of Environment Rural Modernisation Kalinago Upliftment and Constituency Empowerment, Dominica
238. Ministry of Environment, Panama
239. Ministry of Foreign Affairs and Foreign Trade, Saint Vincent and the Grenadines
240. Ministry of Health, Guyana
241. Ministry of Planning and Budget, Brasil
242. Ministry of Tourism, St. Kitts & Neviz
243. Mixed Migration Center (MMC)
244. Montserrat National youth parliament
245. Movimiento Ambientalista Santabarbarense (MAS), Honduras
246. Mujeres Restaurando El Ecosistema, Mexico
247. Mulokot Foundation
248. Municipalidad de Golfito
249. Municipio de Envigado, Colombia
250. Museo de Historia Natural (UNMSM)
251. Mutante
252. National Emissions Registry, Bahamas
253. National Energy Corporation of Trinidad and Tobago
254. National Garifuna Council
255. National Security Council Technical Secretariat, Guatemala
256. Nature's Indigenous Adventures
257. News 5 Belize
258. New School University
259. NoBrainerData
260. North Rupununi District Development Board (NRDDB)
261. NYU Law - Global Justice Clinic
262. Observatoire Terre-Monde (Centre d'Etudes des écologies politiques des Outre-mer et de leurs proches régions)
263. Observatory Caribbean Migrants (OBMICA)
264. Observatory on Health and Climate in Haiti
265. Ocean Youth Working group of the commonwealth
266. Office of the Prime Minister, Gender and Child Affairs, Trinidad and Tobago
267. Office of the Prime Minister, National Emissions Registry, Bahamas
268. Ohio University
269. Open Society Foundation
270. Orbtronics Ltd, St. Lucian
271. Organisation of African, Caribbean and Pacific States (OACPS)
272. Organisation of Eastern Caribbean States (OECS) Commission
273. Organization for Economic Co-operation and Development (OECD)
274. Organización de jóvenes con Vos, Guatemala
275. Organización nacionalidad waorani del Ecuador amazonia
276. Organization for Responsible Governance
277. Pan American Development Foundation (PADF)

278. Pastoral Social Caritas La Ceib, Honduras
279. Permanent Mission of Germany
280. Permanent Mission of St. Kitts and Nevis to the United Nations
281. Permanent Mission of the Dominican Republic to the United Nations Office in Geneva
282. Piya Foundation
283. Plan International
284. Plant-For-The-Planet
285. Plataforma Colombiana de Niñez y Juventud
286. Platform on Disaster Displacement (PDD)
287. Population, Refugee, Migration (PRM)
288. Portmore Community College
289. Programa casa refugiados
290. Programa casa refugiados, Mexico
291. Progressive Young Liberals
292. RainDrop, El-Salvador
293. Red de Adolescentes y Jóvenes Indígenas de Amazonas (RAJIA)
294. Red de Jóvenes Indígenas de Latinoamérica
295. Red de Jóvenes para la Reducción de Riesgo de Desastres de América Latina y el Caribe
296. Red de jóvenes para la RRD
297. Red de mujeres mariposas libres
298. Red de Mujeres Afrodescendientes en Panamà
299. Red de Mujeres Afrolatinoamericanas Afrocaribeñas y de la Diáspora
300. Red Franciscana para Migrantes
301. Red Jesuita con Migrantes - LAC
302. Red para la Reducción del Riesgo de Desastres of the Americas and The Caribbean
303. Red Sudamericana para las Migraciones Ambientales (RESAMA)
304. Red Vivan Las Mujeres, México
305. Rede Sul-Americana para as Migrações Ambientais
306. Refugees Heroes
307. Relatoría Especial sobre los Derechos Económicos, Sociales, Culturales y Ambientales (REDESCA)
308. Robert Bosch Stiftung
309. Rotaract Club of Tobago
310. Rotary club of penal
311. Rotary D7475 Service Foundation
312. Rotary International
313. Ruta del Clima
314. Santa Rosa First People Community, Trinidad and Tobago
315. SDG 7 Youth Constituency
316. Secretaría de Desarrollo Urbano y Medio Ambiente del Gobierno del Estado de Tamaulipas
317. Secretaría de Economía y Turismo Municipal de Tapachula
318. Secretaría de Gestión Integral de Riesgos y Protección Ciudad de México
319. Secretaría de Medio Ambiente e Historia Natural, Gobierno de Chiapas
320. Secretaría de Medio Ambiente y Cambio Climático, México
321. Secretaría de Medio Ambiente y Desarrollo Territorial de Jalisco, México
322. Secretaría de Planeación Distrital, Bogotá
323. Secretaría de Protección Civil Municipal de Tapachula
324. Secretaría de Medio Ambiente y Desarrollo Territorial, México (SEMADET)
325. SHE Changes Climate
326. Siemens
327. Sipaliwini Youth Foundation
328. Social Investment Fund, Belize
329. Solidarity Center, Brasil
330. Soloricon
331. Sotz'il, Guatemala
332. South Rupununi District Council
333. Southern Environmental Association
334. Stichting Key Holders of Sustainable Environment (KHOSE)
335. Stockholm Environment Institute (SEI)
336. Stride592
337. Sustainable Ocean Alliance Dominican Republic
338. Tecnológico de Monterrey, México
339. Technische Universität München
340. Tejiendo por mi Comunidad
341. The Association of Caribbean States (ACS - AEC)
342. The Association of Indigenous Village Leaders (VIDS)
343. The Bahamas Delegation

344. The Breadfruit Collective
345. The Center for Nonviolence Research and Development
346. The City of Coral Springs
347. The Consortium of International Agricultural Research Centers (CGIAR)
348. The Coral Reef Restoration Alliance
349. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
350. The Erline Bradshaw Foundation
351. The National Cooperative Business Association CLUSA International (NCBA CLUSA) Dominican Republic
352. The official Children and Youth Constituency of the UNFCCC (YOUNGO)
353. The UN Resident Coordinator's Office (RCO) in Costa Rica
354. Tobago Updates Television
355. Toledo Alcaldes Association
356. Transforma
357. TransWave Jamaica
358. Trinidad and Tobago Youth Advocacy Network
359. U.S. Department of State, Bureau of Populations, Refugees, and Migration
360. Un Puerto Limpio
361. Unidad Ecológica Salvadoreña (UNES)
362. United Confederation of Taino People
363. United Nations Development Programme (UNDP)
364. United Nations Environment Programme (UNEP)
365. United Nations High Commissioner for Refugees (UNHCR)
366. United Nations Human Settlements Programme (UN-HABITAT)
367. United Nations Industrial Development Organization (UNIDO)
368. United Nations Institute for Training and Research (UNITAR)
369. United Nations International Children's Emergency Fund (UNICEF)
370. United Nations Office for Disaster Risk Reduction (UNDRR)
371. United States Geological Survey (USGS)
372. Universidad Antonio Ruiz de Montoya
373. Universidad Autónoma de Baja California
374. Universidad Autónoma de la Ciudad de México
375. Universidad Católica Andrés Bello (UCAB) Guyana
376. Universidad de Antioquia, Colombia
377. Universidad de Cádiz, Honduras
378. Universidad de Costa Rica
379. Universidad de Hamburgo
380. Universidad de la Costa
381. Universidad de La Sabana
382. Universidad del Atlántico
383. Universidad del Pacífico
384. Universidad del Tolima
385. Universidad del Valle
386. Universidad Earth
387. Universidad Federal da Bahia
388. Universidad Iberoamericana
389. Universidad Nacional de Colombia
390. Universidad Nacional de Costa Rica
391. Universidad Rafael Landivar
392. Universidad Tenochtitlan
393. Universidade Federal do Sul e Sudest do Pará
394. University of Agriculture Faisalabad City Faisalabad Pakistan
395. University of Exeter
396. University of Guyana
397. University of Melbourne
398. University of Nottingham
399. University of North Carolina, Charlotte
400. University of Oxford
401. University of Portugal
402. University of Papua New Guinea
403. University of Peace
404. University of Reading
405. University of Santiago, Chile
406. University of Suriname
407. University of The Bahamas
408. University of the South Pacific
409. University of the West Indies
410. University of Vermont
411. Upper Mazaruni District Council, Guyana
412. US Agency for International Development (USAID)
413. VerdelaTierra, A.C.

414. Vereniging van Inheemse Dorpshoofden in Suriname
415. Virginia Commonwealth University
416. Vitalis Venezuela
417. Voces de Mujeres Afrodescendientes en Panamá
418. Washington Office on Latin America (WOLA)
419. Water and Sewerage Authority (WASA) of Trinidad and Tobago
420. World Bank
421. World Health Organization (WHO)
422. World Resources Institute (WRI)
423. World Wild Fund for Nature (WWF)
424. World Youth for Climate Justice
425. Youth Climate Council - Costa Rica
426. Youth Network for DRR in LAC
427. Youth4Energy

Other Regions

1. A.S. Mangari Global Limited
2. ABA Foundation, Uganda
3. Abu Dhabi Polytechnic, UAE
4. Academic Council on the United Nations System
5. Action Aid kenya
6. Action for the Promotion of Health, Production and the Environment (APROSPEN)
7. Action pour la Santé et le bien être social, Niger
8. Actions for the and Empowerment (ADE)
9. Addis Ababa University
10. Adeyemi Federal University of education
11. AFG Assur Comores
12. Afnan, Egypt
13. Africa Diplomatic Organisation
14. African christian university
15. African Diplomatic league, Senegal
16. African Food Changemakers
17. African Green Bridge Foundation
18. African Network of Young Leaders for Peace and Sustainable Development
19. African Reflections Foundation
20. Afrique Résilience
21. AfriquExploit
22. Aga Khan University, Pakistan
23. Agape Earth Coalition
24. Agence Nationale de la Météorologique du Mali
25. Agribusiness and Environmental Focus for Africa (AEFA)
26. Agriculture and Forestry University, Nepal
27. Achievers Innovative Advocates (AIA) Foundation
28. Ain Shams University
29. AISA ONG internationale
30. Ajemalebu Self-Help (AJESH) Cameroon
31. Al-Azhar Cairo University
32. Al-Moussa ada Humanitarian Association, Chad
33. Alefa Diaspora
34. Alexandria University
35. Aligarh Muslim University
36. All Africa Conference of Churches
37. All-Africa Students Union
38. Alliance for Empowering Rural Communities
39. American University
40. Amerindian Peoples Association
41. Amrita School of Engineering , India
42. Arab African International Bank
43. Arivu central
44. Assiut University, Egypt
45. Association Action Verte
46. Association Caritative pour l'Education et le Développement
47. Association des Scouts et Guides du Sénégal
48. Association E-TEAM
49. Association Humanitaire Al-Moussa'Ada
50. Association internationale des étudiants en sciences économiques et commerciales (AIESEC) Egypt
51. Association Jeunesse Verte du Cameroun (AJVC)
52. Association of Prosthetics and Orthotics Students
53. Association Zumuci
54. Assuit university
55. Azed Agrobusiness
56. Bahauddin Zakariya University Pakistan
57. Bahria University Karachi Campus
58. Baku state university
59. Bangalore University
60. Bangia Technical Engineering
61. Banja la Mtsogolo, Malawi
62. Banquemisr, Egypt

63. Bayero University Kano, Nigeria
64. Biba Transformations LBG
65. Big Ship Organization
66. BIOFIX
67. Bitapi International
68. Blue Pacific Youth Initiative, Fiji
69. Boychild Empowerment Kenya
70. Bricks Environment and Climate Hub Initiative Uganda
71. Bright Future Kenya
72. Brillio
73. Bule hora University
74. Butterloritte Company Ltd, Ghana
75. Cabinet hub, Niger
76. Cairo University
77. Camelot Agroecology Farm
78. Cameroon National Youth Council
79. Camfed association, Zimbabwe
80. Cartoonist4climate
81. Catalyst 2030
82. Center for Climate Change Mitigation and Adaptability
83. Center For Community Enhancement, Cameroon
84. Center for Gender & Refugee Studies
85. Center of Research in Mechanics (CRM), Algeria
86. Central University of Karnataka
87. Centre for Climate Change Adaptation and mitigation University of Embu 88. Centre for foreign relations .
89. Chad basin development authority
90. Chaplin's of hope, Kenya
91. Childfund Kiribati
92. Children National Assembly the Gambia
93. Children Rescue Africa
94. Chitedze Research Station
95. Christian Youth Volunteers Association Trust
96. Chuka university, Kenya
97. Citoyens Volontaires, Benin
98. Civil Defence Commission
99. Clean Energy Generation
100. Clean the Gambia
101. climate Action & community outreach initiatives
102. Climate Agricultural Youth Equity Network Sierra Leone (CAYEN-SL)
103. Climate change Network Zambia
104. Climate Clock
105. Climate Ideation Initiative
106. Climate Inclusion Network, Uganda
107. Climate Savors, Egypt
108. Climatematch, Nigeria
109. Climatic Peace, Egypt
110. Club U-Report Sahel
111. Coalition for Global Health Innovation, China
112. Commonwealth Youth Climate change Network Keny (CYCN Kenya)
113. Communauté et développement durable (CODED)
114. Community Safety Project, Kenya
115. Community settlement and Development Action (COSDA)
116. Concourse International , Algeria
117. Congo Basin Conservation Society, CBCS Network
118. Connecting Climate Minds Sub Sahara
119. Conseil des jeunes régionales, Niger
120. Conseil national des Appelés du service civique du Cameroun, branche Régionale de l'Extreme-Nord
121. Conseil Régional de la Jeunesse de Niamey
122. Conservation Alliance International
123. Consortium pour la nature l'environnement et le développement durable (CNEDDP)
124. Council for Scientific and Industrial research
125. Daisy innovative learners association
126. Damietta University
127. Decathlon, Egypt
128. Deeq development organization, Cameroon
129. DeKUT Center for Energy Studies
130. Delhi University - Kirori Mal College
131. Department of Climate Change Federal Ministry of Environment, Nigeria
132. Department of Health, Pakistan
133. Department of Lands & Physical Planning, International Planned Parenthood Federation, Papua New Guinea
134. Desert Research Center, Egypt
135. Diaspo écolo
136. Diplomatic Youth Initiative Uganda

137. DMUN foundation
138. Drexel University
139. Earth friend club Tanzania
140. Earthplus Sustainability Network
141. Ebenezer Malomo and Co Chartered Accountant firm
142. Eboko foundation
143. Eco Climate Initiative
144. Eco-friends Gambia
145. Ecoclimate vision
146. Ecoclime Africa, Ghana
147. EcoCycle Farm , Rwanda
148. EcoCycle Innovations Togo
149. EcoDiscosure
150. Ecolive
151. Ecoseas Caribbean
152. EcoYouth Jordan
153. Eduardo Mondlane University
154. Education for Sustainable Development Commission
155. Educational Social and Agricultural Organization
156. Egirna Technologies, Egypt
157. Egyptian Sea Scout
158. Egyptian Sea Scout
159. Elgossa Charity Organization for Rural Development
160. Elhandsy For constructions
161. Empower Your Own, Kenya
162. Enactus, Egypt
163. Enactus, Ghana
164. Enkishui Loita community based organization
165. Entreprise Agro-Pastorale Aviconnect
166. Environment and Food Foundation, Cameroon
167. Environment Quality Authority, Palestine
168. Environmental Conservation Initiative Tanzania (ECOTA)
169. Environnement et Sensibilisation
170. Exceeding ICT Global Centre
171. Falcon love trust
172. Farm-Sight Agro Hub
173. Farming Villages Uganda
174. Federal Ministry of Environment, Nigeria
175. Federal Polytechnic Bida, Nigeria
176. Federal University Oye Ekiti
177. Fédération Malienne des clubs pour UNESCO du Mali (FEMACAU)
178. Financial Sector Deepening Africa - FSD Africa
179. Fly Ontime Aviation Sciences Academy
180. Fondation IssaGate
181. Forestry training institute of Olmotonyi Arusha
182. Foundation for Rural Development (FRD)
183. Foundation For Security And Development In Africa
184. Friday for future
185. Fundación Ecuador Kawsay
186. Future University, Egypt
187. Gachuba Empowerment Youth Group
188. Gasy Forestry Students' Association
189. Gender and Environmental Risk Reduction Initiative (GERI)
190. Generation Shapers
191. Ghana Meteorological Agency
192. GIS and Remote sensing solution Ltd, Rwanda
193. Global Environmental and climate Conservation Initiative
194. Global Farmer Network
195. Global Green Forum
196. Global Health Impact Zambia
197. Global Investors Consultation Centre, Tanzania
198. Global network of political leaders
199. Global Platform Uganda
200. Global Youth Biodiversity Network (GhYBN)
201. Gombe state university
202. Gombu Youth Agric Tech Company
203. Grassroot Researchers Association
204. Great Valley Travel agency, Uganda
205. Green Africa Youth Organization
206. Green African Youth Organisation
207. Green Byres Club
208. Green Climate Organizations Union for Sustainable Development Yemen
209. Green Community Initiatives (GCI)
210. Green Dream, Iraq
211. Green Futures Initiative
212. Green girls platform
213. Green Mauritania Youth Network - GreeM

214. Greenbeehive Solution
215. Greenfield University, Nigeria
216. Greenpeace Africa
217. Groupe des Bâtisseurs du Congo
218. Gulabtahir Ltd, Afghanistan
219. Guyana Revenue Authority
220. Hadula Charity Foundation, Namibia
221. Hawasa university
222. Healhomecare Advocacy Foundation
223. Health For All Mali
224. HealthTech Liberia
225. Heartland alliance
226. Heavenly Culture, World Peace, Restoration of Light (HWPL)
227. Help The Future- HTF
228. Helvetas Pakistan
229. Helwan University, Egypt
230. Hongkong and Shanghai Banking Corporation Limited (HSBC)
231. Hope for humanity, Malawi
232. Horus University
233. Huhtamaki Flexible Packaging Egypt LLC.
234. Human Empress, Congo
235. Human rights council of Pakistan
236. Inclusive Bangladesh
237. Indigenous Livelihood Innovation Organization Team (ILIOT)
238. Indigenous Women and Girls Initiative
239. Inhalation of Hope Organisation
240. Inspiring Generations and Humanity Support Foundation Africa, Lesotho
241. Institut des sciences halieutiques de l'Université de Douala à Yabassi
242. Institut Géographique du Burundi
243. Institute for Legal Studies and Research
244. Institute of Electrical and Electronics Engineers (IEEE) Young Professionals
245. Institute of foreign Affaors of Ethiopia
246. Institute of Water and Energy Sciences including Climate change (PAUWES)
247. International Business & Technical Consultants, Inc. (IBTCI)
248. International Fund for Agricultural Development
249. International Human Right Ghana
250. International Movement of Catholic Students (IMCS) Pax Romana
251. Isisa Foundation
252. Ismail Mire Foundation
253. Janjanbureh Area Council, The Gambia
254. Jesuit Refugee Service
255. Jeunes Engagés pour la Réalisation des Objectifs de Développement Durable (JERODD)
256. Jigawa state youth consultative forum
257. Jigawa state youth consultative forum, Nigeria
258. jigawa youth consultative forum
259. Jomo Kenyatta University Of Agriculture And Technology
260. Justice in Motion
261. Justice Pacific
262. Kabale University
263. Kaduna State University
264. Kafr El-Sheikh
265. Kaliye Development Institute
266. Kamuzu University of Health Sciences
267. Kano State Primary Health Care Management Board
268. Kano State Youth Champion Initiative
269. Karakorum international university gilgit
270. Kenya Climate Innovation Center
271. Kenya Extended Producer Responsibility Organization (KEPRO)
272. Kenya Red Cross Society
273. Khalifa University
274. Kimota Science College
275. Kishoka organisation
276. Koya University
277. Kyambogo University
278. Kyebambe Girls Secondary School
279. Kyrgyz National Agrarian University
280. La Voix des Jeunes pour le Développement Durable, Gabon
281. Lagos State University
282. Local Conference of Youth (LCOY) Lesotho
283. League of Arab states
284. Liberian Youth for Climate Actions (LYCA)
285. Life Fingerprint, DR Congo

286. Life Fingerprint ONG, Goma/DRC
287. Light For Nature
288. Ligue nationale des Associations Autochtones Pygmées du Congo (LINAPYCO)
289. Lilayi FM Radio, Zambia
290. Lone Wolf Energy Ltd Nigeria
291. Maasai Community Empowerment Program
292. Maasai mara University
293. Maat Foundation for Peace, Development and Human Rights
294. Mai foundation
295. Makerere University
296. Malaria Research and Training Centre, (MRTC-Mali)
297. Mali-Folkecenter Nyetaa
298. Mané Nanque Piscicultura, Guinea
299. Mansoura University
300. Mansoura University, Egypt
301. Marktech Medicals
302. Masinde Muliro University of Science and Technology
303. Matavale Womens Association
304. Mayors Migration Council
305. Mbuya Community Development Network, Uganda
306. Media and Youth Adaptation Hub
307. Menofia university
308. Mercedes Benz Iraq
309. Mese Energy Solution, Gambia
310. Midwestern Region Anti-Corruption Coalition, Uganda
311. Miklahlife, Uganda
312. Million Trees International Organisation
313. Mindric Pharmaceuticals Limited
314. Ministère des droits de l'homme, de la formation à la citoyenneté et des relations avec les institutions de la République du Togo
315. Ministry of education, Zambia
316. Ministry of Environment Forest and Climate Change, India
317. Ministry of Environment, Kiribati
318. Ministry of Finance, Afghanistan
319. Ministry of Fisheries and blue economy, Somalia
320. Ministry of Foreign and Diaspora Affairs, Kenya
321. Ministry of Health, Zambia
322. Ministry of Mining Blue Economic and Maritime Affairs, Kenya
323. Ministry of Water and Environment, Uganda
324. MNS University of Agriculture, Multan
325. Moh food security foundation
326. Move Northern Kenya
327. Munyonyo youths
328. Mutual Generation International
329. Nanjing Agricultural University, China
330. National Agency for the great green wall
331. National Disaster Management Authority
332. National Obstetric Fistula Centre Katsina
333. National Research Centre, Egypt
334. National university of modern language NUML
335. National Youth & Student Leaders Forum, Kenya
336. National Youth Committee for Climate Change & the SDGs
337. National Youths Parliament of Liberia
338. Nature Target Initiative Forum, Kenya
339. NEEMA self help group
340. Nepalese Youth For Climate Action
341. Network of Reintegration and Irregular Migration Data
342. Network of youth organizations engaged in climate change, biodiversity conservation, wetlands and forests in the DRC.
343. Next Generation Global Connect, Bangladesh
344. Nigerian Institute for Trypanosomiasis Research
345. Nigerian Tulip International Foundation
346. NIgerian Youth Parliament
347. Nile University Nigeria
348. NoBrainerData
349. North American Climate, Conservation and Environment(NACCE)
350. North East Youth Initiative for Development (NEYIF)
351. Northern Resilience Development Organization
352. Norwegian Afghanistan Committee (NAC)
353. Notre climat notre futur, Senegal
354. Nutriguard
355. Oneness Sierra Leone

356. ONG Jeunes Verts Togo
357. ONG Jeunesse Action Et Leadership
358. ONG Les Amis du Bassin du Congo
359. ONG Sahkal, Chad
360. Ong'udi Farm Products Limited
361. Organisation de Développement des Recherches Agricole et la Protection de la Nature
362. Organisation des Jeunes pour l'Eau et les Changements Climatiques
363. Oromia Agricultural Research Institute
364. Oromia Agricultural Research Institute, Ethiopia
365. Outcast activism forum Uganda
366. Pakistan Health Parliament
367. Pakistan Red Crescent Society (PRCS) Merged Area
368. Pamukkale University, Turkiye
369. Pan African University
370. Papua New Guinea University of Natural Resources and Environment
371. Pavifort construction
372. People for Peace and Defence of Rights (PPDR)
373. People's Planet Society
374. Peoples Federation for National Peace and Development (PEFENAP)
375. Phoenix Children Foundation
376. Pillar for Active Vulnerable Women (PIFEVA)
377. Posséder son Entourage par les Actions ctions (PEA-ONG), Benin
378. Postal Corporation of Kenya
379. Poverty Nexus for National Development Agency, Sierra Leone
380. Project Advosafe Initiative
381. Protecting Animals in Kurdistan Organization
382. Puder de Bentana
383. Quality Techno Certification
384. Rafset Togo
385. Rawalpindi Women University
386. Real Estate Domain (RED), Egypt
387. Red Cross Society
388. Reformed Church University
389. Refugee Talent Group
390. Regional Centre for Mapping of Resources for Development
391. Religious Youth Organization Network, Sierra Leone
392. Renew Watts Technologies, Nigeria
393. Réseau Africain pour le Maintien de la Paix, Benin
394. Réseau des Jeunes Entrepreneurs de Guinée (REJEG) and Centre Agri INNOV SARL
395. Réseau des jeunes femmes leaders des partis politiques et des organisations de la société civile (REJEFPO-Mali)
396. Réseau pour la Promotion de l'Education Environnementale au Burundi; RPEEBU
397. Resource Conflict Institute, Kenya
398. Resource link foundation Ghana
399. Rise up movement Chad
400. Rise Up Movement Congo
401. Royal Green World
402. Royal Knights Organization
403. Rural Development Inter-dicosecan Service (RDIS)
404. Rural Youth Empowerment Network (RYEN)
405. Rwanerela(Inerela)
406. Rwenzori Youth Development Foundation
407. Sada Al shabab
408. Sageco Evergreen Company Limited, Uganda
409. Sakha Food Banking Initiative
410. Sam Artwork, Kenya
411. Sant'Egidio Uganda
412. Social Accountability Transformation Initiative (SATI) Organization
413. Savannah Zambia
414. Save My World
415. Sustainable Development Goals (SDGs) Brigade
416. Secure Livelihood Women Forum, Kenya
417. Senzakahle Youth Development
418. Shimba She Rise
419. Shrubhub, Egypt
420. Sidi mohamed ben abdellah university
421. Simba Ghana
422. Sindh Environmental Protection Agency, Government of sindh, Pakistan
423. Society for Human and Environmental Development (SHED)
424. Society for People's Agro-environmental

Sustainable Development Action
425. Sohag Egypt
426. Solidarité National Pour Le Developpement (SONADE)
427. Somali Environmental Development Organization (SEDO)
428. Somali Maritime Admistration
429. Somali National University
430. South valley university
431. South West State of Commission for Refugees & IDPs in Somalia
432. Southern Africa Youth Forum (SAYoF)
433. Southwest somali association of Social Work
434. SouthWest State Commission For Refugees & Idps (SWSCRI)
435. St Marks High School
436. Stanza Bopape Development Center
437. Statice health Bu Branch, Pakistan
438. Student For Liberty
439. Students Anti-Violence Movement Sierra Leone
440. Students For Liberty (SFL), Mali
441. Suez University
442. Suez Canal University
443. Sustainable Development Solutions Network (SDSN) Youth Network, Kenya
444. Sustainable Ocean Alliance Tanzania
445. Tamich Plantation Investment
446. TaNiskala, Indonesia
447. Tanta University, Egypt
448. Tata Institute institute of Social Sciences
449. Teach For Cambodia
450. Technical University of Kenya
451. Techno Essence Solutions Pvt. Ltd, India
452. Tejkhali Chhatra Kalyan Sangha
453. The Chisholm Legacy Project
454. The Egyptian Physics Network
455. The Embassy of the Republic of Kenya in Spain
456. The Goodwill society
457. The Handshake Initiative
458. The Meteorological Office
459. The Model Foundation, Sudan
460. The National Council of Women
461. The People's Matrix Association, Lesotho
462. The power girls foundation
463. The Smart school, Allama Iqbal Campus Gojra
464. The Stephen Akintayo Foundation
465. The Technical University of Kenya
466. The University of Fiji
467. The University of Kinshasa
468. The Youth Climate Action Coalition - Mozambique (YCAC-MOZ)
469. Tour de force
470. Tourism Professional Association
471. Tree Adoption Uganda
472. Tuhifadhi Mchanga Initiative
473. Twiza Movement Association
474. Ubuchange
475. Ubuntu lab For Transformative Leadership
476. Uganda Meteorological Department
477. Unitec Institute of Technology
478. United Arab Emirates University
479. Universal Greening Organization
480. Université de Parakou
481. University for Development and Studies
482. University of Abomey Calavi in Benin
483. University of Burundi
484. University Of Canterbury
485. University of Cape Coast
486. University of Dar es salaam
487. University of Energy and Natural Resources, Ghana
488. University of Jordan
489. University of Kerala
490. University of Khartoum
491. University of Malawi
492. University of Nairobi
493. University of Natural Resources and Environment, Papua New Guinea
494. University of Rwanda
495. University of Rwanda
496. University of Sulaymaniyah
497. University of Sunshine Coast (UNISC) International
498. University of Tripoli
499. University of Zimbabwe
500. Up with community

501. Upper Mazaruni District Council
502. Urban Farm Technology
503. Urban Answers
504. Usmanu Danfodiyo University Sokoto, Nigeria
505. Value Female Network, Nigeria
506. Visionafric
507. Visionary Voices Empowerment
508. Wachakal youth development forum
509. Wajir One youth Association (WOYA)
510. Watech Network Solutions Ltd, Kenya
511. Water Across Southern Africa Development Community
512. Water Resources Management Authority
513. We Got Your Back NGO, Rwanda
514. West Africa Youth and Children's Advocacy Network
515. Woldia University
516. Wollega University
517. Women In Mining Sénégal
518. Women of Tomorrow Development Organization Uganda
519. Worlds Youth for Climate Justice
520. YandyTech Community
521. Yobe State University
522. Young African Leaders Initiative (YALI) Burkina Faso Chapter
523. Young Ecolo
524. Young Professionals for Agriculture Development
525. Young Women Leaders Connect, Kenya
526. Young Women's Christian Association, Kenya
527. Youth Action for Climate Change Organization, South Sudan
528. Youth Alliance for Climate and Health (YACH)
529. Youth Awareness and Development Organization (YADO)
530. Youth Care Network, Cameroon
531. Youth Chamber, Sierra Leone
532. Youth Empowerment Advocacy Network, Sierra Leone
533. Youth empowerment program, Afghanistan
534. Youth Enabled Zambia
535. Youth for Children, Kenya
536. Youth for Climate Morocco
537. Youth for Green Action Kenya
538. Youth for Sustainability Alliance Timor-Leste
539. Youth Forum for National Transformation (YOFONAT)
540. Youth in Natural Resources and Environmental Governance
541. Youth Initiative Actions for Sustainable Development Sierra Leone
542. Youth Network for Sustainable Development (YNSD Ethiopia)
543. YouthNet, Bangladesh
544. Youths in Action for Climate Change
545. Zanzibar health and environmental education
546. Zimbabwe Young Ambassadors
547. Zomi Environmental Organization

Glossary

Note: Most definitions in this glossary are taken from IPCC AR6 in Working Groups I and II (see IPCC 2022: Annex II: Glossary[105])

2030 Agenda for Sustainable Development: A UN resolution in September 2015 adopting a plan of action for people, planet and prosperity in a new global development framework anchored in 17 Sustainable Development Goals.

Adaptation: Process of adjustment to actual or expected climate change and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate change and its effects.

Adaptive capacity: Ability of systems, institutions, humans, and other organisms to adjust to potential damage, take advantage of opportunities, and respond to consequences of climate change impacts.

Administrative unit (level one): First-level administrative units or divisions are one level below the national level. The size and nomenclature for these units differ by country.

Biodiversity: Variety of plant and animal life in the world or in a particular habitat or ecosystem.

Biome: Large naturally occurring community of flora and fauna occupying a major habitat (for example, forest or savannah).

Capacity building: The practice of enhancing the strengths and attributes of, and resources available to, an individual, community, society or organisation to respond to change.

Cartagena Declaration on Refugees (1984): The Cartagena Declaration on Refugees, adopted in 1984 in Cartagena de Indias, Colombia, broadened the definition of 'refugee' established by the 1951 Convention on the Status of Refugees and the 1967 Protocol, to include people impacted by generalized violence, foreign aggression, internal conflicts, human rights violations, and other circumstances that seriously disturb public order. Fourteen countries in Latin America have since incorporated this definition into their national laws and policies.

Climate: In a narrow sense, climate is usually defined as the average weather -or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities- over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization (WMO).

Climate change: A change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity.

Climate displaced persons: In this report, the term "climate displaced persons" refers to people who are moving and projected to move due to climate change impacts in the region, whether within countries or across borders. While recognizing that people have different degrees of choice and agency in decisions to move, this terminology was chosen to reflect the findings of the GCCMI field research in which people across the region described the experience of having to permanently move away from their place of home as a forced uprooting rather than a voluntary decision. Thus, while the GCCMI model assumes that people make informed decisions about when and where to

move, climate impacts act as a forcing factor, imposing the need to make these kinds of decisions and constraining people's mobility options as well as their ability to return.

Climate finance: There is no agreed definition of climate finance. The term climate finance is applied to the financial resources devoted to addressing climate change by all public and private actors from global to local scales, including international financial flows to developing countries to assist them in addressing climate change. Climate finance aims to reduce net greenhouse gas emissions and/or to enhance adaptation and increase resilience to the impacts of current and projected climate change. Finance can come from private and public sources, channelled by various intermediaries, and is delivered by a range of instruments, including grants, concessional and non-concessional debt, and internal budget reallocations.

Climate hazard: A climate hazard is a climate condition with the potential to harm natural systems or society. Examples include heatwaves, droughts, heavy snowfall events and sea-level rise.

Climate information: Information about the past, current or future state of the climate system that is relevant for mitigation, adaptation and risk management. It may be tailored or 'co-produced' for specific contexts, taking into account users' needs and values.

Climate in-migration: In the Greater Caribbean Climate Mobility model, in-migration represents the additional number of people that move into a grid cell (5km x 5km area), administrative unit (level one), country or specific zone (such as the coastal zone or rural areas), under a climate change scenario compared to a 'no climate change' scenario (warming levels are held constant at 2010 conditions). In-migration can be local (moves within an admin unit (level one) area such as provinces or states), national (moves between admin units within a country), or international (cross-border moves to a new country). If expressed by country, the number of climate in-migrants represents the sum of in-migrants for all grid cells within a country. Numbers are always represented as positive and can either be expressed as totals (gross numbers) or as a percentage of the population.

Climate immobility: In the Greater Caribbean Climate Mobility model, climate immobility occurs when a climate change scenario projects fewer people leaving from a grid cell (5km x 5km area), administrative unit (level one), country or zone, under a 'no climate change' scenario (reference in the model is RCP0.0). The model assumes that, when climate damages to wages in potential destinations are higher than migration costs, migration to such places becomes less attractive and people are deterred from leaving their homes, or become immobile. Thus, climate immobility captures the number of people who are compelled to stay in place due to climate impacts on potential destinations, and who would have moved in a world without climate change. If expressed by country, the number of immobile people represents the sum for all grid cells within a country. Numbers are always represented as positive and can either be expressed as totals (gross numbers) or as a percentage of the population.

Climate literacy: Climate literacy encompasses being aware of climate change, its anthropogenic causes and implications.

Climate mobility: The movement of people that is motivated by the adverse effects of sudden- and slow-onset climate impacts. Climate mobility occurs both within and across national borders and involves different levels of constraints, agency, and vulnerability, encompassing forced displacement, migration, and planned relocation. Climate mobility occurs over different distances and can be temporary, recurrent, or permanent.

Climate model: A qualitative or quantitative representation of the climate system based on the physical, chemical and biological properties of its components, their interactions and feedback processes and accounting for some of its known properties.

Climate net mobility: In the Greater Caribbean Climate Mobility model, climate net mobility represents the net effects of climate change on the population of a subnational region, country or specific zone. In effect, it is the difference between people arriving and people leaving (climate in-migration vs. climate out-migration) in a climate vs. no climate scenario. Positive values indicate that a country is projected to gain population under a climate change scenario compared to a scenario that would hold the climate to its 2010 conditions, while negative values indicate that a country is projected to lose population. Numbers can either be expressed as totals (gross numbers) or as a percentage of the population.

Climate out-migration: In the Greater Caribbean Climate Mobility model, climate out-migration represents the additional number of people that move out of a grid cell (5km x 5km area), administrative unit (level one), country or specific zone (such as the coastal zone or rural areas), that results specifically from a climate change scenario (compared to a scenario that would hold the climate constant to its 2010 condition). Out-migration can be local (moves within an admin unit (level one) area such as provinces or states), national (moves between admin units within a country), or international (cross-border moves to a new country). If expressed by country, the number of climate out-migrants represents the sum of out-migrants for all grid cells within a country. Numbers are always represented as positive and can either be expressed as totals (gross numbers) or as a percentage of the population.

Climate projection: Simulated response of the climate system to a scenario of future emissions or concentrations of greenhouse gases (GHGs) and aerosols and changes in land use, generally derived using climate models. Climate projections depend on an emission/concentration/radiative forcing scenario, which is in turn based on assumptions concerning, for example, future socioeconomic and technological developments that may or may not be realised.

Climate risk: Potential for consequences from climate variability and change where something of value is at stake and the outcome is uncertain. Often represented as the probability that a hazardous event or trend occurs multiplied by the expected impact. Risk results from the interaction of vulnerability, exposure, and hazard, as well as responses to climate change failing to achieve their goals.

Climate services: Climate services involve the provision of climate information in such a way as to assist decision-making. The service includes appropriate engagement from users and providers, is based on scientifically credible information and expertise, has an effective access mechanism and responds to user needs.

Climate variability: Deviations of some climate variables from a given mean state (including the occurrence of extremes, etc.) at all spatial and temporal scales beyond that of individual weather events. Variability may be intrinsic, due to fluctuations of processes internal to the climate system (internal variability), or extrinsic, due to variations in natural or anthropogenic external forcing (forced variability).

Climate-resilient development: In line with the IPCC, climate resilient development refers to the process of implementing greenhouse gas mitigation and adaptation measures to support sustainable development for all.

Coastal erosion: Erosion of coastal landforms that results from wave action, exacerbated by storm surge and sea-level rise.

Coastal zone: In this report, the coastal zone is land area within 50 kilometres of the coastline.

Computable General Equilibrium Model (CGE): The Greater Caribbean Climate Mobility model is a CGE model of the global economy. CGE models use economic data to simulate how economies might react to changes in policy or other external shocks, such as climate hazards.

Coping: The use of available skills, resources and opportunities to address, manage and overcome adverse conditions, with the aim of achieving basic functioning of people, institutions, organisations and systems in the short to medium term.

Coping capacity: The ability of people, institutions, organisations and systems, using available skills, values, beliefs, resources and opportunities, to address, manage and overcome adverse conditions in the short to medium term.

Crop productivity: The crop sector model outputs in this report represent crop yield in tons per hectare on an annual time step.

Cultural impacts: Impacts on material and ecological aspects of culture and the lived experience of culture, including dimensions such as identity, community cohesion and belonging, sense of place, worldview, values, perceptions and tradition. Cultural impacts are closely related to ecological impacts, especially for iconic and representational dimensions of species and landscapes. Culture and cultural practices frame the importance and value of the impacts of change, shape the feasibility and acceptability of adaptation options, and provide the skills and practices that enable adaptation.

Disaster: A 'serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts'.

Disaster management: Social processes for designing, implementing and evaluating strategies, policies and measures that promote and improve disaster preparedness, response and recovery practices at different organisational and societal levels.

Disaster risk: The likelihood over a specified time period of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

Displacement: The movement of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalised violence, violations of human rights or natural or human-made disasters.

Early warning systems (EWS): The set of technical and institutional capacities to forecast, predict and communicate timely and meaningful warning information to enable individuals, communities, managed ecosystems and organisations threatened by a hazard to prepare to act promptly and appropriately

to reduce the possibility of harm or loss. Dependent upon context, EWS may draw upon scientific and/or indigenous knowledge, and other knowledge types.

Ecosystem: A functional unit consisting of living organisms, their non-living environment and the interactions within and between them.

Ecosystem-based adaptation (EBA): The use of ecosystem management activities to increase the resilience and reduce the vulnerability of people and ecosystems to climate change.

Emissions (Anthropogenic): Emissions of greenhouse gases (GHGs), precursors of GHGs and aerosols caused by human activities. These activities include the burning of fossil fuels, deforestation, land use and land-use changes, livestock production, fertilisation, waste management and industrial processes.

Emissions (Fossil-fuel): Emissions of greenhouse gases (in particular, carbon dioxide), other trace gases and aerosols resulting from the combustion of fuels from fossil carbon deposits such as oil, gas and coal.

Emission scenario: A plausible representation of the future development of emissions of substances that are radiatively active (e.g., greenhouse gases (GHGs) or aerosols) based on a coherent and internally consistent set of assumptions about driving forces (such as demographic and socioeconomic development, technological change, energy and land use) and their key relationships.

Equality: A principle that ascribes equal worth to all human beings, including equal opportunities, rights and obligations, irrespective of origins.

Escazú Agreement (2018): The Escazú Agreement is known as the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean. It is the world's first agreement on protections for human rights defenders in the context of environmental issues ("environmental defenders") and the first environmental treaty in the LAC region.

Exposure: The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected.

Extreme weather event: Event that is rare at a particular place and time of year. Definitions of rare vary, but an extreme weather event would normally fall in the 10th or 90th percentile of a probability density function estimated from observations. The characteristics of extreme weather vary from place to place in an absolute sense. When a pattern of extreme weather persists for some time, such as a season, it may be classified as an extreme climate event, especially if it yields an average or total that is itself extreme (for example, drought or heavy rainfall over a season).

Extreme sea-level (ESL): The occurrence of an exceptionally low or high local sea surface height, arising from (a combination of) short-term phenomena (e.g., storm surges, tides and waves). Relative sea level changes affect extreme sea levels directly by shifting the mean water levels and indirectly by modulating the propagation of tides, waves and/or surges due to increased water depth. In addition, extreme sea levels can be influenced by changes in the frequency, tracks or strength of weather systems and storms, or due to anthropogenically induced changes such as the modification of coastlines or dredging. In turn, changes in any or all of the contributions to extreme

sea levels may lead to long-term relative sea level changes. Alternate expressions for ESL may be used depending on the processes resolved.

Facilitated migration: Regular migration that has been encouraged or supported by State policies and practices or by the direct assistance of international organisations to make the act of migration and residence easier, more transparent and more convenient.

Food security: A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilisation and stability.

Forced migration: A migratory movement which, although the drivers can be diverse, involves force, compulsion, or coercion.

Fossil fuels: Carbon-based fuels from fossil hydrocarbon deposits, including coal, oil and natural gas.

Gender: The socially constructed roles and relationships, personality traits, attitudes, behaviours, values, relative power and influence that society ascribes to males and females on a differential basis. Gender is relational and refers not simply to women or men, but to the relationship between them.

Global warming: Global warming refers to the increase in global surface temperature relative to a baseline reference period, averaging over a period sufficient to remove interannual variations (e.g., 20 or 30 years). A common choice for the baseline is 1850–1900 (the earliest period of reliable observations with sufficient geographic coverage), with more modern baselines used depending upon the application.

Governance: The structures, processes and actions through which private and public actors interact to address societal goals. This includes formal and informal institutions and the associated norms, rules, laws and procedures for deciding, managing, implementing and monitoring policies and measures at any geographic or political scale, from global to local.

Governance capacity: The ability of governance institutions, leaders and non-state and civil society to plan, coordinate, fund, implement, evaluate and adjust policies and measures over the short, medium and long term, adjusting for uncertainty, rapid change and wide-ranging impacts and multiple actors and demands.

Greenhouse gases (GHG): Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of radiation emitted by the Earth's ocean and land surface, by the atmosphere itself and by clouds. This property causes the greenhouse effect. Water vapour (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4) and ozone (O3) are the primary GHGs in the Earth's atmosphere. Human-made GHGs include sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs) and perfluorocarbons (PFCs); several of these are also O3-depleting (and are regulated under the Montreal Protocol).

Hazard: The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.

Heat stress: A range of conditions in, for example, terrestrial or aquatic organisms when the body absorbs excess heat during overexposure to high air or water temperatures or thermal radiation. In aquatic water-

breathing animals, hypoxia and acidification can exacerbate vulnerability to heat.

Heatwave: A period of abnormally hot weather, often defined with reference to a relative temperature threshold, lasting from two days to months. Heatwaves and warm spells have various and, in some cases, overlapping definitions.

Human mobility: An umbrella term covering all forms of movements of persons, including temporary or long-term, short- or long-distance, internal or international, voluntary or forced, and seasonal or permanent, as well as planned relocation.

Human rights: Rights that are inherent to all human beings, universal, inalienable and indivisible, typically expressed and guaranteed by law. They include the right to life, economic, social and cultural rights, and the right to development and self-determination.

Human security: A condition that is met when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity. In the context of climate change, the vital core of human lives includes the universal and culturally specific, material and non-material elements necessary for people to act on behalf of their interests and to live with dignity.

Immobility: Inability to move or choice not to move away from a place of risk.

Impacts: The consequences of realised risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather/climate events), exposure, and vulnerability. Impacts generally refer to effects on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services) and infrastructure. Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial.

Indigenous knowledge: The understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For many indigenous peoples, IK informs decision-making about fundamental aspects of life, from day-to-day activities to longer-term actions. This knowledge is integral to cultural complexes, which also encompass language, systems of classification, resource use practices, social interactions, values, ritual and spirituality. These distinctive ways of knowing are important facets of the world's cultural diversity.

Inequality: Uneven opportunities and social positions, and processes of discrimination within a group or society, based on gender, class, ethnicity, age and (dis) ability, often produced by uneven development. Income inequality refers to gaps between the highest and lowest income earners within a country and between countries.

Informal settlement: A term given to settlements or residential areas that, by at least one criterion, fall outside official rules and regulations. Most informal settlements have poor housing (with widespread use of temporary materials) and are developed on land that is occupied illegally with high levels of overcrowding. In most such settlements, provision for safe water, sanitation, drainage, paved roads and basic services is inadequate or lacking. The term 'slum' is often used for informal settlements, although it is misleading as many informal settlements develop into good-quality residential areas, especially where governments support such development.

Internal migration: The movement of people within a

State involving the establishment of a new temporary or permanent residence.

Internally displaced persons: Persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalised violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognised state border.

International migration: The movement of persons away from their place of usual residence and across an international border to a country of which they are not nationals.

Land degradation: The deterioration or decline of the biological or economic productive capacity of the land.

Landscape approach: A framework that advances multiple land uses and management to ensure equitable and sustainable use of land.

Loss and Damage, and losses and damages: Loss and Damage (capitalised letters) to refer to political debate under the United Nations Framework Convention on Climate Change (UNFCCC) following the establishment of the Warsaw Mechanism on Loss and Damage in 2013, which is to 'address loss and damage associated with impacts of climate change, including extreme events and slow onset events, in developing countries that are particularly vulnerable to the adverse effects of climate change.' Lowercase letters (losses and damages) have been taken to refer broadly to harm from (observed) impacts and (projected) risks and can be economic or non-economic.

Maladaptive actions (Maladaptation): Actions that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas (GHG) emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future. Most often, maladaptation is an unintended consequence.

Migrant: Any person who is moving or has moved across an international border or within a state away from his/her habitual place of residence, regardless of (1) the person's legal status, (2) whether the movement is voluntary or involuntary, (3) what the causes for the movement are and (4) what the length of the stay is.

Migration: The movement of persons away from their place of usual residence, either across an international border or within a State.

Migration cycle: Stages of the migration process encompassing departure from, and in some cases transit through one or more cities or States, settlement in a place or State of destination and return.

Migration governance: The combined frameworks of legal norms, laws and regulations, policies and traditions as well as organisational structures (subnational, national, regional and international) and the relevant processes that shape and regulate States' approaches with regard to migration in all its forms, addressing rights and responsibilities and promoting international cooperation.

Mitigation (of climate change): Human intervention to reduce the sources or enhance the sinks of greenhouse gases.

Nationally Determined Contributions: The non-binding national plans by each country to reduce national greenhouse gas emissions and adapt to the impacts of climate change enshrined in the Paris Agreement.

Planned relocation: In the context of disasters or

environmental degradation, including when due to the effects of climate change, a planned process in which persons or groups of persons move or are assisted to move away from their homes or place of temporary residence, are settled in a new location, and provided with the conditions for rebuilding their lives.

Place attachment: Place attachment is defined differently across disciplines but can be "broadly defined as the cognitive or emotional bonds formed between person and place."[106]

Poverty: A complex concept with several definitions stemming from different schools of thought. It can refer to material circumstances (such as need, pattern of deprivation or limited resources), economic conditions (such as standard of living, inequality or economic position) and/or social relationships (such as social class, dependency, exclusion, lack of basic security or lack of entitlement).

Poverty trap: Poverty trap is understood differently across disciplines. In the social sciences, the concept, primarily employed at the individual, household or community level, describes a situation in which escaping poverty becomes impossible due to unproductive or inflexible resources. A poverty trap can also be seen as a critical minimum asset threshold, below which families are unable to successfully educate their children, build up their productive assets and get out of poverty. Extreme poverty is itself a poverty trap since poor persons lack the means to participate meaningfully in society. In economics, the term poverty trap is often used at national scales, referring to a self-perpetuating condition where an economy, caught in a vicious cycle, suffers from persistent underdevelopment. Many proposed models of poverty traps are found in the literature.

Projection: A potential future evolution of a quantity or set of quantities, often computed with the aid of a model. Unlike predictions, projections are conditional on assumptions concerning, for example, future socio-economic and technological developments that may or may not be realised.

Protection: All activities aimed at obtaining full respect for the rights of the individual in accordance with the letter and the spirit of the relevant bodies of law (i.e. Human Rights law, International Humanitarian Law, Refugee law).

Protracted displacement: A situation in which refugees, internally displaced persons (IDPs) and/or other displaced persons have been unable to return to their habitual residence for three years or more, and where the process for finding durable solutions, such as repatriation, integration in host communities, settlement in third locations or other mobility opportunities, has stalled.

Rain-fed agriculture: Agricultural practice relying almost entirely on rainfall as its source of water.

Representative Concentration Pathway (RCP): The five RCP scenarios developed by the IPCC correspond to different mitigation futures. The RCPs represent the trajectory of greenhouse gas concentration resulting from human activity corresponding to a specific level of radiative forcing in 2100. The low greenhouse gas, concentration RCP2.6, middle greenhouse gas concentration RCP4.5, and high greenhouse gas concentration RCP7.0, employed in this report imply futures in which radiative forcing of 2.6, 4.5, and 7.0 watts per square meter, respectively, are achieved by the end of the century, leading to different levels of warming in the earth's atmosphere.

Resilience: Capacity of interconnected social,

economic, and environmental systems to cope with a hazardous event, trend, or disturbance by responding or reorganising in ways that maintain their essential function, identity, and structure while maintaining the capacity for adaptation, learning, and transformation.

Risk: The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change.

Risk perception: The subjective judgement that people make about the characteristics and severity of a risk.

Rural: There is no universally accepted or applied definition of rural. According to the IPCC, rural refers generally to areas of open country and small settlements but it is usually defined with reference to, and often considered inversely related to "urban." In the Greater Caribbean Climate Mobility model, rural areas are grid cells (5km by 5km areas) where the primary economic activity is in the primary sector, including agriculture and nature-based livelihoods.

Scenario: A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships. Note that scenarios are neither predictions nor forecasts, but are used to provide a view of the implications of developments and actions.

Sea-level rise: Increases in the height of the sea with respect to a specific point on land. Eustatic sea-level rise is an increase in global average sea-level brought about by an increase in the volume of the ocean as a result of the melting of land-based glaciers and ice sheets. Steric sea-level rise is an increase in the height of the sea induced by changes in water density as a result of the heating of the ocean. Density changes induced by temperature changes only are called thermosteric; density changes induced by salinity changes are called halosteric.

Settlements: Places of concentrated human habitation. Settlements can range from isolated rural villages to urban regions with significant global influence. They can include formally planned and informal or illegal habitation and related infrastructure.

Shared Socioeconomic Pathway (SSP): The IPCC considers the implications of future socioeconomic development on mitigation and adaptation through five SSPs. Each pathway represents different future socioeconomic assumptions that could present challenges to mitigation (greenhouse gas emissions reductions) and societal adaptation to climate change, such as population growth, land cover and use, consumption, trade, and inequality. This report uses SSP1 'Sustainability' pathway, SSP2 "Middle of the Road" pathway, and SSP3 'Inequitable growth' pathway. The SSPs can be coupled with RCPs (see "Representative Concentration Pathway").

Small Island Developing State (SIDS): Small Island Developing States (SIDS) are a distinct group of 39 States and 18 Associate Members of United Nations regional commissions that face unique social, economic and environmental vulnerabilities. The Greater Caribbean hosts 29 SIDS.

Social inclusion: The process of improving the terms of participation in society, particularly for people who are disadvantaged, through enhancing opportunities, access to resources and respect for rights.

Social protection: In the context of development aid

and climate policy, social protection usually describes public and private initiatives that provide income or consumption transfers to the poor, protect the vulnerable against livelihood risks and enhance the social status and rights of the marginalised, with the overall objective of reducing the economic and social vulnerability of poor, vulnerable and marginalised groups. In other contexts, social protection may be used synonymously with social policy and can be described as all public and private initiatives that provide access to services, such as health, education or housing, or income and consumption transfers to people. Social protection policies protect the poor and vulnerable against livelihood risks and enhance the social status and rights of the marginalised, as well as prevent vulnerable people from falling into poverty.

Slow-onset climate change: Changes in climate parameters—such as temperature, precipitation, and associated impacts, such as water availability and crop productivity changes—that occur over long periods of time (in contrast to sudden-onset events, such as cyclones and floods, which take place in days or weeks).

Storm surge: The rise in seawater level during a storm, measured according to the height of the water above the normal predicted astronomical tide.

Sudden-onset event: Events such as cyclones and floods which take place in days or weeks (in contrast to slow-onset climate change that occurs over long periods of time).

Sustainable Development Goals (SDGs): The 17 global goals for development for all countries established by the United Nations through a participatory process and elaborated in the 2030 Agenda for Sustainable Development, including ending poverty and hunger; ensuring health and well-being, education, gender equality, clean water and energy, and decent work; building and ensuring resilient and sustainable infrastructure, cities and consumption; reducing inequalities; protecting land and water ecosystems; promoting peace, justice and partnerships; and taking urgent action on climate change.

Sustainable livelihood: Livelihood that endures over time and is resilient to the impacts of various types of shocks including climatic and economic.

Sustainability: Involves ensuring the persistence of natural and human systems, implying the continuous functioning of ecosystems, the conservation of high biodiversity, the recycling of natural resources and, in the human sector, successful application of justice and equity.

Trapped populations: People unable to move away from locations in which they are extremely vulnerable to environmental shocks and impacts.

Tropical cyclone: The general term for a strong, cyclonic-scale disturbance that originates over tropical oceans. Distinguished from weaker systems (often named tropical disturbances or depressions) by exceeding a threshold wind speed.

United Nations Framework Convention on Climate Change (UNFCCC): The UNFCCC was adopted in May 1992 and opened for signature at the 1992 Earth Summit in Rio de Janeiro. It entered into force in March 1994 and as of May 2018 had 197 Parties (196 States and the European Union). The Convention's ultimate objective is the 'stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'. The provisions of the Convention are pursued and implemented by two treaties: the Kyoto Protocol and the Paris Agreement.

Urban: The categorisation of areas as 'urban' by

government statistical departments is generally based either on population size, population density, economic base, provision of services, or some combination of the above. Urban systems are networks and nodes of intensive interaction and exchange including capital, culture, and material objects. Urban areas exist on a continuum with rural areas and tend to exhibit higher levels of complexity, higher populations and population density, intensity of capital investment, and a preponderance of secondary (processing) and tertiary (service) sector industries. The extent and intensity of these features varies significantly within and between urban areas. Urban places and systems are open, with much movement and exchange between more rural areas as well as other urban regions. In the Greater Caribbean Climate Mobility model, urban areas are defined by grid cells (5km x 5km areas) where the primary economic activity is in the tertiary (service) sector.

Urbanisation: Urbanisation is a multi-dimensional process that involves at least three simultaneous changes: (1) land-use change: transformation of formerly rural settlements or natural land into urban settlements, (2) demographic change: a shift in the spatial distribution of a population from rural to urban areas and (3) infrastructure change: an increase in provision of infrastructure services including electricity, sanitation, etc. Urbanisation often includes changes in lifestyle, culture and behaviour, and thus alters the demographic, economic and social structure of both urban and rural areas.

Vulnerability: Propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Wellbeing: A state of existence that fulfils various human needs, including material living conditions and quality of life, as well as the ability to pursue one's goals, to thrive and to feel satisfied with one's life. Ecosystem well-being refers to the ability of ecosystems to maintain their diversity and quality.

References

1. Clement, Viviane; Rigaud, Kanta Kumari; de Sherbinin, Alex; Jones, Bryan; Adamo, Susana; Schewe, Jacob; Sadiq, Nian; Shabahat, Elham (2021). Groundswell Part 2: Acting on Internal Climate Migration. World Bank, Washington, DC. http://hdl.handle.net/10986/36248

2. Ruiz Soto, A.R., Bottone, R., Waters, J., Williams, S., Louie, A. and Wang, Y., (2021). Charting a New Regional Course of Action: The Complex Motivations and Costs of Central American Migration. Migration Policy Institute.

3. Ginetti J. (2015). Disaster-related Displacement Risk: Measuring the Risk and Addressing its Drivers. Internal Displacement Monitoring Centre, Norwegian Refugee Council.

4. Vezzoli, S. (2015). Borders, independence and post-colonial ties: the role of the state in Caribbean migration. [Doctoral Thesis, Maastricht University]. Boekenplan. https://doi.org/10.26481/dis.20151120sv

5. Dominguez-Mujica, J., de L fera, D. L., Ortega-Rivera, E., & Perez-Carames, A. (2020). Latin America Spain migratory system: Has the economic crisis been a parenthesis? Cuadernos Geográficos, 59(3), 37- 57. doi:10.30827/cuadgeo.v59i3.9223

6. Thomas, A. & L. Benjamin (2017). Management of loss and damage in small island developing states: implications for a 1.5°C or warmer world. Regional Environmental Change, 1–10.

7. Abel, G. & E. Cohen, J. (2019). Bilateral international migration flow estimates for 200 countries (1990- 1995 to 2015-2020). figshare. Dataset. https://doi.org/10.6084/m9.figshare.7731233.v5

8. Garcia-Guerrero, V. M., Masferrer, C., & Giorguli-Saucedo, S. E. (2019). Future Changes in Age Structure and Different Migration Scenarios. The Case of North and Central America. Revista Latinoamericana de Población, 13(25), 36-53. doi:10.31406/relap2019.v13.i2.n25.2

9. Ruiz Soto et al. [2]

10. Ragozzino, M. R. (2023). "This Hell Was My Only Option:" Abuses Against Migrants and Asylum Seekers Pushed to Cross the Darién Gap. Human Rights Watch.

11. IOM (2023a). DTM Panamá — Monitoreo de Flujo de Población Migrante — Darién (Junio 2023). IOM, Panama. https://dtm.iom.int/reports/panama-monitoreo-de-flujo-de poblacion-migrante-darien-junio-2023?close=true

12. Seele, A. (2023). In a Dramatic Shift, the Americas Have Become a Leading Migration Destination. Migrationpolicy.Org. https://www.migrationpolicy.org/article/latin-america-caribbean-immigration-shift

13. Gandini, L., Rosas, V. P., & Lozano-Ascencio, F. (2020). New mobilities in Latin America: Venezuelan migration in crisis contexts and the regional responses. Cuadernos Geográficos, 59(3), 102-120. doi:10.30827/cuadgeo.v59i3.9294

14. R4V (2024). Refugees and Migrants from Venezuela. The Interagency Coordination Platform for Refugees and Migrants. https://www.r4v.info/es/refugiadosymigrantes

15. IOM (2023b). Trends in Caribbean migration and mobility.

16. ibid.

17. Lacarte, V., Amaral, J., Chaves-González, D., Sáiz, A., & Harris, J. (2023). Migration, Integration, and Diaspora Engagement in the Caribbean: A Policy Review. Washington, DC: Inter-American Development Bank and Migration Policy Institute. https://reliefweb.int/report/haiti/migration-integration-and-diaspora engagement-caribbean-policy-review

18. ibid.

19. Cashman, A., & Yawson, D. O. (2019). Water, Livelihoods, and Migration in SIDS: Climate change and future prospects for Carriacou, West Indies. Resources, 8(4), 174. https://doi.org/10.3390/resources8040174

20. Carte, L., Schmook, B., Radel, C., & Johnson, R. (2019). The Slow Displacement of Smallholder Farming Families: Land, Hunger, and Labor Migration in Nicaragua and Guatemala. Land, 8(6), 89. https://doi.org/10.3390/land8060089

21. Rodríguez-Vignoli, J., & Rowe, F. (2018). How is internal migration reshaping metropolitan populations in Latin America? A new method and new evidence. Population Studies, 72(2), 253–273. https://doi.org/10.1080/00324728.2017.1416155

22. ibid.

23. Milan, A. & Ruano, S. (2014). Rainfall variability, food insecurity and migration in Cabricán, Guatemala, Climate and Development, 6(1), 61-68, DOI:10.1080/17565529.2013.857589

24. Ranasinghe, R., A.C. Ruane, R. Vautard, N. Arnell, E. Coppola, F.A. Cruz, S. Dessai, A.S. Islam, M. Rahimi, D. Ruiz Carrascal, J. Sillmann, M.B. Sylla, C. Tebaldi, W. Wang, and R. Zaaboul, 2021: Climate Change Information for Regional Impact and for Risk Assessment. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1767–1926, doi: 10.1017/9781009157896.014.

25. Ginnetti J. [3}

26. IDMC (International Displacement Monitoring Centre). (2023). GRID 2023. Geneva: IDMC.

27. Thomas & Benjamin [6]

28. Piguet, E. & Laczko, F., (2014). People on the move in a changing climate : the regional impact of environmental change on migration. In Organización Internacional para las Migraciones (OIM-Misión Colombia) eBooks. https://ci.nii.ac.jp/ncid/BB14748642

29. Nawrotzki, R., Hunter, L. M., Runfola, D. M., & Riosmena, F. (2015). Climate change as a migration driver from rural and urban Mexico. Environmental Research Letters, 10(11), 1-9. doi:10.1088/174809326/10/11/114023

30. Feng, S., A.B. Krueger, and M. Oppenheimer. 2010. Linkages among Climate Change, Crop Yields and Mexico–US Cross-Border Migration. Proceedings of the National Academy of Sciences, 107 (32):14257– 62

31. Cashman & Yawson [19]

32. Rigaud, K. K., De Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., ... & Midgley, A. (2018). Groundswell: Preparing for internal climate migration. Washington DC: World Bank.

33. Cashman & Yawson [19]

34. ibid.

35. Bower, E. (2023). "The Sea is Eating the Land Below Our Homes." Human Rights Watch. https://www.hrw.org/report/2023/07/31/sea-eating-land-below-our-homes/indigenous-community-facing-lack-space-and-rising

36. Ministry of Housing and Urban Development (2024) Abbreviated Resettlement Action Plan (ARAP): East Coast Relocation Project. Accessed 27 November 2024. https://www.housing.gov.dm/nl/component/content/article/arap-east-coast-relocation-project

37. Lashley, J. G., & Warner, K. (2015). Evidence of demand for microinsurance for coping and adaptation to weather extremes in the Caribbean. Climatic Change, 133(1), 101–112. https://doi.org/10.1007/s10584- 013-0922-

38. Piguet, E. & Laczko, F. [28]

39. Paramaribo Strategic Flood Risk Assessment: Final Report (English). Washington, D.C.: World BankGroup. http://documents.worldbank.org/curated/en/463821538552629012/Paramaribo-Strategic-Flood-Risk-Assessment-Final-Report

40. Thomas, A., Baptiste, A. K., Martyr-Koller, R., Pringle, P., & Rhiney, K. (2020). Climate change and small island developing states. Annual Review of Environment and Resources, 45(1), 1–27. https://doi.org/10.1146/annurev-environ-012320-083355

41. CRED / UCLouvain (2024) EM-DAT data for floods and droughts filtered for ACS Member States from 2000 to 2024. EM-DAT. www.emdat.be.

42. United Nations Office For Disaster Risk Reduction (June, 2023) Overview of Disasters in Latin America and the Caribbean 2000 - 2022 (34).

43. Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.

44. ibid.

45. Castellanos, E., M.F. Lemos, L. Astigarraga, N. Chacón, N. Cuvi, C. Huggel, L. Miranda, M. Moncassim Vale, J.P. Ometto, P.L. Peri, J.C. Postigo,

L. Ramajo, L. Roco, and M. Rusticucci, 2022: Central and South America. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 1689–1816, doi:10.1017/9781009325844.014.

46. World Bank [21]

47. Castellanos et al. [n 45] 1705

48. Thomas & Benjamin [6]

49. EM-DAT data for droughts filtered for ACS Member States from 2000 to 2024. The Emergency Events Database –Université Catholique de Louvain (UCL).

50. Castellanos et al. [n 45] 1701

51. University of West Indies (UWI). (2020). State of the Caribbean Climate. Kingston: UWI.

52. Trotman, A., Joyette, A., Meerbeeck, C. V., Mahon, R., Cox, S.-A., Cave, N., & Farrell, D. (2017). Drought Risk Management in the Caribbean Community: Early Warning Information and Other Risk Reduction Considerations. In Drought and Water Crises. CRC Press.

53. Mycoo, M., M. Wairiu, D. Campbell, V. Duvat, Y. Golbuu, S. Maharaj, J. Nalau, P. Nunn, J. Pinnegar, and O. Warrick, 2022: Small Islands. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2043–2121, doi:10.1017/9781009325844.017.

54. Hsiang, S. M., & Jina, A. S. (2014). The causal effect of environmental catastrophe on long-run economic growth: Evidence from 6,700 cyclones (No. w20352). National Bureau of Economic Research.

55. Hsiang, S. M. (2010). Temperatures and cyclones strongly associated with economic production in the Caribbean and Central America. Proceedings of the National Academy of Sciences, 107(35), 15367- 15372. https://doi.org/10.1073/pnas.1009510107

56. Burgess, C., M. Taylor, N. Spencer, J. Jones and T. Stephenson. (2018). Estimating damages from climate-related natural disasters for the Caribbean at 1.5°C and 2°C global warming above preindustrial levels. Regional Environmental Change 18, 2297–2312; https://doi.org/10.1007/s10113-018-1423-6

57. After the Rain: The Lasting Effects of Storms in the Caribbean. (n.d.). UNDP. Retrieved August 13, 2024, from https://www.undp.org/latin-america/after-rain-lasting-effects-storms-caribbean

58. United Nations Development Program (n.d.). After the Rain: The Lasting Effects of Storms in the Caribbean. Retrieved October 16, 2024. https://www.undp.org/latin-america/after-rain-lasting-effects-storms-caribbean

59. IFRC (2022). Final report. Central America hurricanes Eta and Iota. https://reliefweb.int/report/guatemala/central-america-hurricanes-eta-iota-final-report-mdr43007

60. Hsiang & Jina [54]

61. Rosenblatt, D., Saboin, J. L., Mendívil, C. O. de, Mooney, H., Gauto, V., Teixeira, G., Clayton, K., Ishii, S., Hussain, L., & Satnarine-Singh, N. (2024). Caribbean Economics Quarterly: Volume 13, Issue 1: Risks and Opportunities for Caribbean Economies in a Diverging World. IDB Publications. https://doi.org/10.18235/0012988

62. Hurley, G., Panwar, V., Wilkinson, E., Lindsay, C., Bishop, M. and Mami, E. (2024) Breaking the cycle of debt in Small Island Developing States. ODI Report. London: ODI https://odi.org/en/publications/breaking-the-cycle-of-debt-in-small-island-developing-states/

63. Hoegh-Guldberg, O., D. Jacob, M. Taylor, M. Bindi, S. Brown, I. Camilloni, A. Diedhiou, R. Djalante, K.L. Ebi, F. Engelbrecht, J. Guiot, Y. Hijioka, S. Mehrotra, A. Payne, S.I. Seneviratne, A. Thomas, R. Warren, and G. Zhou, 2018: Impacts of 1.5°C Global Warming on Natural and Human Systems. In: Global Warming

of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte,V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla,A. Pirani,W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 175-312. https://doi.org/10.1017/9781009157940.005.

64. Thomas & Benjamin [6]

65. Vecchio, E. A., Dickson, M., & Zhang, Y. (2022). Indigenous mental health and climate change: A systematic literature review. The Journal of Climate Change and Health, 6, 100121. https://doi.org/10.1016/j.joclim.2022.100121

66. GCCMI Survey data, 2024. Based on surveys from 14 communities across 6 countries in the Greater Caribbean region.

67. West, J. (2023). Social vulnerability and population loss in Puerto Rico after Hurricane Maria. Population and Environment, 45(2), 8.

68. UNICEF (2023). The Changing Face of Child Migration in Latin America and the Caribbean. UNICEF – CHILD ALERT

69. Van Vuuren, D. P., E. Kriegler, B. C. O'Neill, K. L. Ebi, K. Riahi, T. R. Carter, J. Edmonds, S. Hallegatte, T. Kram, R. Mathur, and H. Winkler. (2014). A new scenario framework for climate change research: scenario matrix architecture. Climatic Change 122 (3): 373–386.

70. Can you imagine a Caribbean minus its beaches? It's not science fiction, it's climate change. (2014, September 5). World Bank. Retrieved November 5, 2024, from https://www.worldbank.org/en/news/feature/2014/09/05/can-you-imagine-a-caribbean-minus-its-beaches-climate-change-sids

71. UN-Habitat.(2020). World cities report 2020. The value of sustainable urbanization. https://unhabitat.org/world-cities-report-2020-the-value-of-sustainable-urbanization

72. United Nations, Department of Economic and Social Affairs, Population Division (2018). World Urbanization Prospects: The 2018 Revision, Online Edition.

73. Chávez Galindo, A. and Pinto da Cunha, J. (2023). Urban migrants in the cities of Latin America and the Caribbean. Chapter 6 in González-Pérez, J., Irazábal, C., and Lois-González, R. (Eds.). The Routledge Handbook of Urban Studies in Latin America and the Caribbean: Cities, Urban Processes, and Policies. Routledge. https://doi.org/10.4324/9781003132622.

74. Rodríguez-Vignoli, J. and Rowe, F. (2018) How is internal migration reshaping metropolitan populations in Latin America? A new method and new evidence, Population Studies, 72:2, 253-273, doi: 10.1080/00324728.2017.1416155

75. CEPALSTAT / Economic Commission for Latin America and the Caribbean – United Nations. https://statistics.cepal.org/portal/cepalstat/dashboard

76. Sandoval, V., & Sarmiento, J. P. (2020). A neglected issue: informal settlements, urban development, and disaster risk reduction in Latin America and the Caribbean. Disaster Prevention and Management: An International Journal, 29(5), 731-745. doi:10.1108/DPM-04-2020-0115

77. CEPALSTAT / Economic Commission for Latin America and the Caribbean – United Nations. https://statistics.cepal.org/portal/cepalstat/dashboard

78. Castellanos et al. [n 45]

79. International Labour Organisation (ILO) (2020). Tourism sector in the English- and Dutch-speaking Caribbean: An overview and the impact of COVID-19 on growth and employment

80. Baptiste, A. K., & Rhiney, K. (2016). Climate justice and the Caribbean: An introduction. Geoforum, 73, 17–21. https://doi.org/10.1016/j.geoforum.2016.04.008

81. Look, C., Friedman, E., & Godbout, G. (2019). The Resilience of Land Tenure Regimes During Hurricane Irma: How Colonial Legacies Impact Disaster Response and Recovery in Antigua and Barbuda. Journal of Extreme Events, 6(1), N.PAG-N.PAG. https://doi.org/10.1142/S2345737619400049

82. Look, C., Friedman, E., & Godbout, G. (2019). The Resilience of Land Tenure Regimes During Hurricane Irma: How Colonial Legacies Impact Disaster Response and Recovery in Antigua and Barbuda. Journal of Extreme Events, 6(1), N.PAG-N.PAG. https://doi.org/10.1142/S2345737619400049

83. Harvey, C. A., Saborio-Rodríguez, M., Martinez-Rodríguez, M. R., Viguera, B., Chain-Guadarrama, A., Vignola, R., & Alpizar, F. (2018). Climate change impacts and adaptation among smallholder farmers in Central America. Agriculture & Food Security, 7(1), 57. https://doi.org/10.1186/s40066-018-0209-x

84. Ratha, D., Plaza, S., Kim, E., Chandra, V., Kurasha, N. and Pradhan, B. (2023). Remittances Remain Resilient But Are Slowing. Washington, DC: KNOMAD–World Bank. https://www.knomad.org/publication/migration-and-development-brief-38

85. Vacaflores, D. E. (2018). Are remittances helping lower poverty and inequality levels in Latin America? Quarterly Review of Economics and Finance, 68, 254-265. doi:10.1016/j.qref.2017.09.001

86. Nuñez, R., & Osorio-Caballero, M. I. (2021). Remittances, Migration, and Poverty. A Study for Mexico and Central America. Investigación Económica, 80(318), 98-125. doi:10.22201/fe.01851667p.2021.318.79360

87. Bettin, G., & Zazzaro, A. (2018). The Impact of Natural Disasters on Remittances to Low- and Middle-Income Countries. The Journal of Development Studies, 54(3), 481–500. https://doi.org/10.1080/00220388.2017.1303672

88. Wong, J. (n.d.). Chapter 14. Emigration and Remittances in the Caribbean. Retrieved October 29, 2024, from https://www.elibrary.imf.org/display/book/9781484315194/ch14.xml

89. Lacarte et al. [17]

90. Thomas and Benjamin [6]

91. Clemens, M. A. (2015). Global Skill Partnerships: A proposal for technical training in a mobile world. IZA Journal of Labor Policy, 4(1), 2. https://doi.org/10.1186/s40173-014-0028-z

92. Radel, C., Schmook, B., Carte, L., & Mardero, S. (2018). Toward a Political Ecology of Migration: Land, Labor Migration, and Climate Change in Northwestern Nicaragua. World Development, 108, 263–273. https://doi.org/10.1016/j.worlddev.2017.04.023

93. Chile Declaration and Plan of Action. (2024). Chile Declaration and Plan of Action 2024-2034. ACNUR. https://www.acnur.org/sites/default/files/2024-12/Chile_Declaration_and_Plan_of_Action_ENG.pdf

94. Inter-American Court of Human Rights. (2025). Advisory Opinion OC-32/25, The Climate Emergency and Human Rights. https://www.corteidh.or.cr/opiniones_consultivas.cfm?lang=en

95. Center for Gender and Refugee Studies (2024). How the Cartagena +40 Process Can Improve Protection for Cross-Border Climate Displacement. Retrieved December 2, 2024, from https://cgrs.uclawsf.edu/our-work/publications/how-cartagena-40-process-can-improve-protection-cross-border-climate

96. Kummu, M., Taka, M., and Guillaume, J. H. (2018). Gridded global datasets for gross domestic product and human development index over 1990–2015. Scientific data, 5(1):1–15.

97. Barro, R. J. and Lee, J. W. (2013). A new data set of educational attainment in the world, 1950–2010. Journal of development economics, 104:184–198

98. Fick, S. E. and Hijmans, R. J. (2017). Worldclim 2: new 1-km spatial resolution climate surfaces for global land areas. International Journal of Climatology, 37(12):4302–4315.

99. Kjellstrom, T., Freyberg, C., and Lemke, B. (2018). Estimating population heat exposure and impacts on working people in conjunction with climate change. Int J Biometeorol, 62:291–306.

100. Tebaldi, C., Ranasinghe, R., Vousdoukas, M., and et al. (2021). Extreme sea levels at different global warming levels. Nat. Clim. Chang., 11:746–751.

101. Kirezci, E. and et al. (2020). Projections of global-scale extreme sea levels and resulting episodic coastal flooding over the 21st century. Sci. Rep., 10.

102. Harris, I., Osborn, T.J., Jones, P. et al. (2020), Version 4 of the CRU TS monthly high-resolution gridded multivariate climate dataset. Sci Data 7, 109. https://doi.org/10.1038/s41597-020-0453-3

103. Spalding, M., Burke, L., Wood, S. A., Ashpole,

J., Hutchison, J., and Zu Ermgassen, P. (2017).Mapping the global value and distribution of coral reef tourism. Marine Policy, 82:104–113.

104. Burzynski, M., Deuster, C., and Docquier, F. (2020). Geography of skills and global inequality. Journal of Development Economics, 142:102333.

105. Abel, G. J. and Cohen, J. E. (2022). Bilateral international migration flow estimates updated and refined by sex. Scientific Data, 9(1):173

106. Jayakody, D. Y., Adams, V. M., Pecl, G., & Lester, E. (2024). When does place attachment lead to climate change adaptation and when does it not? A quantitative review and thematic analysis. Environmental Science & Policy, 160, 103866. https://doi.org/10.1016/j.envsci.2024.103866

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