

ALBATROSS

Advancing knowledge for Long-term Benefits
and Climate Adaptation through Holistic Climate
Services and Nature-based Solutions

D2.3 – Exploring the interplay between climate, migration and urbanization in Sub-Saharan Africa

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This report is referenced as deliverable 2.3 (D2.3) under the ALBATROSS project (Grant Agreement No. 101137895), an EU-funded research initiative to advance knowledge for long-term benefits and climate adaptation through holistic climate services and nature-based solutions in Sub-Saharan Africa (SSA). This deliverable is produced within the framework of Work Package 2 (WP2) and specifically under Task 2.3, which investigates migration trends and urbanisation patterns under current and projected climate scenarios and adaptation options.

D2.3 represents the first stage of a two-step process, with its findings set to contribute to Deliverable 2.5 (D2.5). Together, these deliverables will provide, combined with other tasks of the WP2, the necessary empirical basis and conceptual framing for the development of the ALBATROSS Integrated Assessment Model (IAM) under Task 2.5. Additionally, D2.3 plays a pivotal role in informing policy recommendations under Work Package 6 (WP6), ensuring that migration and urbanization dynamics are effectively integrated into climate adaptation strategies at both local and national levels.

Relationship with other tasks and deliverables:

- Task 2.3: D2.3 is the primary output of this task, providing an evidence-based analysis of migration and urbanisation patterns in SSA, and their interplay with climate change.
- Task 2.5: The findings from D2.3 will directly inform the development of the ALBATROSS Integrated Assessment Model, which aims to integrate multiple dimensions of climate risk, migration, and urban resilience.
- Work Package 6 (WP6): D2.3 will supply critical insights to WP6, where policy responses and governance frameworks for climate adaptation will be formulated. The migration and urbanisation trends identified in this report will shape policy recommendations tailored to local, national, and regional governance structures.
- Interaction with WP4 and WP5: The socio-economic and migration data synthesized in D2.3 will support WP4's assessment of Nature-Based Solutions (NBS) and WP5's development of computational models for decision support systems.

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Legal disclaimer

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Glossary

A

Adaptation (Climate Adaptation) – The process of adjusting to actual or expected climate change and its effects. Adaptation seeks to moderate harm or exploit beneficial opportunities (IPCC).

Arid and Semi-Arid Lands (ASALs) – Regions characterized by low and unpredictable rainfall, making them vulnerable to drought and desertification (UNEP).

Anthropogenic Climate Change – Climate change that is caused by human activities, such as greenhouse gas emissions from burning fossil fuels (IPCC).

C

Circular Migration – A form of migration in which people move repeatedly between their place of origin and destination, often seasonally or for employment purposes (IOM).

Climate Change – Long-term changes in temperature, precipitation, and other atmospheric conditions primarily driven by human activities (IPCC).

Climate Displacement – The forced movement of people due to climate-related hazards such as floods, droughts, and rising sea levels (IOM).

Climate Migration – The movement of people driven by climate-related factors, either voluntarily or forcibly, within or across borders (IOM).

Climate Resilience – The ability of a system, community, or individual to anticipate, prepare for, and respond to climate-related risks and shocks (World Bank).

Climate Variability – Natural fluctuations in climate conditions over time, distinct from long-term climate change (IPCC).

Coastal Erosion – The loss of coastal land due to wave action, rising sea levels, and human activities (UNEP).

D

Desertification – The process by which fertile land becomes desert due to climate change, deforestation, or unsustainable agriculture (UNCCD).

Displacement – The forced movement of people due to conflict, environmental hazards, or disasters (UNHCR).

Drought – A prolonged period of below-average precipitation, leading to water shortages and reduced agricultural productivity (IPCC).

E

Ecosystem Degradation – The deterioration of environmental conditions, including biodiversity loss, due to human and natural factors (UNEP).

Environmental Migration – The movement of people driven by environmental factors such as natural disasters, land degradation, or resource scarcity (IOM).

Extreme Weather Events – Severe weather occurrences such as storms, heatwaves, and floods that pose risks to people and infrastructure (IPCC).

G

Greenhouse Gas Emissions (GHGs) – Gases such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) that trap heat in the atmosphere and contribute to global warming (IPCC).

Green Infrastructure – Natural or semi-natural solutions such as wetlands, urban forests, and green roofs that help mitigate climate impacts in urban areas (UN-Habitat).

I

Internal Migration – The movement of people within national borders, often from rural to urban areas (IOM).

Internally Displaced Person (IDP) – Someone who is forced to flee their home but remains within their country of residence (UNHCR).

Informal Settlements – Unregulated and unplanned housing areas lacking formal infrastructure and services, often in rapidly urbanizing regions (UN-Habitat).

L

Land Degradation – The decline in land quality caused by climate change, deforestation, and unsustainable land use (UNCCD).

Livelihood Diversification – Strategies individuals or communities use to sustain income through multiple economic activities, often in response to environmental stress (World Bank).

M

Maladaptation – An adaptation strategy that inadvertently increases vulnerability to climate impacts (IPCC).

Mitigation (Climate Mitigation) – Efforts to reduce or prevent greenhouse gas emissions to slow global warming (IPCC).

Mobility as Adaptation – The concept that migration can serve as a strategy to adapt to climate change rather than being solely a last-resort option (IOM).

P

Pastoralism – A livelihood system based on livestock herding, often practiced in arid and semi-arid regions (FAO).

Peri-Urban Areas – Transitional zones between rural and urban areas experiencing rapid development (UN-Habitat).

Planned Relocation – The organized movement of people to safer locations in response to climate risks (IOM).

R

Rural-Urban Migration – The movement of people from rural areas to cities in search of better economic opportunities (World Bank).

Resilience Building – Strengthening the capacity of individuals, communities, and ecosystems to withstand and recover from climate shocks (UNDP).

S

Sea-Level Rise – The increase in global sea levels due to melting ice caps and thermal expansion of seawater (IPCC).

Sedentary Adaptation – A strategy where populations remain in place and implement adaptation measures rather than relocating (IPCC).

Slum Upgrading – The process of improving informal settlements by providing essential services such as sanitation, water, and housing (UN-Habitat).

Social Resilience – The ability of societies and communities to adapt and recover from environmental and socio-economic stresses (UNDP).

T

Translocality – The interconnectedness of places and communities through migration, social ties, and economic linkages (IOM).

Trapped Populations – Communities that lack the resources or ability to migrate despite facing climate-related risks (IPCC).

U

Urbanization – The process by which populations concentrate in cities and towns, often driven by economic opportunities and migration (UN-Habitat).

Urban Heat Island Effect – The phenomenon where urban areas experience higher temperatures than surrounding rural areas due to human activities (World Bank).

Urban Resilience – The capacity of cities to withstand and recover from climate hazards and socio-economic shocks (UN-Habitat).

Executive Summary

Sub-Saharan Africa (SSA) stands at the intersection of multiple transformative forces: climate change, migration, and rapid urbanization. This report, published in the context of the EU-funded research project ALBATROSS, offers a comprehensive analysis of how these forces interact, drawing on evidence from Ghana, Kenya, Tanzania, Madagascar, and South Africa. The findings are based on extensive country-level assessments of climate trends, migration dynamics, and urbanization processes, complemented by a series of interviews with national experts and by policy and governance reviews. While climate change threatens livelihoods and infrastructure through slow-onset stresses (e.g., drought, soil degradation) and sudden shocks (e.g., cyclones, floods), human responses—particularly migration—are shaped by diverse social, economic, and political factors. Cities, which receive the majority of internal migrants, offer both opportunities for adaptation and challenges regarding service provision, infrastructure, and equity. This executive summary highlights the major insights, addresses knowledge gaps, and provides policy recommendations that integrate climate resilience, migration governance, and urban sustainability.

Background

Climate change and human mobility

The notion that climate change alone drives mass migration is overly simplistic. Research indicates that climate stressors—extreme temperatures, fires, droughts, floods, coastal erosion—often act as “threat multipliers,” aggravating existing economic and social vulnerabilities. People move in response to intersecting drivers: livelihood failures, economic aspirations, resource competition, social networks, and governance capacity. Mobility, particularly seasonal or circular migration, may serve as an adaptive strategy that diversifies income and reduces risks.

Urbanization as both opportunity and challenge

Sub-Saharan Africa is urbanizing at one of the fastest rates globally, with a projected 70% of its population to be urban by 2050 in certain countries. This “urban pull” is strengthened by prospects of better jobs, education, and infrastructure. However, the report underscores how unplanned urban growth leads to rising informal settlements, overcrowding, and strains on essential services such as water, sanitation, transport, and healthcare. In the absence of climate-sensitive urban planning, climate hazards—like floods in coastal and low-lying settlements, and fires on the urban and settlement fringes—are amplified.

Main Takeaways by Country

Ghana

- **Climate Trends:** Ghana’s ecological zones, from the semi-arid north to humid coastal areas in the south, experience rising temperatures, unpredictable rainfall, and recurrent flooding. Droughts in northern Ghana have escalated food insecurity and driven rural-urban migration toward the south.

- **Migration Dynamics:** Migration patterns are strongly shaped by the north–south development divide, coupled with climate impacts on agriculture. Seasonal migration to southern urban centers—especially Accra and Kumasi—remains a coping strategy, supported by remittances that bolster rural livelihoods.
- **Urbanization Challenges:** Rapid urban growth outstrips city infrastructure, leading to extensive informal settlements in Accra, Takoradi, and Kumasi. Flood-prone neighborhoods and precarious housing amplify vulnerability. The National Migration Policy and National Urban Policy provide frameworks but face coordination and funding deficits.

Kenya

- **Climate Trends:** Kenya’s ASAL (arid and semi-arid lands) regions are particularly hit by recurrent droughts, while western and coastal areas face riverine and coastal floods. Rising temperatures threaten agricultural hubs, including the Rift Valley highlands.
- **Migration Dynamics:** Rural–urban migration to Nairobi, Mombasa, and Kisumu is driven by uneven regional development and persistent drought in the ASALs. Seasonal and circular migration patterns reflect livelihood diversification; pastoralists, for example, move seasonally to manage scarce water and pasture.
- **Urbanization Challenges:** Urban expansion in Nairobi and Mombasa frequently occurs in floodplains or areas lacking formal planning. Large informal settlements (e.g., Kibera in Nairobi) face overlapping risks of floods, food insecurity, and disease. The National Climate Change Action Plan and Urban Areas and Cities Act guide adaptation and development, but limited municipal resources hamper effective implementation.

Tanzania

- **Climate trends:** Rising temperatures, erratic rainfall, and recurrent floods mark Tanzania’s climate profile. Drought-prone central regions contrast with flood-susceptible coastal areas like Dar es Salaam.
- **Migration dynamics:** Rural–urban flows to Dar es Salaam, Arusha, and Mwanza are motivated by perceived economic opportunities. Environmental stress—especially drought—pushes agricultural communities out of Dodoma and Singida, though many also engage in circular migration to maintain rural ties.
- **Urbanization challenges:** Dar es Salaam is Africa’s fastest-growing city, with extensive informal sprawl and limited infrastructure. Weak coordination between land-use planners, climate agencies, and local authorities leads to unregulated development on flood-prone land. The National Climate Change Strategy and the Urban Planning Act contain climate-related provisions but lack operational capacity and integrated oversight.

Madagascar

- **Climate trends:** The island’s ecological diversity features recurrent cyclones in the east, persistent drought in the south, and rising sea levels along the coasts. Southern Madagascar has faced near-famine conditions due to multi-year droughts.

- **Migration dynamics:** Drought-induced displacement from the south is widespread. Coastal livelihoods in western and northern regions face threats from coastal erosion and coral reef degradation, pushing fishers and farming communities toward larger cities like Antananarivo and Tamatave.
- **Urbanization challenges:** Antananarivo, the capital, struggles with unplanned settlements, flood risks, and insufficient infrastructure. Port city Tamatave attracts rural migrants but suffers from severe cyclones, limited drainage, and vulnerabilities in low-lying areas. National climate policies remain fragmented, and no comprehensive migration policy addresses climate-induced displacement.

South Africa

- **Climate Trends:** South Africa’s highly variable climate combines severe droughts in the west (e.g., Cape Town’s “Day Zero” crisis in 2018) with flooding in KwaZulu-Natal and Eastern Cape. Rising urban heat island effects exacerbate heat stress in major cities.
- **Migration dynamics:** Post-apartheid governance reforms lifted movement restrictions, sparking rural-urban migration into cities like Johannesburg, Cape Town, and Durban. Climate factors—especially drought and soil erosion in the Eastern Cape—further drive out-migration.
- **Urbanization challenges:** Legacies of spatial segregation persist, with many migrants settling in under-served, peripheral townships. Informal housing expansions aggravate flood and heat vulnerabilities. Although frameworks like the Integrated Urban Development Framework promote inclusive cities, local governance capacity is uneven.

Overarching Insights

This report identifies eight key insights that capture the nuanced interplay between climate change, migration, and urbanization dynamics in Sub-Saharan Africa:

#1. It is not only about climate change

Climate variability intensifies existing vulnerabilities but rarely acts as the sole driver of migration. Economic forces, social networks, and governance structures all shape how communities respond to environmental stress. Recognizing the multiplicity of drivers underscores that migration outcomes reflect both ecological risks and broader socio-economic pressures.

#2. Climate–migration relationships are non-linear

Contrary to narratives that assume direct, one-to-one pathways from climate shocks to mass displacement, mobility is better understood as a process that evolves through time, feedback, and thresholds. People’s decisions to migrate, stay, or move seasonally are shaped by aspirations, capabilities, and a host of contextual factors—only some of which are climate-related. Climate shocks can lead to increased or decreased mobility, depending on the context.

#3. Immobility is as important as mobility

Some households lack the resources or social capital to relocate away from climate-vulnerable areas, while others remain in place by choice, due to cultural ties or land tenure constraints. Such “trapped” or “voluntary immobility” can pose serious risks, as limited options may force people to endure increasing hazards without adequate support.

#4. Beyond a simple migration–urbanization causal framework

Rural-to-urban migration does contribute to urban growth, but it also interacts with market forces, political reform, technological innovation, and evolving social aspirations. Understanding urbanization as part of broader structural transformations reveals that urban expansion can both result from and further drive mobility, creating complex feedback loops across sectors and scales.

#5. Acknowledging translocality and the rural–urban system

Many families pursue multi-local strategies—keeping one foot in rural agricultural livelihoods while tapping urban employment or markets. Migrants’ remittances and social ties sustain not only urban livelihoods but also rural adaptation, underlining that policy interventions must address and leverage the connectivity between sending (rural) and receiving areas (urban).

#6. Cities as adaptation hubs

Urban centers can provide migrants with better livelihoods, healthcare, and education, thus boosting resilience. However, inadequate planning, infrastructure deficits, and social exclusion in fast-growing urban settlements can exacerbate vulnerabilities. Policies that incorporate climate risks into city planning—such as flood protection, green infrastructure, and inclusive service delivery—are critical for leveraging cities as engines of adaptation.

#7. Migration toward cities as a sustainability force

While migration can strain public services, it also brings new skills, economic dynamism, and social remittances that benefit urban and rural areas alike. Harnessing migrants’ contributions—through vocational training, social protection, and investment channels—can help align urban growth with long-term sustainability goals, including climate resilience and inclusive development.

#8. Going beyond a static, sedentary vision of climate adaptation

Migration itself can be a proactive strategy for dealing with climate threats, rather than a failed response. Recognizing this adaptive function demands policies that enable safe and planned mobility—such as well-regulated internal migration frameworks, social protection for migrants in urban areas, and support for translocal livelihood systems. By treating mobility as a legitimate adaptation pathway, policymakers can reduce harm and strengthen resilience in both origin and destination communities.

Taken together, these insights show that climate change, migration, and urbanization are inextricably linked, yet shaped by broader economic and governance contexts. Moving beyond narrow or linear

assumptions opens new policy avenues for cities and rural districts alike to reduce vulnerabilities, enhance well-being, and leverage the adaptive potential inherent in human mobility.

Knowledge gaps

1. **Data deficiencies:** high-resolution, up-to-date data on climate-induced migration remain scarce. Many studies still rely on outdated national censuses that fail to capture temporal/spatial variations.
2. **Health and gender dimensions:** the gender-specific health burdens of climate migrants—e.g., in informal settlements or pastoral communities—are understudied.
3. **Longitudinal dynamics**¹: few longitudinal studies assess how repeated climate shocks shape household migration decisions over extended periods.
4. **Translocal strategies:** further empirical evidence is needed on how remittances, circular migration, and dual-residence influence both rural and urban resilience.

Policy recommendations

Integrate climate mobility into national adaptation plans

- **Align national urban and climate policies:** to address environmental push factors and urban service provision, cohesive frameworks must integrate climate migration into national and local policies.
- **Enhance coordination:** establish inter-ministerial task forces to synchronize migration governance with urban climate planning.

Strengthen local governance and urban resilience

- **Infrastructure and housing:** prioritize public investments in flood defenses, resilient housing, and green infrastructure, especially in informal settlements.
- **Participatory planning:** engage migrants and vulnerable groups in decision-making to ensure equitable distribution of adaptation benefits.

Expand research and data collection

- **Improve migration and climate metrics:** develop standardized, high-frequency data mechanisms to track mobility patterns, including city-level registries and remote sensing.
- **Focus on health and well-being:** conduct targeted studies on how climate-induced migration intersects with disease outbreaks, mental health, and household nutrition.

Promote rural resilience to reduce forced migration

¹ The study of how variables or behaviors evolve over extended periods, often using repeated observations of the same subjects.

- **Diversify livelihoods:** support climate-smart agriculture, livestock diversification, and income-generating activities to stabilize rural incomes and reduce distress migration.
- **Invest in education and social services:** bolster rural schools and healthcare to narrow the rural-urban service gap, thereby decreasing “push factors”.

Harness migration as an adaptation strategy

- **Facilitate safe and orderly mobility:** develop legal pathways and skill-training programs for migrants, ensuring their protection and integration in urban labor markets.
- **Leverage remittances for adaptation:** incentivize diaspora investment and channel remittances into local resilience-building initiatives, such as irrigation and microfinance schemes.

Conclusion

This report demonstrates that climate change, migration, and urbanization in SSA are deeply interlinked, yet far more complex than simplistic narratives suggest. Climate hazards—drought, flooding, coastal erosion—contribute to mobility decisions but interact with socio-economic inequalities, governance structures, and individual aspirations. Urban centers can function as engines of resilience if municipal authorities integrate climate adaptation measures, address informal settlement vulnerabilities, and harness migrants’ adaptive capacities. However, disjointed policies, limited local capacity, and scarce data hamper effective governance.

A paradigm shift is necessary: rather than viewing migration only as a problem (or the symptom of a failure), it can also serve as a strategic, adaptive response. By building institutional capacity, strengthening data systems, and promoting integrated urban planning, SSA can move toward inclusive policies that embrace mobility as an integral part of resilience. Coordinated national and regional frameworks, backed by sufficient investment and local participation, can ensure that climate-driven urbanization unfolds in ways that enhance sustainability and equity for all. Whether by stabilizing rural livelihoods or embracing safe migration pathways, actions taken in the next decade will define the region’s capacity to navigate the intensifying climate crisis.

1 Introduction

Climate change, migration, and urbanization are three of the most pressing challenges shaping the future of Sub-Saharan Africa (SSA). As environmental stressors intensify, millions of people are facing the need to adapt their livelihoods, often through mobility. Migration, traditionally seen as an economic or conflict-driven phenomenon, is increasingly recognized as a response to climate variability and its socio-economic repercussions. However, the pathways linking climate change, migration, and urbanization are complex and shaped by a multitude of factors, including governance, economic opportunities, and social networks. Understanding these dynamics is crucial for developing policies that promote social resilience, equitable urban growth, and sustainable development.

This report, developed under Work Package 2 (WP2) of the European-funded project ALBATROSS, aims to explore the interplay between climate, migration, and urbanization in SSA, especially in Ghana, Kenya, Tanzania, Madagascar and South Africa. Through a combination of interviews, empirical research, policy analysis, and case studies, this deliverable seeks to provide insights into how environmental stressors are influencing human mobility patterns and reshaping urban landscapes. It also examines how cities are responding to these shifts, the governance challenges they face, and the potential for integrating migration and climate adaptation into urban planning strategies.

1.1 Purpose of the report

The primary objective of this deliverable is to offer a comprehensive analysis of the relationship between climate change, migration, and urbanization in the SSA context. While a growing body of research highlights the impact of climate change on human mobility, there remains a need for more detailed, region-specific analyses that consider historical migration trends, socio-economic drivers, and governance structures. This report contributes to filling this gap by synthesizing evidence from multiple sources and providing policy-relevant recommendations for governments, urban planners, and international organizations.

Specifically, this deliverable aims to:

- Identify key climate-related drivers of migration in Sub-Saharan Africa, distinguishing between slow-onset and sudden-onset events.
- Analyze the role of migration as both an adaptation strategy and a challenge for urban development.
- Assess how urban centers are managing inflows of climate migrants and the extent to which migration is integrated into urban resilience planning.
- Provide key insights to help practitioners apprehend the relationship between climate, migration and adaptation.
- Provide recommendations for policymakers to enhance governance coordination and structures, improve climate adaptation strategies, and promote sustainable urbanization.

By addressing these objectives, this deliverable seeks to enhance understanding of how climate-induced migration influences urbanization processes and what measures can be taken to foster climate-resilient cities.

1.2 Structure of the report

This report is structured to provide a clear and systematic analysis of climate change, migration, and urbanization dynamics, incorporating both conceptual discussions and empirical findings. The document is organized into the following sections:

- **Country-level analysis** – Presents in-depth analyses of migration and urbanization trends in selected countries, highlighting how environmental changes are influencing mobility and settlement patterns.
- **Discussion and key insights** – Synthesizes findings from country-level analyses to identify overarching themes and patterns in climate-migration-urbanization dynamics.
- **Knowledge gaps and research needs** – Identifies gaps in current research and opportunities for improved understanding of the studied phenomenon.
- **Policy and governance gaps** – Identifies specific deficiencies in policy and institutional responses that hinder effective climate adaptation and urban planning.
- **Policy recommendations, by actors and by country** – Proposes actionable strategies to improve governance, enhance urban resilience, and support climate migrants.
- **Conclusion** – Summarizes key findings and provides actionable recommendations for policymakers, urban planners, and international agencies.

Each chapter builds upon the previous one to ensure a logical progression of insights, culminating in a set of evidence-based recommendations that can guide future policy interventions.

1.3 Intended audience

This public deliverable is designed to inform a wide range of stakeholders involved in climate adaptation, migration governance, and urban planning. The intended audience includes:

- **Policymakers and government officials:** Decision-makers at international, regional, national and local levels who are responsible for climate adaptation policies, urban development strategies, and migration governance.
- **Urban planners and municipal authorities:** City officials and urban development experts seeking to integrate climate resilience into planning processes and address the challenges of migration-driven urbanization.
- **International organizations and development agencies:** Institutions such as the United Nations, the World Bank, and the African Union that support climate adaptation and sustainable urbanization initiatives.
- **Researchers and academics:** Scholars working on climate change, migration studies, and urbanization trends who require empirical data and policy insights to inform their work.
- **Civil society organizations and NGOs:** Groups advocating for climate justice, migrant rights, and sustainable development, seeking evidence-based recommendations to support their initiatives.

By targeting these diverse stakeholders, this deliverable aims to bridge knowledge gaps, foster collaboration, and contribute to more effective policy responses that address the interconnected challenges of climate change, migration, and urbanization in SSA.

2 Methodology

This report adopts a qualitative expert-informed synthesis approach, integrating insights from expert interviews to complement findings from an extensive literature review. Rather than conducting a formal thematic analysis, expert perspectives were used to contextualize and reinforce key arguments, adding empirical depth to the synthesis of existing knowledge.

2.1 Literature review

The research builds on a comprehensive literature review conducted before the expert interviews. This review included:

- Scientific literature: Peer-reviewed journal articles and academic studies examining the intersections between climate change, migration, and urbanization in SSA.
- Grey literature: Reports and working papers from international organizations, research institutes, and think tanks, including yet to be published outputs from projects such as HABITABLE.
- Policy documents: National and regional strategies, climate adaptation plans, urban development frameworks, and migration policies from governments and intergovernmental organizations (e.g., the African Union, ECOWAS, and the United Nations).

This multi-source approach ensured a broad and policy-relevant foundation for the analysis, allowing the report to bridge gaps between academic research, policy frameworks, and real-world implementation challenges. The literature review also helped identify key thematic areas and knowledge gaps, which subsequently informed the structure and focus of the expert interviews.

2.2 Expert interviews

To strengthen the analysis, a total of nine expert interviews were conducted in November 2024, following the literature review. The experts were selected based on their professional expertise in migration, climate change, and urbanization, as well as their geographical specialization in the countries studied. They were drawn from organizations participating in the ALBATROSS project, ensuring ethical compliance.

Additionally, insights were gathered from HABITABLE project researchers during their Final Conference, in December 2024, in Nairobi, Kenya, where they presented preliminary findings that were not yet available in formal publications. This provided access to emerging research and unpublished knowledge, further enriching the synthesis.

2.3 Expert contributions and integration with literature

Expert interviews were conducted using semi-structured discussions, allowing for flexibility while ensuring consistency across interviews. Rather than treating expert responses as standalone data for systematic analysis, their insights were selectively incorporated into the report to:

- Validate and reinforce findings from the literature review.
- Provide real-world perspectives and triangulation on climate-migration-urbanization dynamics.
- Highlight context-specific nuances that might not be fully captured in the published literature.

Given the complexity of climate change, migration, and urbanization linkages, this expert-informed synthesis approach helps bridge knowledge gaps by combining theoretical insights with grounded expertise.

2.4 Limitations

While this methodology provides valuable empirical depth, it has certain limitations:

- Experts perceptions, while authoritative, remain interpretative rather than representative of broader populations.
- The insights from HABITABLE researchers were based on preliminary findings, meaning some conclusions may evolve as their research undergoes formal peer review.
- The absence of a formal coding process limits the ability to systematically compare themes across interviews.
- The study focuses on five countries within Sub-Saharan Africa, which, while providing a meaningful regional perspective, cannot fully capture the complexity and diversity of the entire SSA region. The report sometimes refers to SSA as a whole for ease of writing, but this is an overgeneralisation. The socio-economic, political, and environmental contexts across the continent are far more nuanced than what this report can comprehensively address.

However, given the purpose of the report—synthesizing existing knowledge rather than generating new primary data—this approach remains methodologically sound. By leveraging expert input as a complementary layer rather than as standalone data, this report provides a robust and contextually grounded synthesis of climate, migration, and urbanization patterns in SSA.

3 Country-level analysis

This chapter provides a focused analysis of how climate impacts, migration patterns, and rapid urban growth unfold in five selected countries of SSA—Ghana, Kenya, Tanzania, Madagascar, and South Africa (Figure 1). Drawing on data from both primary and secondary sources, as well as interviews with national experts, each country profile explores the distinct ecological realities, mobility trajectories, and urban development challenges. By outlining these varied, context-specific experiences, the chapter underscores the need for integrated policies and interventions tailored to local socioeconomic and environmental conditions. Ultimately, the examination sets the stage for deeper insights into the cross-cutting themes that shape climate resilience and sustainable urbanization in the region.

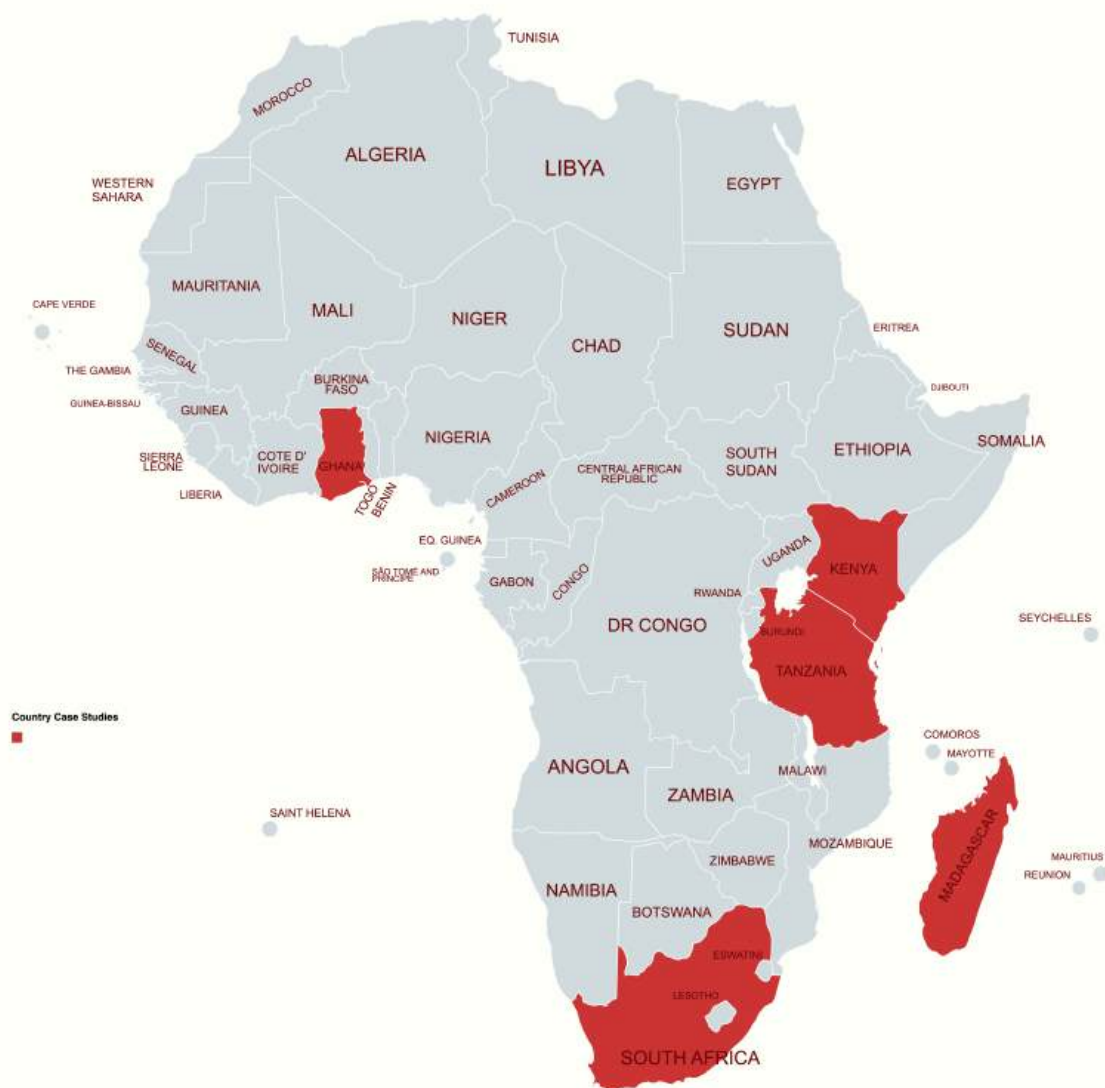


Figure 1: Map of Africa highlighting the Country case studies for this report. Created by Debève (2025)

Ghana



Figure 2: Map of Ghana (Encyclopædia Britannica, 2008)

3.1 Climate trends and impacts in Ghana

“When you look at Ghana, precipitation and temperature trends vary significantly across regions. The coastal zone has a bimodal rainfall pattern, while the northern part of the country experiences a unimodal pattern. The northern region, in particular, is getting hotter, with longer dry periods, which is making farming increasingly difficult.” (Interview with climate scientist, University of Kumasi, Ghana, November 2024)

Ghana, situated in West Africa, is grappling with the far-reaching impacts of climate change, which are reshaping its environmental and socio-economic dynamics in intricate and region-specific ways. From the arid savannahs in the north to the humid coastal areas in the south, the country faces a variety of climate-related challenges such as rising temperatures (Owusu-Ansah 2016; Klutse, Owusu,

and Bofo 2020; Ankrah, Monteiro, and Madureira 2023) unpredictable rainfall (Atiah, Tsidu, and Amekudzi 2020), sea-level rise, and extreme weather events. These challenges cut across existing vulnerabilities, weaving a complex web of risks that threaten livelihoods, deepen inequalities, and hinder sustainable development (IPCC 2022; Amoako 2018).

3.1.1 Intensifying heat and drought in Northern Ghana

In northern Ghana, the effects of climate change are particularly severe, with average temperatures rising at a faster pace compared to other regions (Issahaku, Campion, and Edziye 2016). This semi-arid region, already characterized by limited and erratic rainfall, is witnessing increasingly unpredictable precipitation patterns. Prolonged droughts have become more frequent, reducing water availability for both farming and household needs. Traditional farming systems that depend on staple crops such as millet, sorghum, and maize are under significant pressure as yields continue to decline (Nkegbe and Kuunibe 2014; Bawayelaazaa Nyuor et al. 2016). For instance, during the extreme drought of 2007, communities in the Upper East and Upper West regions suffered widespread crop failures, leading to acute food insecurity and compelling many households to migrate southward in search of better opportunities (Van Der Geest 2011), often leaving behind in the most vulnerable groups—women, children, and the elderly—with limited access to essential resources and support (Awumbila 2015a).

“Based on different climate models, we are expecting temperature increases across all scenarios. Under the high-end scenario (SSP5), the temperature rise will be much steeper, which could make some areas in northern Ghana less habitable” (Interview with climate scientist, University of Kumasi, Ghana, November 2024)

The vulnerabilities in the north are further compounded by weak infrastructure and limited access to climate-resilient technologies (Mu-utasim Yahaya 2021). Communities that depend on shallow wells and seasonal rivers face mounting challenges as rising temperatures and declining rainfall contribute to chronic water scarcity. This scarcity fuels competition between agricultural and domestic needs, leading to heightened tensions within and between communities. Women, in particular, bear a disproportionate burden, as they are often required to travel longer distances to collect water and provide for their families’ basic needs. These pressures erode social cohesion and reinforce cycles of poverty (Fielmua, Gordon, and Mwingyine 2017).

3.1.2 Environmental pressures in the middle belt

In contrast, Ghana’s middle belt, which serves as a transitional zone between the arid north and the humid south, faces another set of challenges. This region—encompassing the Ashanti, Bono, and Eastern areas—features a blend of forest and savannah ecosystems that are increasingly at risk due to deforestation and land-use changes. Rising temperatures and shifting rainfall patterns have accelerated the degradation of these ecosystems, triggering far-reaching consequences for agriculture and biodiversity (Atiah, Tsidu, and Amekudzi 2020). Cocoa farming, a cornerstone of the local economy and a vital export crop, is particularly susceptible to these climatic shifts. Cocoa trees thrive under specific environmental conditions, and even slight increases in temperature or variations in rainfall can have a significant impact on yields. Faced with declining productivity, many farmers have turned to cultivating heat-tolerant crops such as cashews. While this shift may offer temporary relief, it often comes at the cost of lower economic returns and heightened food insecurity (Baada and Najjar 2020; Läderach et al. 2013). However, more recent studies suggest that crop diversification—

including the coupling of cashew and cocoa farming—could play a role in enhancing food security over the longer term (Hashmiu, Agbenyega, and Dawoe 2022).

3.1.3 Flooding challenges in the middle belt: Kumasi as a case study

Flooding presents another major challenge in the middle belt, especially in riverine areas such as the Ankobra and Pra River basins. Intensified rainfall events, driven by shifting precipitation patterns and a rise in extreme weather occurrences, frequently lead to river overflows that displace communities, damage infrastructure, and disrupt local economies. Research indicates that the frequency and severity of flooding in the region have escalated in recent years, largely due to deforestation, urban expansion, and inadequate land management practices that exacerbate vulnerability to heavy rainfall (Owusu-Ansah 2016; Abass et al. 2020; Abass 2022). Beyond the physical destruction of homes and farmlands, these floods often cut off access to education, healthcare, and essential services—further deepening the hardships faced by marginalized communities. Kumasi, the middle belt’s largest urban center, highlights the compounded impact of flooding in an environment undergoing rapid urbanization (Abass et al. 2020). The city’s fast-growing population has placed increased pressure on its existing drainage systems, while deforestation of the surrounding Ashanti forests has stripped away natural flood buffers, intensifying the risk of inundation. During the heavy rains of June 2021, large parts of Kumasi were submerged, displacing thousands and causing extensive damage to roads, schools, and hospitals (Torsah et al. 2025). Informal settlements, home to many of the city’s low-income residents, are particularly at risk, as they are often situated in flood-prone areas with inadequate drainage infrastructure and flood mitigation measures (Abass 2022; Asibey and Yeboah 2024).

The aftermath of flooding in Kumasi and other urban centers often brings a surge in waterborne diseases such as cholera, typhoid, and dysentery (Abu and Codjoe 2018). Floodwaters frequently mix with untreated sewage, contaminating drinking water sources and triggering public health crises. Children and the elderly are particularly vulnerable, with disease outbreaks compounding the already significant economic and emotional toll on affected families. The disruption caused by these floods extends far beyond the immediate recovery period—families grapple with the loss of livelihoods, prolonged school closures, and the gradual erosion of assets and savings (Codjoe & Nabie, 2014; World Bank, 2021).

Beyond the health and economic challenges, the increasing frequency of floods in Kumasi threatens the city’s position as a key economic hub in the middle belt. Damage to transport networks disrupts trade and commerce, while the continuous need for rebuilding diverts public resources away from long-term development goals. Addressing these risks requires strategic investments in resilient infrastructure, including the expansion and maintenance of drainage systems, reforestation efforts to restore natural buffers, and stricter urban planning policies to prevent construction in high-risk areas (Antwi-Agyei et al. 2023; Sarfo et al. 2024; Asibey and Yeboah 2024). Implementing these measures is not only critical for Kumasi but also essential for strengthening resilience across the wider middle belt region in the face of climate change-induced flooding.

3.1.4 Rising seas and coastal erosion in southern Ghana

In southern Ghana, the impacts of climate change are most pronounced along the coastline, where rising sea levels and coastal erosion pose significant threats to communities. With an estimated annual sea-level rise of 4 millimeters, the coastline is steadily receding, leading to the loss of valuable land and infrastructure (Brempong et al. 2023). The Volta River Delta is among the hardest-hit areas, forcing entire villages to relocate inland (Abu, Heath, et al. 2024). In towns like Keta, coastal erosion

has displaced thousands of residents and severely impacted traditional fishing and salt production industries that have sustained local economies for generations. The destruction of homes and livelihoods not only disrupts social structures but also exacerbates economic inequalities, as displaced populations struggle to rebuild their lives (Atta-Quayson and Baidoo 2020; Adjei Baffour 2024).

Urban centers in southern Ghana, particularly Accra and Takoradi, face unique climate-related challenges. In Accra, for example, heavy rains frequently overwhelm poorly maintained drainage systems, leading to severe flooding (Amoako and Inkoom 2018). The devastating floods of June 2015, which claimed over 150 lives and caused widespread property damage, serve as a stark reminder of the dangers posed by the intersection of climate hazards and inadequate urban planning. Informal settlements—where many migrants settle—are especially vulnerable, often lacking basic infrastructure and exposing residents to floodwaters, contaminated drinking water, and other hazards (I. Adams, Ghosh, and Runeson 2023; Amoako 2018).

3.1.5 Socio-economic and health implications of climate change

The socio-economic impacts of climate change in Ghana are closely intertwined with these environmental challenges. Agriculture, which employs over 40% of the population and plays a crucial role in the national economy, is one of the most climate-sensitive sectors (Awuni et al. 2023). Declining yields of staple crops, coupled with population growth, have driven up food prices and increased the country's reliance on imports. This places significant strain on household budgets, particularly for low-income families, and exacerbates food insecurity. The nutritional consequences are particularly concerning for children, with rising rates of malnutrition and stunting in vulnerable regions (Fielmua, Gordon, and Mwingyine 2017).

“The agriculture sector is particularly vulnerable to climate variability. When rainfall patterns change, crop yields drop, and that creates a ripple effect—reduced food security, increased rural poverty, and ultimately, more migration.” (Interview with climate scientist, University of Kumasi, Ghana, November 2024)

As already hinted, climate change also presents growing public health challenges across Ghana. Rising temperatures and shifting rainfall patterns create favourable conditions for the spread of vector-borne diseases such as malaria and dengue fever. Flooding events further heighten the risk of waterborne diseases like cholera, especially in densely populated urban areas with inadequate sanitation systems. Beyond physical health, the psychological consequences are becoming increasingly apparent, as communities grapple with displacement, livelihood loss, and uncertainty about the future (Abu, Heath, et al. 2024). These health pressures place additional strain on Ghana's already overburdened healthcare system, highlighting the need for targeted interventions.

The economic toll of climate change in Ghana is substantial. Flood damage, coastal erosion, declining agricultural productivity, and rising healthcare costs collectively put significant pressure on public finances. According to the World Bank's Climate Change Knowledge Portal, climate-related damages could cost Ghana up to 2% of its GDP annually by 2050 if decisive action is not taken. These financial burdens fall disproportionately on low-income households, deepening existing inequalities and hindering poverty reduction efforts. Smallholder farmers in the north and middle belt—who often lack access to insurance and credit—are particularly vulnerable, struggling to recover from climate-related losses and falling further into poverty (Antwi-Agyei et al. 2023; Assan et al. 2018).

3.2 Migration dynamics in Ghana

3.2.1 North-to-south migration and socio-economic disparities

A dominant trend in Ghana is the north-to-south migration flow, which reflects long-standing socio-economic disparities and unequal resource distribution. Economic inequalities, uneven infrastructure development, and disparities in access to education and healthcare have historically fueled this movement. The northern regions—comprising Upper East, Upper West, and Northern—are marked by high poverty rates, limited industrialization, and fewer economic opportunities compared to the more urbanized and economically vibrant southern regions, such as Greater Accra, Ashanti, and Western (Van Der Geest 2011; Duplantier et al. 2017).

“The key drivers of migration in Ghana are economic. But apart from economic reasons, social indicators like education and family ties also play a role. However, what’s often overlooked is that environmental and climate factors are intertwined with these economic drivers.” (Interview with expert from UGHANA, November 2024).

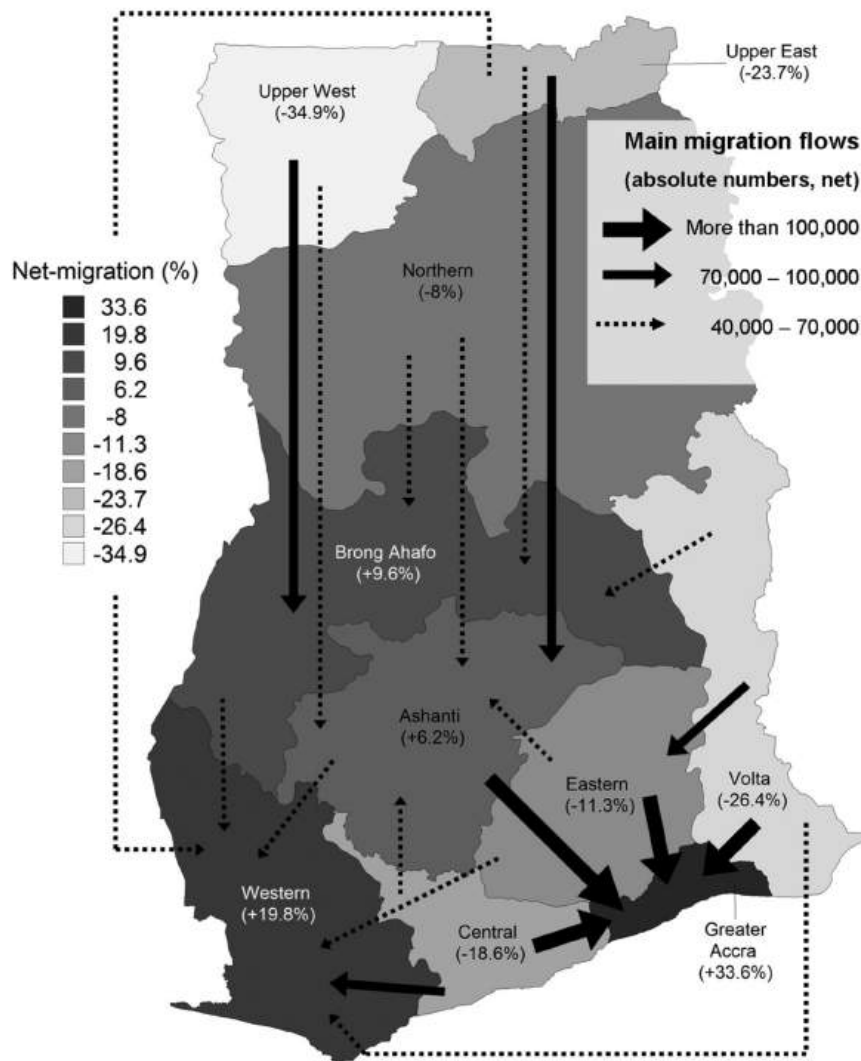


Figure 3: Inter-regional net migration flows and regional net migration rates (Van Der Geest, Vrieling, and Dietz 2010)

Recent statistics underscore the extent of these disparities. In 2020, poverty incidence in northern Ghana stood at approximately 54%, a stark contrast to 7% in Greater Accra and 11% in the Ashanti Region (Ghana Statistical Service, 2021). Similarly, literacy rates in the north average around 37%, significantly lower than the national average of 79%, highlighting persistent gaps in educational access and attainment (UNESCO, 2021). These socio-economic inequalities drive many, particularly young people, to seek better opportunities in southern urban centers. Studies indicate that more than 60% of internal migrants in Ghana originate from the northern regions, with Accra and Kumasi being the most common destinations (Awumbila, Owusu, and Teye 2014).

“Most migration patterns in Ghana are directed towards the southern cities—Accra and Kumasi in particular—because these are the economic hubs. But this rapid urbanization is putting pressure on resources, services, and infrastructure.” (Interview with climate scientist, University of Kumasi, Ghana, November 2024)

3.2.2 Colonial legacies and regional imbalances

The structural imbalances that fuel these migration patterns have their roots in colonial and post-colonial policies. Under colonial rule, the northern regions were primarily designated as labor reserves to supply workers for cocoa plantations and mines in the south. Infrastructure investments, such as railways and roads, were concentrated in southern Ghana, further entrenching the economic divide. Although post-independence policies have aimed to address these inequalities, inconsistent implementation has left northern Ghana heavily dependent on rain-fed agriculture—making it particularly vulnerable to climate change impacts described in the previous section (Kwankye et al. 2009; Bawayelaazaa Nyuor et al. 2016).

3.2.3 Environmental drivers of migration

Environmental factors, as well as the impacts of climate change, have also significantly shaped migration trends from northern Ghana, where agriculture remains the primary livelihood for many communities. As developed in the previous section, prolonged droughts, erratic rainfall, and widespread land degradation have severely reduced agricultural productivity, exacerbating food insecurity across the region. Between 2010 and 2020, yields of staple crops declined by nearly 20%, pushing many families to seek alternative livelihoods in urban centers (Chemura, Schauburger, and Gornott 2020; Hashmiu, Agbenyega, and Dawoe 2022). As a result, migration from northern Ghana to southern cities substantially increased over the same period, with Accra and Kumasi emerging as key destinations. In several studies, including recently as part research conducted in the context of the HABITABLE project (W Neil Adger et al. (Yet to be published)), migrants cited their inability to sustain farming activities as a primary reason for relocating. Women, in particular, have become increasingly active in this migration trend, often seeking employment in informal sectors such as domestic work and petty trading in urban markets (Awumbila et al., 2016).

“Adaptation strategies should focus on sustainable land management, improved irrigation, and alternative livelihood programs. We can’t stop people from migrating, but we can make rural areas more resilient so that migration is a choice rather than a necessity.” (Interview with climate scientist, University of Kumasi, Ghana, November 2024)

3.2.4 Coastal mobility

Beyond the north-to-south migration pattern, Ghana’s coastal regions are also witnessing significant internal mobility. Migration along the coastline—particularly between urban hubs such as Takoradi,

Cape Coast, and Accra—is largely driven by economic opportunities in fishing, trade, and port-related industries. Coastal cities like Tema and Sekondi-Takoradi attract large numbers of migrants due to their thriving fishing trade, shipping activities, and the growing oil and gas sector. For instance, Sekondi-Takoradi, often referred to as Ghana’s “oil city,” experienced a 20% population increase between 2010 and 2020, driven primarily by the expansion of the oil and gas industry (Ghana Statistical Service, 2021).

In addition to permanent relocation, seasonal migration is a common strategy among coastal fishers, who frequently move between landing sites along the coast in response to shifting fish stocks and seasonal variations (Antwi-Agyei et al. 2018). This cyclical movement reflects the adaptability of coastal communities as they navigate the economic opportunities and environmental challenges associated with their livelihoods.

Despite the economic opportunities that attract migrants to coastal regions, mobility in these areas comes with significant challenges. Coastal communities are particularly vulnerable to the impacts of climate change, including sea-level rise, coastal erosion, and frequent flooding. In the Volta River Delta, for example, rising sea levels have displaced entire fishing communities, forcing families to migrate inland and adapt to unfamiliar environments. This displacement disrupts traditional livelihoods and often creates socio-economic tensions between migrants and host communities (Abu, Heath, et al. 2024; W. Neil Adger et al. 2020). Moreover, overcrowding in coastal cities—driven by a combination of rural-urban migration and economic pressures—has led to housing shortages and strained public services, mirroring the challenges faced by inland urban centers.

3.2.5 Socio-economic challenges and remittances

Migrants in urban areas encounter significant socio-economic difficulties, as many are forced to settle in informal communities, where housing conditions are poor, and access to basic services remains inadequate. These settlements often lack proper sanitation, potable water, and healthcare facilities, exposing residents to serious health risks. For instance, cholera outbreaks during the rainy seasons of 2014 and 2017 disproportionately affected migrant populations in Accra’s informal settlements, with infection rates recorded at 40% higher than the city average (WHO, 2018).

Despite these hardships, migrants play a crucial role in both urban economies and rural development. Research has shown that remittances sent by urban migrants to their families in northern Ghana constitute a vital source of household income. Studies indicate that these remittances can account for a substantial proportion of household earnings, with a significant portion directed towards essential expenses such as education, healthcare, and small-scale agricultural investments. Research highlights that migrant remittances play a critical role in improving household welfare and reducing poverty by providing financial resources for investment in human capital and economic activities. Evidence suggests that remittances support economic resilience in rural areas by offering a buffer against economic shocks, diversifying income sources and facilitating expenditure on long-term development needs (R. H. Adams and Cuecuecha 2013).

3.2.6 Feminization of migration

A notable trend shaping internal migration in Ghana is the feminization of migration, which reflects broader shifts in socio-economic roles. Increasingly, women are migrating independently from rural areas in the north to urban centers in the south in pursuit of economic opportunities, education, and greater autonomy. Many of these women find employment in informal markets, domestic work, and

service industries. However, they face unique challenges, including gender-based discrimination, job insecurity, and vulnerabilities to exploitation and abuse (Awumbila 2015b). Concrete examples of this trend can be observed in urban markets such as Makola in Accra, where women from the north dominate the sale of vegetables and other perishable goods. While these market activities provide crucial income opportunities, they often come with precarious working conditions, such as long hours and exposure to health risks due to poor sanitation in market spaces.

3.2.7 Education-driven migration

Educational aspirations are also a significant driver of internal migration in Ghana, particularly among the youth. Many young individuals migrate to urban centers in pursuit of better educational opportunities, with the expectation of securing employment and improving their future prospects. Studies indicate that a substantial proportion of youth migrate primarily for education, with universities in Accra, Kumasi, and Cape Coast serving as major destinations for students nationwide (Amuakwa-Mensah, Boakye-Yiadom, and Baah-Boateng 2016). This influx has led to an increased demand for housing and facilities, which often exceeds supply, resulting in overcrowding and escalating living costs in university towns (Duplantier et al. 2017). Consequently, internal migration for education has not only contributed to urban population growth but also placed additional pressure on infrastructure and public services in these areas (Ackah and Medvedev 2012).

3.2.8 Policy responses to internal migration

In response to the challenges posed by internal migration, the Ghanaian government has implemented several policy measures aimed at managing migration more effectively and improving migrant welfare. The National Migration Policy (NMP)², introduced in 2016, adopts a comprehensive approach by addressing the underlying drivers of migration and promoting regional equity through investment in rural infrastructure and social services (Awumbila, Owusu, and Teye 2014). The policy seeks to balance development across regions to reduce the economic push factors driving rural-urban migration, while also supporting the integration of migrants into urban environments through improved housing, healthcare, and employment initiatives (Awuse, Tadoh Offi, and Acakpovi 2020). Despite these efforts, challenges remain in effectively implementing the policy and ensuring that development interventions adequately address the needs of both migrants and host communities (Teye et al. 2019).

Programs such as *One District, One Factory*³ and the Northern Development Authority aim to create employment opportunities in rural areas to alleviate migration pressures. However, these initiatives have faced criticism for uneven implementation and limited reach. As of 2022, only 125 out of the targeted 216 districts had operational factories, with the majority concentrated in southern Ghana, leaving many northern communities underserved (Ministry of Trade and Industry, 2022). Strengthening these efforts and expanding their reach to disadvantaged regions remain crucial to effectively addressing the root causes of migration.

3.3 Urbanization trends and challenges in Ghana

The transition from a predominantly rural society to an urban-centered population has been driven by demographic, economic, and socio-political factors, alongside substantial internal migration. Historical

² <https://www.iom.int/news/ghana-builds-national-migration-policy-capacity>

³ <https://1d1f.gov.gh/>

data indicates that in 1960, only 23% of Ghanaians lived in urban areas, but this figure surged to 57% by 2021, positioning Ghana as one of the most urbanized nations in West Africa ⁴. The United Nations projects that by 2050, nearly 70% of Ghana’s population will reside in urban areas, emphasizing the ongoing rural-to-urban migration and natural population growth trends in cities (UN DESA). However, this rapid urbanization presents significant challenges, including pressure on housing, infrastructure, and social services, which require strategic urban planning to ensure sustainable development (Asabere et al. 2020).

3.3.1 Key metropolitan areas and urban sprawl

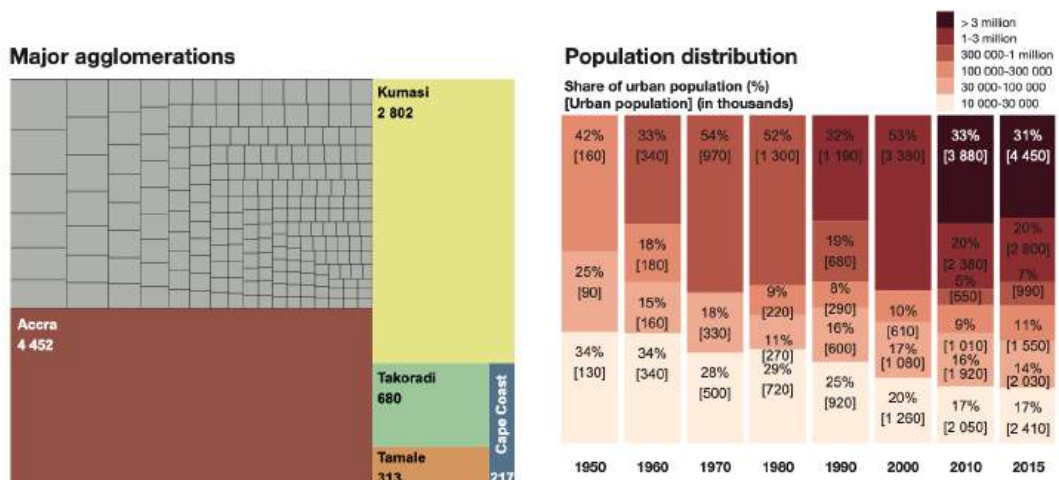
Urban growth in Ghana has been primarily concentrated in key metropolitan areas such as Accra, Kumasi, Sekondi-Takoradi, and Tamale. Accra, as the capital city, remains the largest urban hub, with a population exceeding 5 million as of recent estimates. Kumasi, often regarded as Ghana’s commercial center, follows closely with over 3.6 million residents. As already mentioned, the growth of Sekondi-Takoradi has been largely driven by its emerging oil industry, while Tamale’s expansion is influenced by its role as the administrative center of northern Ghana (Eduful and Hooper 2019). A defining feature of this rapid urbanization is the phenomenon of urban sprawl, where cities expand into surrounding peri-urban and rural areas. The Greater Accra Metropolitan Area (GAMA), for example, has sprawled beyond its administrative boundaries into neighboring districts such as Ga West and Kasoa (Asabere et al. 2020). Similarly, Kumasi’s rapid expansion has extended into adjacent areas like Ejisu and Aboabo, leading to unique governance and infrastructure challenges. These peri-urban settlements, characterized by a blend of urban and rural features, face significant challenges related to service delivery, land use planning, and environmental management (Cobbinah and Amoako 2012).

⁴ <https://population.un.org/wpp/>



Ghana

Population	Total population 27 403 000	Urban population 14 236 000	Urbanisation level 52 %
Agglomerations	Number of agglomerations 209	Metropolitan population 51 %	Average distance between agglomerations 17 km
Density	Average urban density 3 901 hab./km²	Urban land cover 3 650 km²	Urban land cover/ total land cover 1.6 %



AFRICA'S URBANISATION DYNAMICS 2020 © OECD 2020

Figure 4: Urbanization dynamics in Ghana (OCDE 2020)

3.3.2 Drivers of rapid urbanization

Multiple factors contribute to the rapid urbanization of Ghana, including internal migration, economic prospects, natural population growth, and infrastructural expansion. As we have seen in the previous section, internal migration plays a crucial role, as economic disparities between rural and urban areas drive many individuals to cities in search of better opportunities. The influx of internal migrants has significantly contributed to urbanization in major Ghanaian cities, intensifying pressure on infrastructure and public services. Between 2010 and 2020, Accra and Kumasi experienced substantial population growth, largely driven by rural-to-urban migration. Accra, for instance, has seen an annual growth rate of approximately 4%, surpassing the national average and leading to congestion and spatial challenges (Amoako and Inkoom 2018). This rapid expansion has resulted in overcrowding and housing shortages, with an increasing number of residents settling in informal and peri-urban areas, often without access to adequate infrastructure and services. Studies highlight that unplanned urban growth has led to environmental degradation, deteriorating social services, and the proliferation of slums, emphasizing the urgent need for comprehensive urban planning and investment in social infrastructure to address the challenges posed by Ghana's urbanization trends (Asabere et al. 2020). Old Fadama, one of the largest informal settlements in Accra, exemplifies the challenges associated with unplanned urbanization. Housing conditions in this settlement are precarious, with many residents living in makeshift shelters that are highly vulnerable to flooding during the rainy season (Amoako 2018). Migrants living in Old Fadama primarily depend on low-paying and insecure jobs within the informal sector, which offers little to no financial stability (Morrison 2017). Additionally, limited access to essential public services, such as healthcare and education, perpetuates cycles of poverty and restricts opportunities for social mobility. Despite these challenges, community-led efforts and collaborations with non-governmental organizations have sought to address sanitation issues and improve living conditions (Kritz 2018). However, structural barriers and lack of governmental support continue to hinder sustainable development in the area.

3.3.3 Natural population growth and infrastructure expansion

Natural population growth, influenced by declining mortality rates and relatively high fertility rates, continues to be a significant factor driving urbanization in Ghana. Between 2010 and 2020, the country's urban population grew at an average annual rate of 3.2%, outpacing the national population growth rate of 2.1% (Owusu and Oteng-Ababio 2015). Infrastructure development has further fuelled urban expansion, with improved transportation networks and expanded access to electricity and water supply systems making urban and peri-urban areas more attractive for both businesses and residents (Asabere et al. 2020). For instance, the construction of major road networks, such as the Tema Motorway in the 1960s and subsequent expansions in the Greater Accra and Ashanti regions, has significantly enhanced connectivity and accessibility (Jedwab and Moradi 2011). Similarly, initiatives such as the Ghana National Electrification Scheme, which extended electricity to rural and peri-urban areas, have played a crucial role in fostering urban sprawl and economic growth by attracting investment and migration to these areas (Owusu-Manu et al. 2019).

3.3.4 Challenges associated with rapid urbanization

While urbanization has brought economic growth and improved access to essential services in Ghana, it has also introduced significant challenges that threaten the sustainability of urban centers. The rapid expansion of cities has outpaced the provision of affordable housing, leading to the proliferation of informal settlements. In Accra, approximately 40% of the population resides in informal settlements such as Old Fadama and Agbogbloshie (Morrison 2017). Studies have shown that during periods of

heavy rainfall, these settlements experience severe flooding, leading to waterborne disease outbreaks such as cholera, with infection rates significantly higher than city averages (Adongo et al. 2014). The lack of formal public health infrastructure further exacerbates health challenges in these areas, as residents struggle to access quality healthcare services (Fuseini and Kemp 2016). Addressing these challenges requires coordinated policy efforts to enhance urban planning, improve infrastructure provision, and integrate informal settlements into the broader urban framework (Asabere et al. 2020).

Urban growth in Ghana is also placing strain on transportation systems, particularly in major cities like Accra, which experiences chronic traffic congestion. This situation is exacerbated by the lack of an integrated public transportation system, leading to increased vehicle emissions, air pollution, and reduced productivity (Armah, Yawson, and Pappoe 2010). The growing vehicle population and inadequate transport infrastructure have further worsened congestion, negatively impacting economic output and quality of life (Harriet and Poku 2013).

Environmental degradation is another critical consequence of rapid urbanization. The expansion of cities has led to widespread deforestation, biodiversity loss, and reinforcing even further the risks related to flooding. In Kumasi, forested areas have been cleared to accommodate residential and industrial developments, altering local ecosystems and increasing vulnerability to flooding (Asabere et al. 2020).

Access to essential services such as healthcare, education, and waste management remains unevenly distributed across Ghana's urban areas, with informal settlements facing the most significant deficits. In Old Fadama, for instance, only 10 percent of households have access to proper sanitation facilities, compared to 68 percent in formal urban neighbourhoods (Ghana Statistical Service, 2021). Urban poverty remains a pressing issue, with approximately 23 percent of urban residents living below the poverty line as of 2020. Informal sector workers, who make up a large proportion of the urban labor force, are particularly vulnerable to income instability and the lack of social protection, which perpetuates cycles of poverty in city centers (UN-Habitat, 2020).

Access to essential services such as healthcare, education, and waste management remains unevenly distributed across Ghana's urban areas, with informal settlements facing the most significant deficits. In Old Fadama, for example, only a small fraction of households have access to proper sanitation facilities compared to more affluent urban neighbourhoods, exacerbating health risks and environmental challenges (Cobbinah et al. 2019). Urban poverty remains a pressing issue, with approximately 23% of urban residents living below the poverty line as of 2020. Informal sector workers, who constitute a large proportion of the urban labour force, are particularly vulnerable to income instability and lack of social protection, which perpetuates cycles of poverty in city centers (Farvacque-Vitkovic et al. 2008).

3.3.5 Economic opportunities amid challenges

Despite these challenges, urbanization has also created opportunities for economic growth and social development. Cities such as Accra and Kumasi have evolved into dynamic hubs of innovation and entrepreneurship, attracting investments and generating employment. The redevelopment of the Kejetia Market in Kumasi, for example, has modernized one of the country's most vital commercial centers, reinforcing its position as a key regional economic powerhouse (Farvacque-Vitkovic et al. 2008). Similarly, the discovery of oil and gas in Sekondi-Takoradi has transformed the city into a thriving economic hub, yet the benefits of this economic boom have not been evenly distributed.

3.3.6 Policy responses to urban challenges

Recognizing the pressing challenges posed by rapid urbanization, the Ghanaian government has introduced several policy interventions to promote sustainable urban development. The National Urban Policy (NUP), launched in 2012, aims to enhance urban governance, improve infrastructure provision, and promote environmental sustainability. Key strategies outlined in the policy include expanding affordable housing, upgrading informal settlements, and strengthening urban planning capacity (Anarfi, Shiel, and Hill 2020). Despite these efforts, challenges remain in fully implementing the policy due to resource constraints and administrative inefficiencies (Aryee et al. 2018).

To address urban transportation challenges, the Ghana Urban Mobility and Accessibility Project has been introduced to improve public transit systems in major cities. The implementation of Bus Rapid Transit (BRT) systems in Accra and Kumasi represents a significant step toward reducing congestion and enhancing mobility, though issues such as delays and funding limitations have hindered their full deployment (Fuseini and Kemp 2016).

Efforts to tackle environmental issues have also been initiated, including reforestation programs around urban areas and investments in climate-resilient infrastructure. Coastal cities like Sekondi-Takoradi have seen mangrove restoration projects aimed at combating the effects of sea-level rise and coastal erosion, with mixed success in terms of long-term sustainability (Farvacque-Vitkovic et al. 2008).

In short, urbanization in Ghana presents both opportunities and challenges. On one hand, it has fueled economic growth, expanded access to services, and fostered innovation; on the other, it has placed significant strain on infrastructure, deepened social inequalities, and heightened environmental risks. To fully harness the potential of urbanization as a driver of sustainable development, Ghana must adopt integrated and inclusive policies that address these complex challenges. A balanced approach—one that prioritizes equitable service delivery, environmental sustainability, and economic inclusivity—will be essential in shaping a resilient and prosperous urban future for the country.

3.4 Mapping the national and regional policy framework

Ghana has developed a range of policies and initiatives to address the interlinked challenges of climate change, migration, and urbanization. These frameworks aim to foster sustainable development, ensure social protection for vulnerable populations, and build resilience against environmental stressors. However, gaps in coordination and implementation remain, creating opportunities for improved policy coherence and effective action.

A core instrument guiding Ghana's effort on climate change is the National Climate Change Policy (NCCP) (2013), which promotes climate-resilient and low-carbon development strategies. The NCCP provides a basis for integrating climate adaptation measures into sectoral policies, especially those related to agriculture, water, and infrastructure. Complementing this policy is the Ghana National Adaptation Plan (NAP) process, which seeks to strengthen institutional capacities and mainstream adaptation strategies into national development planning. These climate-focused policies, while broad in scope, increasingly recognize the role of human mobility—particularly rural-urban migration—in exacerbating both environmental and urban challenges.

On the migration front, Ghana's National Migration Policy (NMP) (2016) provides a comprehensive framework for managing internal, regional, and international mobility. Although it focuses significantly on diaspora engagement and labor migration, the policy has recently placed greater emphasis on the link between migration, environmental pressures, and resource scarcity. The NMP recognizes that climate-related factors can amplify rural unemployment and land degradation, prompting people to seek better livelihoods in urban areas. However, operational strategies to address such climate-induced movements remain limited.

To tackle rapid urban growth, the National Urban Policy (NUP) (2012) was introduced to promote spatially balanced development and enhance infrastructure provision in towns and cities. This policy recognizes the role of migration in driving urban sprawl and has provisions to improve housing, public services, and environmental management in urban centers. Moreover, the government's Coordinated Programme of Economic and Social Development Policies highlights the need for inclusive urban planning that addresses climate vulnerability and population pressures.

At the regional level, Ghana is a signatory to frameworks by the Economic Community of West African States (ECOWAS) and the African Union (AU), such as the Migration Policy Framework for Africa. These instruments underscore the importance of regional collaboration in managing cross-border migration, mitigating climate risks, and ensuring that urbanization strategies are harmonized across member states. Their emphasis on shared responsibility and coordinated responses underscores the transnational nature of environmental challenges.

Despite these policy efforts, gaps in implementation persist. A key challenge is the lack of effective coordination among the multiple government agencies tasked with climate, migration, and urban development. Overlapping mandates and limited interagency communication can undermine the coherence of policy interventions. Additionally, resource constraints—both financial and technical—limit the ability of local authorities to enforce regulations, upgrade infrastructure, and provide social services to fast-growing urban populations. Data limitations also impede evidence-based policymaking, particularly regarding the scale of climate-induced displacement within Ghana.

Opportunities for improvement include stronger institutional collaboration through a central coordinating body or task force that integrates migration and climate considerations into urban planning. Expanded partnerships with civil society, academia, and the private sector could enhance data collection, policy monitoring, and resource mobilization. Leveraging innovative financing mechanisms, such as climate funds or public-private partnerships, could help address funding shortfalls. Finally, efforts to build local capacity—through training programs and technology transfer—would enable metropolitan, municipal, and district assemblies to better address climate-induced migration and urban growth pressures.

Kenya



Figure 5 : Map of Kenya (Encyclopædia Britannica, 2011)

3.5 Climate trends and impacts in Kenya

Kenya, situated in East Africa along the equator, is facing significant challenges due to climate change. The country's diverse ecological zones—ranging from arid and semi-arid lands (ASALs) to fertile highlands—are experiencing distinct climate-related impacts that are reshaping its socio-economic and environmental landscapes. Rising temperatures, erratic rainfall patterns, prolonged droughts, and increasingly severe weather events are among the key challenges threatening livelihoods and ecosystems. These climate trends interact with Kenya's existing socio-economic vulnerabilities, exacerbating inequalities, hindering sustainable development, and intensifying climate-induced migration.

3.5.1 Intensifying droughts in ASALs

In Kenya's ASALs— which cover approximately 80% of the country's land area and support nearly 16 million people—the effects of climate change are particularly severe. Counties such as Turkana, Mandera, and Garissa have experienced rising temperatures, with average annual increases of 0.2°C to 0.4°C per decade over the last 50 years (Huho et al. 2023; Yator 2024). The warming trend is especially pronounced during the dry season, worsening water scarcity and undermining traditional pastoralist livelihoods. In addition, rainfall in these regions has become increasingly unpredictable, with prolonged droughts occurring more frequently (Sagero, Shisanya, and Makokha 2021). Between 2010 and 2020 alone, Kenya endured five severe droughts, including the devastating 2016 drought, which left over 3 million people food insecure and forced thousands of pastoralist families to abandon their homes in search of water and pasture (Uhe et al. 2018). The failure of consecutive rainy seasons has severely disrupted agricultural production and strained water resources, further deepening the vulnerability of fragile ecosystems and communities (IPCC 2022).

3.5.2 Changing rainfall patterns in the highlands

In contrast, Kenya's highlands—the country's agricultural heartlands—are experiencing changing rainfall patterns and rising temperatures that are disrupting traditional growing seasons and reducing crop yields (Sagero, Shisanya, and Makokha 2021; Kilavi et al. 2018). Regions such as Nakuru, Nyeri, and parts of the Rift Valley, which have historically relied on predictable bimodal rainfall—long rains from March to May and short rains from October to December—are now facing erratic weather patterns. Delays in the onset of rains and uneven distribution have led to significant agricultural losses. For example, the failure of the 2021 short rains in many parts of the highlands resulted in an estimated 30% reduction in maize yields, driving up food prices nationwide (Kogo, Kumar, and Koech 2021). Farmers dependent on coffee, tea, and maize—key pillars of Kenya's economy—are struggling to adapt, with many transitioning to drought-tolerant alternatives like sorghum and cassava (Recha 2018; Rwigema 2021). While these crops offer a measure of resilience, they are often less profitable, raising long-term concerns about household incomes and food security.

3.5.3 Escalating flood risks

Flooding is also becoming more frequent and severe, particularly in Kenya's river basins and urban centers (Enenkel, Engle, and Svoboda 2024; Byrne et al. 2024). In 2020, heavy rains caused major rivers such as the Tana and Nzoia to overflow, displacing over 300,000 people and damaging critical infrastructure, including bridges, roads, and schools (MacLeod et al. 2021; Kiptum et al. 2024). Low-lying areas around Lake Victoria have also been heavily affected, with rising water levels inundating homes and farms, disrupting livelihoods, and displacing fishing communities. In urban areas like Nairobi and Kisumu, flooding poses unique challenges, as heavy rains frequently overwhelm aging and poorly maintained drainage systems, particularly in informal settlements. In May 2021, flash floods in Nairobi's informal neighborhoods of Kibera and Mathare displaced thousands, with floodwaters mixing with untreated sewage, triggering a public health crisis marked by outbreaks of cholera and typhoid (Juma et al. 2023).

3.5.4 Gender and child vulnerabilities

Like in Ghana, women and children are disproportionately affected by the impacts of climate change and migration (Rao 2019). In rural areas, women bear the burden of water scarcity, often traveling long distances to fetch water for household use—time that could otherwise be spent on income-generating activities or education. In urban areas, female migrants frequently work in the informal

sector, taking on roles such as domestic workers or small-scale traders, where they are at increased risk of exploitation, job insecurity, and gender-based violence (Amwata, Nyariki, and Musimba 2016). Children, meanwhile, face significant disruptions to their education as families are forced to migrate or divert their limited resources to meet immediate survival needs.

3.5.5 Coastal challenges: sea-level rise and erosion

Kenya's coastal regions, including Mombasa, Kilifi, and Lamu, are facing distinct climate challenges associated with sea-level rise, coastal erosion, and saline intrusion (Kebede et al. 2012). An annual sea-level rise of approximately 3 millimeters, coupled with intensified storm surges, is threatening critical infrastructure, mangrove forests, and tourism-dependent economies. The degradation of coral reefs—natural barriers that protect the coastline from storm surges—has further heightened the vulnerability of coastal communities. In Mombasa, rising sea levels have led to significant beach erosion, undermining the foundations of key infrastructure, including hotels and ports. As a result, the tourism sector, a vital contributor to Kenya's GDP, has suffered considerable losses, deepening economic hardships for local communities that rely heavily on tourism-related employment (Omuombo, Olago, and Odada 2013).

3.5.6 Urban food systems and rising costs

Climate change is also having a profound impact on Kenya's urban food systems, where disruptions in rural agricultural production are creating ripple effects on food security and affordability. Cities like Nairobi, which depend on food supplies from the Rift Valley and Central Kenya for vegetables, fruits, and grains, are feeling the strain of declining agricultural productivity (Detelinova et al. 2023). In recent years, the country has witnessed a significant surge in maize flour prices, largely driven by the aforementioned prolonged droughts and unpredictable rainfall patterns that have severely affected production. The rising cost of staple foods has placed immense pressure on urban low-income households, which already allocate a large portion of their income to food. This has further deepened food insecurity and heightened economic vulnerability among marginalized urban populations (De Jong et al. 2024).

3.5.7 Public health strains

Kenya's public health systems are also under growing strain as climate change exacerbates health risks across the country. Rising temperatures and stagnant floodwaters have created ideal breeding conditions for vector-borne diseases such as malaria and dengue fever. In coastal areas, the incidence of dengue fever significantly increased between 2015 and 2020, correlating with higher temperatures and rainfall variability (Githeko 2021). Waterborne diseases, including cholera and typhoid, are also becoming more prevalent in both rural and urban areas following flood events. These health threats are further aggravated by inadequate sanitation infrastructure and overcrowded living conditions in informal settlements, where access to clean water and proper hygiene facilities remains limited (Okaka and Odhiambo 2018).

3.5.8 Economic impacts on agriculture and tourism

Kenya's economic sectors are increasingly impacted by climate change, with agriculture, tourism, and infrastructure among the hardest hit. Agriculture, which employs over 70% of the country's workforce and contributes approximately 25% to the GDP (WBG, Data Catalog), remains highly vulnerable to climate-related shocks. Declining yields of staple crops, coupled with rising costs of agricultural inputs, are exacerbating rural poverty and food insecurity, leaving many farming communities struggling to sustain their livelihoods. Similarly, the tourism sector—deeply reliant on Kenya's rich landscapes and

diverse wildlife—is under threat as habitat degradation and extreme weather events jeopardize iconic national parks and reserves such as the Maasai Mara (Rotich 2022).

3.5.9 Adaptation and mitigation strategies

In response to the challenges posed by climate change, Kenya has implemented a range of adaptation and mitigation strategies aimed at enhancing resilience across key sectors. The National Climate Change Action Plan (NCCAP) provides strategic priorities to reduce vulnerabilities and strengthen adaptation efforts, focusing on areas such as climate-smart agriculture, improved water management systems, and investments in renewable energy (Kwena et al. 2015). Kenya has positioned itself as a regional leader in geothermal energy production, with the Olkaria Geothermal Plant contributing a significant share to the country’s electricity supply and supporting low-carbon development goals (Dalla Longa and Van Der Zwaan 2017). Afforestation initiatives such as the Green Belt Movement further contribute to Kenya’s climate mitigation efforts by restoring degraded landscapes and enhancing carbon sequestration (Oulu 2011).

Urban areas are also implementing proactive measures to adapt to climate change. Nairobi’s Integrated Urban Development Plan emphasizes upgrading drainage systems, flood risk mapping, and incorporating green infrastructure to mitigate extreme weather impacts (Ruth, Lagat, and Lilian 2020). Coastal cities such as Mombasa are addressing sea-level rise through the construction of seawalls and the restoration of mangrove ecosystems, which act as natural buffers against storm surges (Atieno et al. 2024).

These large-scale efforts are complemented by community-based adaptation projects, including rainwater harvesting and early warning systems for floods and droughts, empowering local populations to better cope with climate-related risks (Bryan et al. 2013). However, challenges such as financial constraints and limited coordination continue to hinder the full implementation and scaling of these climate initiatives.

3.6 Migration dynamics in Kenya

3.6.1 Rural-to-urban migration patterns

The predominant migration pattern in Kenya is the rural-to-urban shift, with cities such as Nairobi, Mombasa, and Kisumu attracting a large share of internal migrants. These urban hubs offer prospects for employment, improved living conditions, and better access to education and healthcare (Ayiemba 2022). Conversely, rural regions—particularly the ASALs, including Turkana, Mandera, and Garissa—experience high out-migration rates due to limited economic opportunities and escalating environmental stresses (Oucho, Oucho, and Ochieng 2014). Migration from these underdeveloped regions underscores the persistent economic inequalities that have shaped Kenya’s development trajectory.

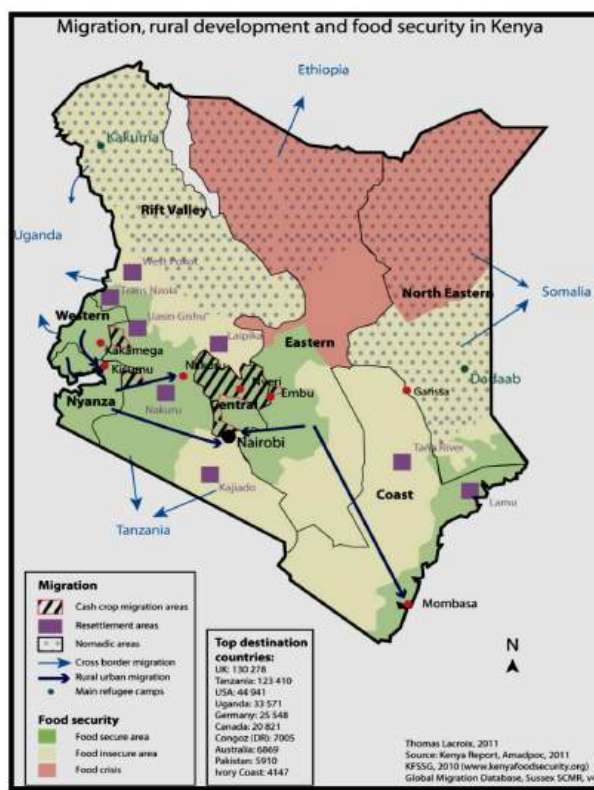


Figure 6: Kenya’s Internal and International Migration Routes

3.6.2 Pastoralist livelihoods under pressure in ASALs

The ASAL regions, especially Turkana, are deeply rooted in pastoralist traditions, with livestock herding serving as the backbone of the local economy and culture (Opiyo et al. 2015; 2016; Yoda, Anthony, and Kihara 2020). However, climate change, land degradation, and dwindling resources are placing immense pressure on these livelihoods. Turkana County, one of the most remote and marginalized areas in Kenya, exemplifies the challenges pastoralist communities face. With approximately 60% of its population relying on livestock, the region has been severely affected by recurrent droughts, leading to significant livestock losses (Opiyo et al. 2015). The 2017–2019 drought, for example, resulted in the loss of up to 80% of livestock herds, plunging many households into extreme poverty and driving migration to urban areas in search of alternative livelihoods (Huho et al. 2023).

3.6.3 Economic inequalities and disparities

Migration data underscores the stark disparities fuelling these trends. By 2020, poverty levels in the ASALs averaged 68%, with Turkana’s poverty rate exceeding 75%, compared to 29% in urban areas like Nairobi and Mombasa (Kenya National Bureau of Statistics, 2022). These economic challenges are further compounded by limited access to essential services, with literacy rates in Turkana standing at just 38%—far below the national average of 82% (UNESCO, 2021). As pastoralist livelihoods become increasingly unsustainable, many families are forced to migrate to urban areas or neighbouring counties in search of better opportunities and alternative income sources.

3.6.4 Historical roots of uneven development

Kenya's uneven development has deep historical roots, with colonial-era policies playing a pivotal role in shaping the country's current socio-economic landscape. During the colonial period, fertile highlands were prioritized for settler agriculture, becoming the epicenter of economic activities, while arid and ASALs such as Turkana were marginalized and excluded from meaningful development (Simson 2024). Post-independence efforts to integrate these regions into the national economy have been inconsistent, often failing to address the specific needs of pastoralist communities. The lack of substantial investments and economic diversification has perpetuated out-migration from these regions to urban centers, leaving Turkana's population particularly vulnerable to poverty and socio-economic exclusion.

3.6.5 Climate change as a driver of migration

Climate change has further intensified internal migration trends, particularly from ASALs (Yator 2024). These cycles, which once allowed pastoralist communities to sustainably manage scarce resources, are now marked by conflict over dwindling water and pasture, both within Kenya and across its borders. The increasing frequency and severity of droughts have compelled many pastoralist families to migrate permanently to urban centers in search of alternative livelihoods. However, as further developed in the following section, integrating into urban economies presents significant challenges, with many migrants settling in informal settlements where opportunities are scarce, and living conditions precarious (Ayiemba 2022).

3.6.6 Coastal migration and environmental pressures

Kenya's coastal regions also experience significant internal migration, driven by economic opportunities in tourism, fishing, and infrastructure development. Cities such as Mombasa and Malindi attract migrants seeking employment in industries tied to the ocean economy, including hospitality and logistics. However, these regions are increasingly affected by environmental challenges such as rising sea levels and coastal erosion (Kebede et al. 2012). In Kilifi, for example, entire communities have been forced to relocate inland as their fishing grounds and homes are gradually being lost to the encroaching sea. This migration has placed additional strain on Mombasa's already stretched infrastructure, intensifying competition for essential services such as housing and sanitation.

3.6.7 Challenges and opportunities in urban centers

While urban centers across Kenya provide opportunities for migrants, they also present significant challenges. Many migrants settle in informal settlements such as Kibera in Nairobi and Bangladesh in Mombasa, where overcrowded living conditions, poor sanitation, and inadequate access to healthcare services heighten their vulnerability. For example, during the heavy rains of 2020, widespread flooding in Nairobi's informal settlements displaced thousands of people, contaminating water sources and leading to outbreaks of waterborne diseases such as cholera and typhoid (Juma et al. 2023).

Nevertheless, Kenya's urban areas continue to attract migrants in search of better livelihoods, underscoring the resilience and adaptability of migrant populations. The persistence of internal migration highlights the urgent need for policies that address both the challenges and opportunities posed by urbanization, ensuring that migrants can contribute meaningfully to Kenya's socio-economic development. Internal migration in Kenya brings significant socio-economic benefits that extend beyond urban areas. Migrants play a crucial role in urban economies, contributing to sectors such as small-scale trading, construction, and domestic work (Fry, Zickgraf, et al. 2024). Their economic activities are vital to the functioning of cities, providing affordable goods and essential services to

urban residents. Beyond their immediate contributions, migrants also support rural economies through remittances, which account for up to 25% of household income in some ASAL regions (Omondi 2014). These financial inflows help sustain families, fund education, and improve living standards in migrants' home communities, serving as a critical lifeline in regions with limited economic opportunities.

3.6.8 Feminization of migration

A notable shift in Kenya's migration patterns, similar to what we have seen in Ghana, is the increasing participation of female migrants. Historically, migration was predominantly male-driven, with men relocating to urban centers for work while women remained in rural areas to manage households. However, recent trends indicate that more women are independently migrating in pursuit of economic opportunities and education (Nasiyo 2016). Many of these women find employment in informal sectors such as domestic work and small-scale trading in local markets. While migration provides them with greater economic independence and agency, it also exposes them to significant challenges, including exploitation, gender-based violence, and limited access to social protections (Camlin, Snow, and Hosegood 2014). Despite these challenges, female migrants play a crucial role in supporting their families, with remittances frequently directed toward the education and well-being of children (Brockhoff and Eu 1993).

3.6.9 Policy measures and development initiatives

To address the challenges posed by internal migration, the Kenyan government has introduced several policy measures aimed at managing migration flows and mitigating their impacts. The National Migration Policy, adopted in 2018, provides a comprehensive framework for improving migrant welfare and addressing rural-urban inequalities. Key interventions under the policy include investments in rural development through initiatives such as irrigation projects, vocational training programs, and enhanced access to healthcare and education in ASAL regions (Oucho 2007). In urban areas, initiatives such as Nairobi's Integrated Urban Development Plan aim to upgrade informal settlements, expand affordable housing, and improve public services to better accommodate migrant populations.

Additionally, national development programs such as the *Big Four Agenda*⁵, *Kenya Vision 2030*⁶, and the *LAPSSET Corridor*⁷ aim to create economic opportunities in rural and peri-urban areas to alleviate migration pressures on cities. However, these initiatives face persistent challenges related to funding, implementation, and the equitable distribution of resources. Strengthening these programs and tailoring them to the diverse needs of different regions will be crucial in effectively addressing the underlying drivers of migration and fostering balanced national development.

3.7 Urbanization trends and challenges in Kenya

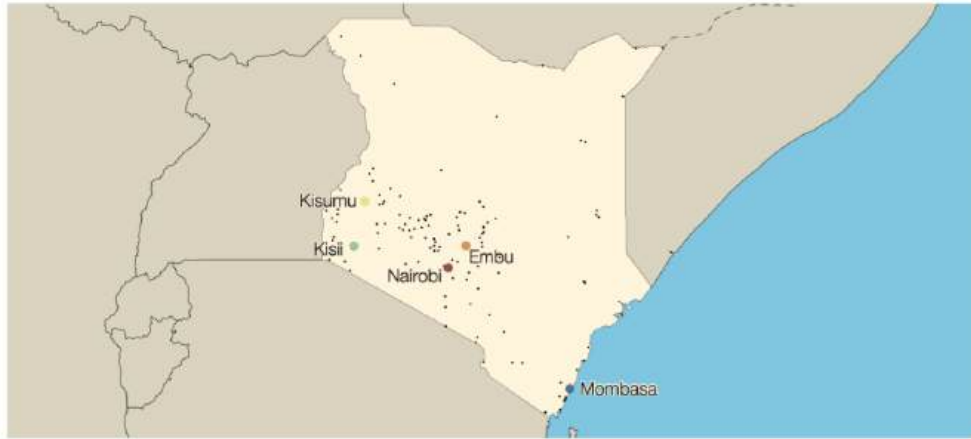
In the early post-independence years, urbanization in Kenya was relatively modest, with only about 8% of the population living in urban areas in 1960 (World Bank, 2016). By 2020, this figure had risen to nearly 30%, and projections suggest that by 2050, more than half of the population will reside in urban areas (Kenya National Bureau of Statistics, 2019). Nairobi, the capital and largest city, now has a population exceeding 4.4 million, while other cities such as Mombasa, Kisumu, Nakuru, and Eldoret

⁵ <https://big4.delivery.go.ke/>

⁶ <https://vision2030.go.ke>

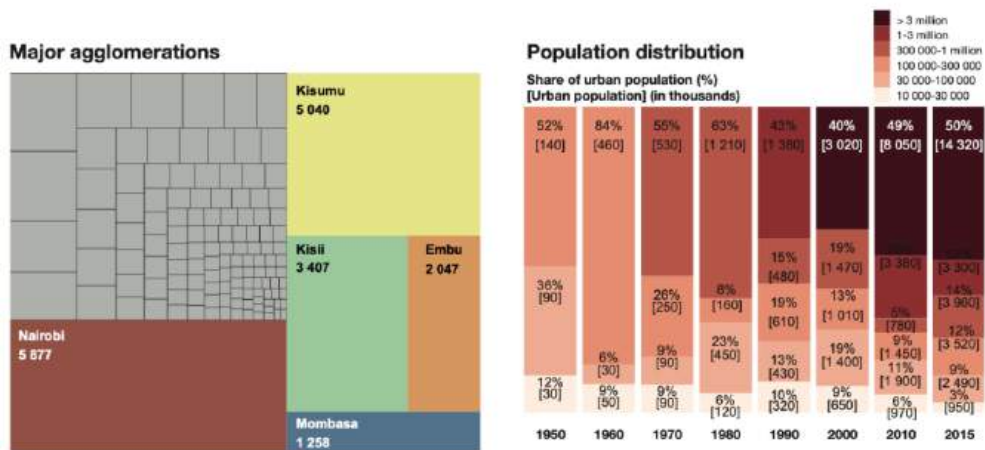
⁷ <https://lapsset.go.ke/>

have experienced substantial growth due to their roles as economic, administrative, and transportation hubs (Kenya National Bureau of Statistics, 2019).



Kenya

Population	Total population 44 157 000	Urban population 28 559 000	Urbanisation level 65 %
Agglomerations	Number of agglomerations 126	Metropolitan population 25 %	Average distance between agglomerations 28 km
Density	Average urban density 1 235 hab./km²	Urban land cover 23 131 km²	Urban land cover/ total land cover 4.1 %



AFRICA'S URBANISATION DYNAMICS 2020 © OECD 2020

Figure 7: Urbanization dynamics in Kenya (OECD 2020)

3.7.1 Drivers of urban expansion

A range of factors drives urbanization in Kenya, with internal migration playing a crucial role. Economic disparities between rural and urban areas push many individuals to seek better opportunities in cities, as rural regions, particularly in ASAL counties such as Turkana, Mandera, and Garissa, offer limited livelihood opportunities due to their reliance on subsistence agriculture and pastoralism. Urban centers, in contrast, provide employment in industries, services, and the informal economy, with Nairobi hosting Kenya's formal financial and industrial sectors, and Mombasa serving as a key trade and logistics hub due to its strategic port location (Mundia 2017). Kisumu has similarly become a critical regional hub, linking Lake Victoria's economy to national and international markets (Mireri 2006).

Natural population growth is another significant driver of urban expansion. Kenya's urban population is growing at an annual rate of 4%, surpassing the national population growth rate of 2.3%. This rapid increase is driven by high fertility rates and declining mortality, particularly among younger urban populations (Jo Huth 1984). As more families migrate to cities, peri-urban areas are rapidly expanding to accommodate new residents, contributing to Kenya's changing urban landscape (Nyamwange 1995).

Infrastructure development has played a pivotal role in accelerating urbanization by improving connectivity between rural and urban areas. Investments in major road networks, such as the Nairobi Expressway and the Standard Gauge Railway linking Nairobi and Mombasa, have significantly enhanced trade and mobility, making cities more attractive for economic activities (Kamakia, Guoqing, and Zaman 2018). Additionally, electrification initiatives have expanded access to energy in peri-urban settlements, further driving migration to urban centers by improving living conditions and supporting business opportunities (Thuo 2010).

3.7.2 Informal settlements and peri-urban growth

While urbanization in Kenya presents opportunities for economic growth, innovation, and social development, it also brings significant challenges. A defining feature of urban life is the widespread presence of informal settlements, as cities struggle to meet the housing demands of a rapidly expanding population. In Nairobi, informal settlements such as Kibera and Mathare are home to a significant portion of the urban poor. These areas lack essential services, including clean water, sanitation, and healthcare. For example, in Kibera, only 24% of residents have access to proper sanitation facilities, compared to 83% in Nairobi's more affluent neighborhoods (Juma et al. 2023).

Urban sprawl has led to the rapid expansion of peri-urban settlements, where rural and urban characteristics intersect. In Nairobi, areas such as Rongai and Kitengela have witnessed significant growth, transforming former farmland into residential and commercial spaces (Duncan 2022). This rapid expansion presents governance challenges, as many peri-urban areas fall outside municipal boundaries, making it difficult to regulate development and provide adequate services. Mombasa faces similar challenges, with peri-urban areas such as Jomvu and Likoni growing rapidly without the necessary infrastructure to support their increasing populations (Kilcullen 2019).

3.7.3 Environmental impacts of rapid urbanization

The environmental consequences of urbanization are also a growing concern. Rapid construction and expansion have resulted in the depletion of forests, wetlands, and other ecosystems that provide crucial environmental services. In Nairobi, wetlands such as the Nairobi Dam ecosystem have been

encroached upon by settlements and industries, exacerbating flooding during the rainy season (Kaburu, Koech, and Manguriu 2019). Similarly, Kisumu’s wetlands along Lake Victoria have been severely affected by pollution and unregulated development, threatening biodiversity and increasing the risk of waterborne diseases.

3.7.4 Economic disparities in urban areas

Economic disparities remain a significant challenge in Kenya’s urbanization process. While cities such as Nairobi and Mombasa serve as economic powerhouses, they are also marked by stark inequalities. A large portion of the urban workforce is employed in the informal sector, where low wages, job insecurity, and a lack of social protections persist (Ngayu 2011). Urban poverty rates remain high, with approximately 33% of Nairobi’s residents living below the poverty line. Despite these challenges, urbanization presents considerable opportunities for economic advancement and poverty alleviation, as urban centers continue to attract investments, foster entrepreneurship, and drive innovation (World Bank 2016). Mombasa’s strategic position along the Indian Ocean makes it a crucial hub for trade and tourism, while Kisumu has emerged as a key center for agriculture and fishing industries (Hope 2012).

3.7.5 Policy responses and urban resilience

In an effort to manage urban growth sustainably, the Kenyan government has introduced several policies and programs, including Kenya Vision 2030 and the National Urban Development Policy, which emphasize integrated planning, infrastructure development, and equitable resource allocation to address urban challenges (Omolo 2013). Under the Big Four Agenda, initiatives aimed at reducing the country’s housing deficit by constructing 500,000 affordable housing units were launched. However, as of 2021, only 10% of this target had been achieved, highlighting the need for increased investment and improved implementation efficiency (Ngayu 2011; Lawanson 2021).

Urban resilience efforts are also gaining momentum, with cities like Nairobi and Kisumu investing in climate adaptation strategies such as flood mitigation projects and green infrastructure development (Kibii 2023). Nairobi’s Karura Forest restoration initiative is a notable example, enhancing urban green spaces, reducing the city’s carbon footprint, and providing much-needed recreational spaces for residents. Meanwhile, Mombasa has focused on mangrove restoration along its coastline to combat rising sea levels and protect its tourism-dependent economy from the adverse effects of climate change.

3.8 Mapping the national and regional policy framework

Kenya’s policy landscape related to climate change, migration, and urbanization has evolved considerably over the past decade, reflecting growing recognition of their interconnected impacts on socioeconomic development. At the national level, the Climate Change Act (2016) serves as a cornerstone, providing a legal framework for coordinating climate action and mainstreaming climate considerations into development planning. The National Climate Change Action Plan (NCCAP), revised in 2018, lays out specific mitigation and adaptation priorities, including strategies to enhance resilience in agriculture and water resources—key sectors where climate-induced shocks often precipitate rural-urban migration. In parallel, the National Adaptation Plan (2015–2030) underscores the need for integrated responses to vulnerabilities, highlighting drought-affected regions where resource scarcity spurs population movements.

Kenya's broader development blueprint, Vision 2030, prioritizes sustainable urbanization and improved living conditions as part of its long-term growth agenda. The National Spatial Plan (2015–2045) further complements this vision by guiding land use and infrastructure development in ways that can help absorb growing migrant populations. Additionally, the Urban Areas and Cities Act (2011) seeks to strengthen urban governance structures, aiming to improve service delivery for rapidly expanding towns and cities. Recognizing the specific challenges of pastoralist communities and arid lands—often the epicenters of climate-induced migration—the government has also introduced the National Policy for the Sustainable Development of Northern Kenya and Other Arid Lands (2012). This policy encourages livelihood diversification, resource management, and infrastructural development in traditionally marginalized regions, with the aim of reducing migration pressures.

Despite the existence of these frameworks, implementation gaps persist. Coordination among relevant ministries and agencies remains fragmented, leading to overlapping mandates and inefficiencies. While climate change policies acknowledge the importance of migration, they often lack explicit guidelines on how to manage population movements and urban growth in tandem. Financial constraints also hamper efforts to translate plans into action, as climate finance mechanisms can be complex and resource allocation tends to prioritize short-term, immediate needs over long-term resilience-building. Furthermore, data gaps pose a significant challenge; the lack of reliable, disaggregated information on climate-induced migration patterns makes it difficult to design evidence-based interventions and measure policy effectiveness over time.

Addressing these issues presents several opportunities. First, stronger inter-ministerial coordination and the development of clear protocols for managing climate-related migration could improve policy coherence. Second, increasing investment in data collection—through community-based monitoring, digital mapping tools, and academic collaborations—would generate better insights into migration trends and urban growth hotspots. Such data could inform more targeted infrastructure development and social services provision in rapidly expanding urban areas. Third, deeper engagement with county governments, civil society, and the private sector could unlock additional funding sources and innovative solutions for climate adaptation. Finally, integrating climate resilience into national housing and urban planning guidelines would ensure that migration and urbanization strategies bolster rather than undermine efforts to mitigate climate risks.

Tanzania



Figure 8: Map of Tanzania (Encyclopædia Britannica, 2011)

3.9 Climate trends and impacts in Tanzania

3.9.1 Regional variations and key climate stressors

“Almost every region in Tanzania is affected by climate change, but in different ways. Coastal areas like Dar es Salaam face serious flooding, while inland regions like Arusha and Moshi are dealing with prolonged droughts. Even the big lakes are seeing rising water levels.” (Interview with Social Scientist, Ardhi University, Tanzania, November 2024)

Tanzania is experiencing a range of climate-induced changes, including rising temperatures, unpredictable rainfall patterns, and an increasing frequency of extreme weather events, such as floods and droughts (Solomon H. Gebrechorkos, Hülsmann, and Bernhofer 2020; S. H. Gebrechorkos et al. 2023). However, these impacts are not uniform across the country. The southern and semi-arid regions are particularly affected by water scarcity, while coastal and low-lying areas are increasingly vulnerable to recurrent flooding caused by rising sea levels and extreme rainfall events (Anande and Park 2021). Studies indicate that Tanzania’s annual mean temperatures have been steadily rising, with projections suggesting further increases of 1.5 to 3°C by mid-century, depending on global emissions trajectories (Chang’a et al. 2021; Chegere and Mrosso 2022).

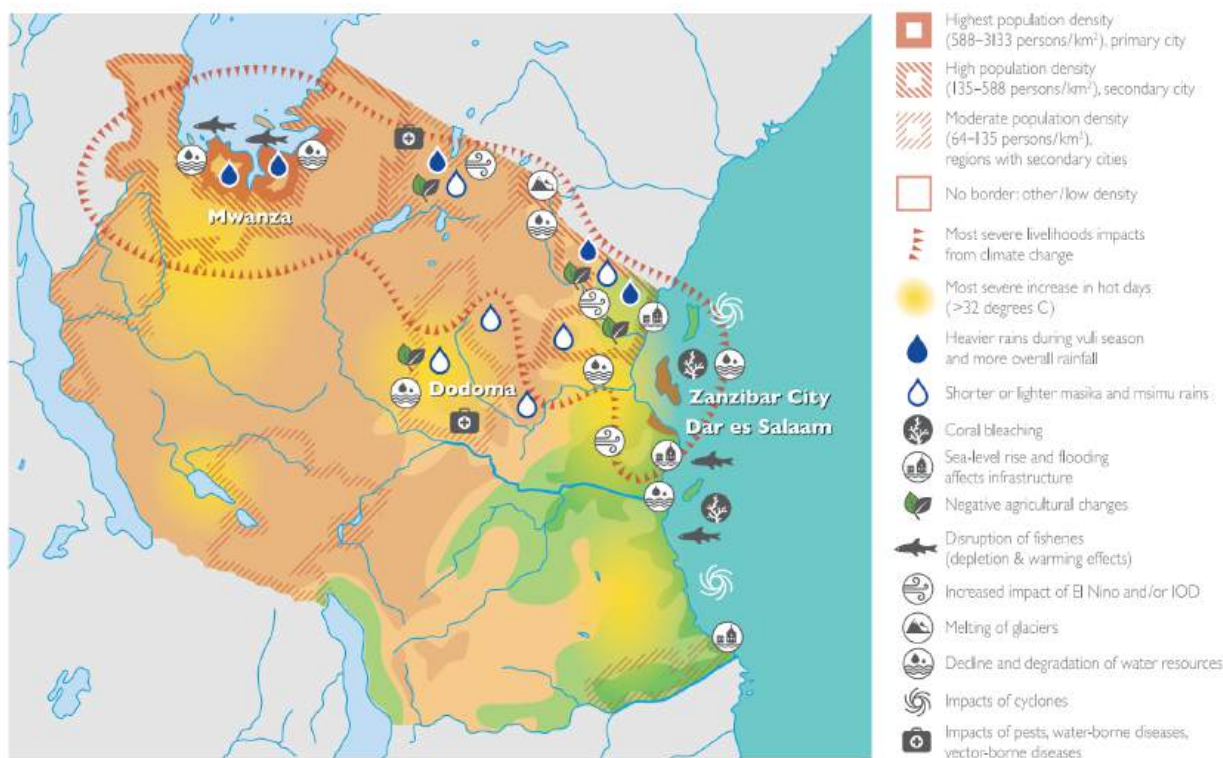


Figure 9: Map of known projected future climate change impacts and related environmental degradation in the United Republic of Tanzania (J. Blocher, International Organization for Migration, and Potsdam-Institut für Klimafolgenforschung 2021)

3.9.2 Agriculture under stress

Agriculture, which serves as the backbone of Tanzania’s economy and supports approximately 80% of the population, is especially vulnerable to these climatic changes (Chegere and Mrosso 2022). As rain-fed agriculture remains dominant, farmers are highly susceptible to fluctuations in precipitation.

Droughts in regions, such as Dodoma, Singida, and Shinyanga have led to widespread crop failures, threatening food security and income stability (Rowhani et al. 2011). Maize, a staple crop, has experienced yield reductions of up to 13% during drought years, with further declines anticipated under future warming scenarios. Conversely, excessive rainfall in other areas has resulted in destructive flooding that damages crops and infrastructure, exacerbating agricultural losses. In regions like Kilosa, farmers are increasingly shifting toward drought-resistant crops and adopting irrigation techniques to mitigate these challenges (Adhikari, Nejadhashemi, and Woznicki 2015; Gwambene, Liwenga, and Mung'ong'o 2023).

3.9.3 Water resource challenges

Beyond agriculture, Tanzania's water resources are under mounting pressure due to climate variability. While northern and western parts of the country are projected to experience increased precipitation, the southern highlands are likely to face declining rainfall and prolonged droughts (Näschen et al. 2019). This regional imbalance in water availability intensifies challenges for domestic consumption, irrigation, and hydroelectric power generation, which plays a crucial role in Tanzania's energy supply. Studies indicate that the Rufiji River Basin, a vital source for hydropower production, is increasingly vulnerable to reduced flows during dry seasons, posing significant risks to energy security and economic development (Luhunga et al. 2018).

3.9.4 Health implications of a changing climate

As in other countries studied, climate change presents substantial threats to human health in Tanzania. Similar to Kenya, rising temperatures and altered precipitation patterns are creating ideal conditions for the spread of vector-borne diseases such as malaria and waterborne diseases like cholera. Coastal areas, particularly Dar es Salaam, are experiencing an increase in heat-related illnesses, exacerbated by the urban heat island effect, rapid urbanization, and the limited adaptive capacity of informal settlements (Pasquini et al. 2020). Tanzania's health systems remain underprepared to effectively address these emerging challenges, with limited resources and fragmented responses undermining efforts to mitigate and adapt to climate-related health risks (Mboera et al. 2012; Pasquini et al. 2020).

3.9.5 Ecosystem and biodiversity pressures

Tanzania's ecosystems and biodiversity are also facing mounting pressures from climate change. Forest ecosystems, especially in biodiversity-rich regions like the Eastern Arc Mountains, are experiencing shifts in species composition and distribution due to changing climate conditions. These shifts threaten endemic species and compromise critical ecosystem services, such as water filtration and carbon sequestration, which many communities rely on for their livelihoods (Ract 2021). Similarly, coral reefs along the Indian Ocean coast are increasingly vulnerable to bleaching events caused by rising sea temperatures, endangering marine biodiversity and the livelihoods of coastal fishing communities that depend on these ecosystems for food and income (McClanahan 2009; Mung'ong'o and Mwevura 2019).

3.9.6 Socioeconomic repercussions and vulnerabilities

The socioeconomic repercussions of climate change are particularly severe for Tanzania's poorest and most marginalized communities, who bear the brunt of environmental and economic disruptions. Rural households in semi-arid regions often lack the resources to adapt, making them highly vulnerable to food insecurity and economic instability. Women and children are disproportionately affected, as they are primarily responsible for subsistence farming and water collection—tasks that

have become more challenging due to environmental degradation and resource scarcity (Kangalawe and Lyimo 2013; Kangalawe et al. 2017). At the same time, urban areas are facing an influx of climate-induced migrants, as people leave degraded rural lands in search of better opportunities, further straining already overburdened urban infrastructure and services (Chegere and Mrosso 2022; J. M. Blocher, Hoffmann, and Weisz 2024).

3.9.7 Policy and adaptation initiatives

Despite these challenges, Tanzania has made progress in addressing climate change through various policy and adaptation initiatives. The government has developed strategic frameworks such as the *National Climate Change Strategy* and the *Disaster Management Act*, aimed at enhancing resilience and mitigating climate risks. Investments in irrigation infrastructure, reforestation programs, and early warning systems have shown promising results in improving climate resilience. However, significant gaps remain in funding, coordination, and implementation, which continue to hinder the full realization of these efforts (Shemsanga, Omambia, and Gu 2010; Ampaire et al. 2016).

3.10 Migration dynamics in Tanzania

Tanzania’s internal migration trends can be broadly categorized into rural-to-urban, rural-to-rural, and circular movements. Urban centers, such as Dar es Salaam, Arusha, and Mwanza serve as major destinations for rural migrants seeking improved economic opportunities, particularly within the informal sector. The concentration of services, infrastructure, and industries in urban areas acts as a strong pull factor, drawing migrants from less developed regions. However, the rapid pace of urbanization driven by these migrations presents significant challenges, including overcrowding, unemployment, and the expansion of informal settlements, where access to essential services remains limited and living conditions are often precarious (Wenban-Smith 2015).

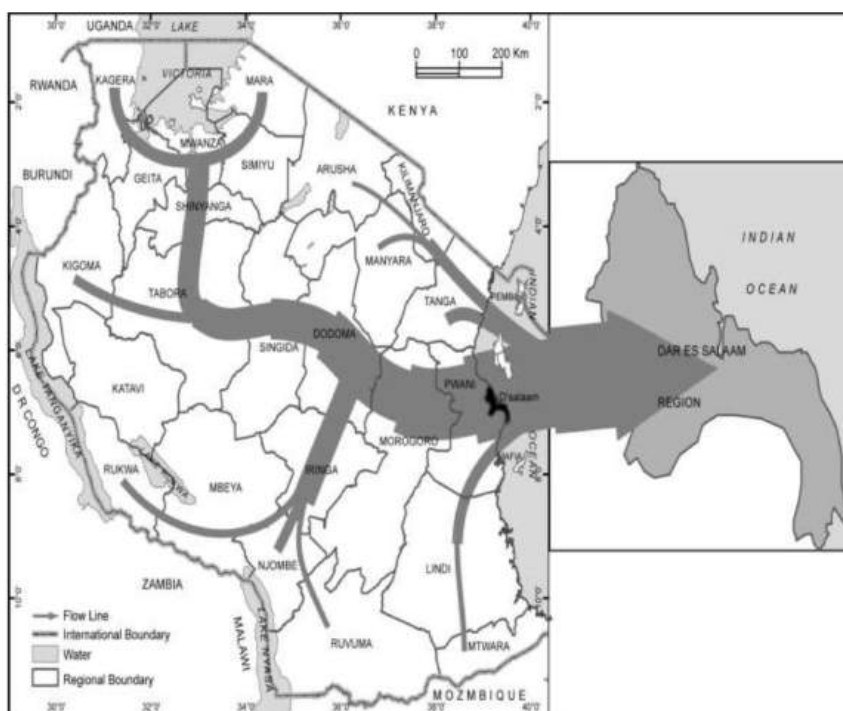


Figure 10: Internal Migration to Dar es Salaam (J. Blocher, International Organization for Migration, and Potsdam-Institut für Klimafolgenforschung 2021)

3.10.1 Rural-to-rural movements

Rural-to-rural migration is also a prevalent trend, primarily influenced by agricultural opportunities and environmental factors. Regions with fertile soils and reliable water sources, such as the Southern Highlands and Kilombero Valley, attract migrants from more arid and semi-arid areas like Dodoma and Singida. These movements are often seasonal, aligning with planting and harvesting cycles. However, environmental degradation—such as deforestation, drought, and soil depletion—has increasingly undermined the sustainability of agriculture, forcing many individuals to relocate or diversify their income sources to sustain their livelihoods (Salerno et al. 2017; J. M. Blocher, Hoffmann, and Weisz 2024).

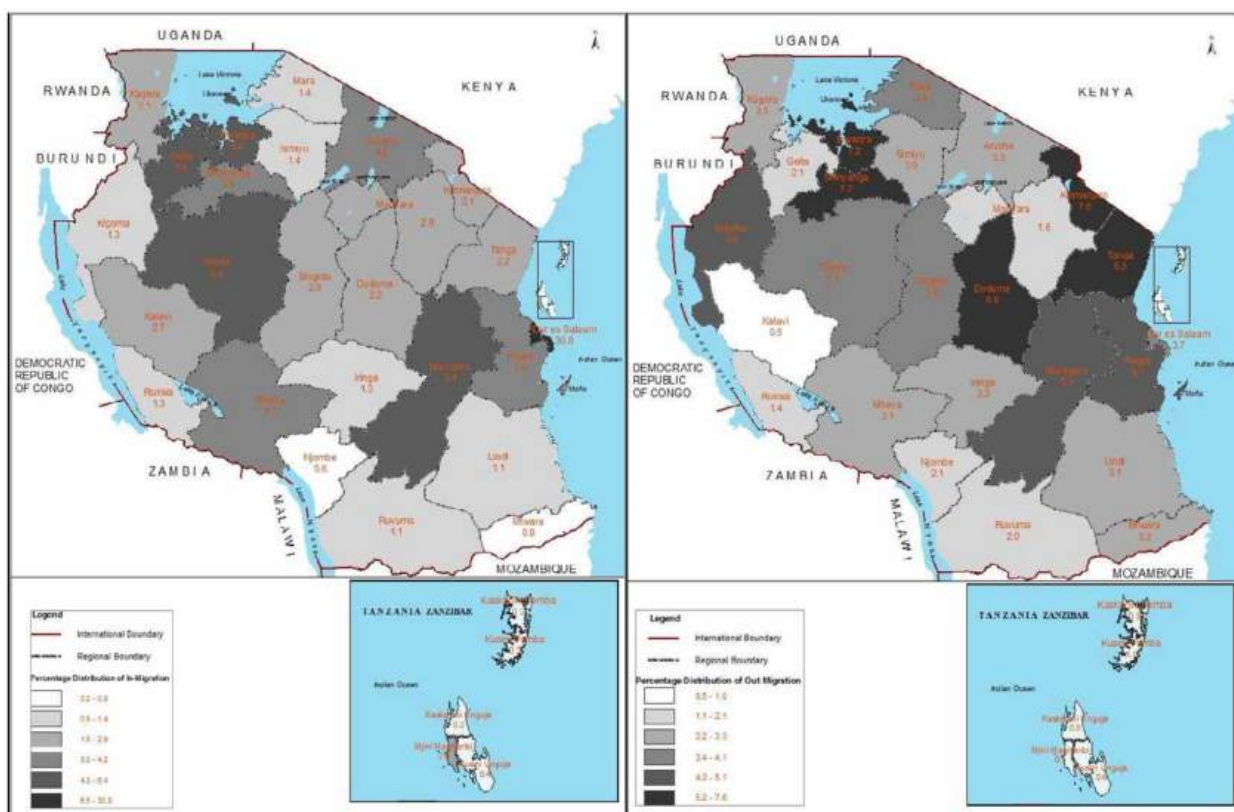


Figure 11: Share of permanent/lifetime in-migrants (left) and out-migrants (right) in the Percentage Distribution of Lifetime In-Migrants by Region of Birth; Tanzania by region of birth (J. Blocher, International Organization for Migration, and Potsdam-Institut für Klimafolgenforschung 2021)

3.10.2 Environmental and climate drivers

Environmental factors play an increasingly critical role in shaping migration patterns in Tanzania (J. M. Blocher, Hoffmann, and Weisz 2024). Climate variability, including recurrent droughts and floods, has been a major driver of population movements. In drought-prone areas, declining agricultural productivity has compelled households to send family members to more viable locations to diversify income sources. For example, persistent droughts in central and northern regions have driven migration toward areas with more stable climatic conditions or better irrigation infrastructure and

socioeconomic opportunities (Kubik and Maurel 2016). Similarly, flood-prone coastal areas have experienced displacement due to rising sea levels, extreme weather events, and infrastructure expansion, further intensifying migration pressures.

3.10.3 Demographic influences

Demographic factors, such as age, gender, education, tribes, and family ties, also play a significant role in influencing migration trends. Migration flows are predominantly driven by younger individuals, particularly men, who often move independently to urban centers or agricultural zones in search of better economic prospects. Women, while generally less mobile, participate in migration for various reasons, including employment opportunities, small business/petty trade, marriage, or environmental crises. Educational disparities further influence migration patterns, with individuals possessing higher education levels more likely to relocate to urban areas in pursuit of professional opportunities and improved living standards (Msigwa and Bwana 2014).

3.10.4 Circular migration and adaptation strategies

A notable trend in Tanzania's internal migration is the rise of circular migration, where individuals move back and forth between rural and urban areas (Jettah, Kaswamila, and Higin 2021). This pattern reflects an adaptive strategy that allows migrants to maintain strong ties to their rural homes while seeking economic opportunities in urban centers. Circular migration provides a flexible response to economic and environmental uncertainties, enabling migrants to diversify their income sources and reduce risks. However, this mobility also places a strain on the social and economic systems of both origin and destination areas, creating challenges for service delivery and infrastructure planning (Hirvonen and Lilleør 2015).

3.10.5 Economic implications of migration

The economic implications of migration are multifaceted. On one hand, migration contributes to poverty alleviation and economic diversification, allowing households to access new income streams and reduce their vulnerability to shocks. Studies indicate that migration enhances household consumption growth and plays a significant role in poverty reduction, particularly for those transitioning from agriculture to other economic sectors (Beegle et al. 2008). On the other hand, migration exacerbates regional inequalities. Resource-rich urban centers and agriculturally productive regions continue to attract investment and labor, while poorer areas face depopulation and a shrinking workforce, perpetuating cycles of underdevelopment and economic stagnation (Pietrelli and Scaramozzino 2019).

3.10.6 Social and environmental consequences

Migration also has significant social and environmental consequences. The rapid influx of people into urban areas places immense pressure on infrastructure and public services, leading to overcrowding, inadequate housing, and strained healthcare and education systems. In rural areas, migration can lead to environmental degradation, as increased demand for agricultural land often results in deforestation, overgrazing, and soil erosion. Regions experiencing an influx of agropastoral migrants have reported significant environmental pressures, which in turn contribute to further migration, creating a feedback loop of resource depletion and displacement (J. M. Blocher, Hoffmann, and Weisz 2024; Salerno et al. 2017).

3.10.7 Government policies and planning

Government policies and planning efforts have played a critical role in shaping migration patterns in Tanzania. Historically, the villagization program of the 1970s aimed to consolidate rural populations into larger settlements to improve service delivery and economic productivity. However, this policy often disrupted traditional livelihoods and led to large-scale internal displacement, demonstrating the unintended consequences of poorly planned interventions (Gerlach 2024). Contemporary efforts have shifted towards a more balanced approach, focusing on urban planning and rural development to manage migration flows sustainably. Despite these efforts, challenges persist due to limited resources, lack of coordination, and the complexity of addressing the diverse drivers of migration (Msigwa and Bwana 2014; Alem Gebregiorgis et al. 2022).

“The best way to manage migration is to strengthen rural economies. If people had better opportunities in their home regions, they wouldn’t be forced to leave. Agriculture needs to be modernized, and industries should be developed outside major cities.” (Interview with Social Scientist, Ardhi University, Tanzania, November 2024)

3.11 Urbanization trends and challenges in Tanzania

Since independence, urbanization in Tanzania has accelerated significantly, with cities such as Dar es Salaam, Arusha, Mwanza, and Mbeya emerging as key urban centers. The proportion of the population residing in urban areas has grown from just 5% in 1967 to approximately 35% by 2020 (UN-HABITAT, 2023c). Dar es Salaam, the country’s largest city, has been at the forefront of this transformation, expanding from a population of just over 270,000 in 1967 to more than 5 million today, making it one of the fastest-growing cities in Africa (Wenban-Smith 2015; World Bank 2021).

3.11.1 Drivers of urbanization

The drivers of urbanization in Tanzania are complex and multifaceted. As in other countries studied, rural-to-urban migration remains a primary catalyst, largely driven by the pursuit of better employment opportunities and access to essential services such as education and healthcare. Limited economic opportunities in rural areas serve as a major push factor, while the prospect of urban jobs and improved living standards act as strong pull factors. In addition to migration, natural population growth within urban areas also contributes significantly to the expansion of cities, further fueling urbanization trends (J. Gwaleba 2018).

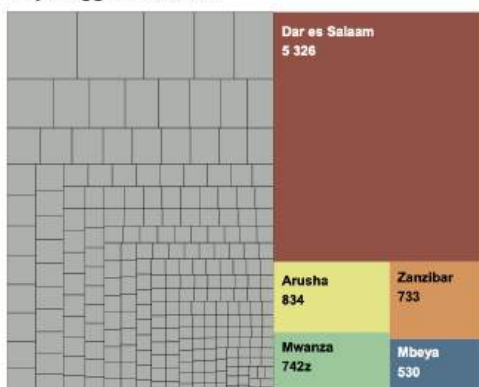
“Urbanization in Tanzania is happening at a very high rate, especially among young people moving to towns in search of better opportunities. There is a strong belief that the city offers everything, which keeps migration rates high.” (Interview with Urban Studies expert, Ardhi University, Tanzania, November 2024)



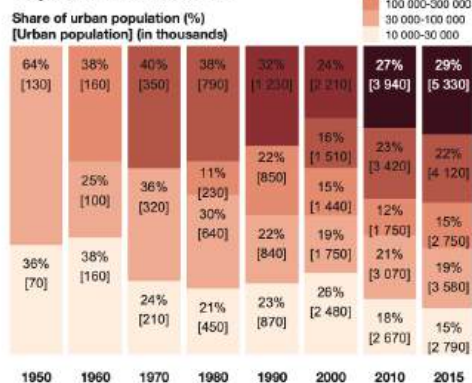
Tanzania

Population	Total population 48 786 000	Urban population 18 567 000	Urbanisation level 38 %
Agglomerations	Number of agglomerations 249	Metropolitan population 29 %	Average distance between agglomerations 24 km
Density	Average urban density 3 357 hab./km ²	Urban land cover 5 531 km ²	Urban land cover/ total land cover 0.6 %

Major agglomerations



Population distribution



AFRICA'S URBANISATION DYNAMICS 2020 © OECD 2020

Figure 12: Urbanization Dynamics in Tanzania (OECD 2020)

3.11.2 Spatial expansion and informal settlements

Spatially, Tanzania's urban expansion is characterized by rapid and often unplanned growth. In cities like Dar es Salaam, urban sprawl has resulted in the proliferation of informal settlements that accommodate a significant portion of the urban poor. These settlements frequently lack critical infrastructure such as roads, water supply, and sanitation facilities. Between 1990 and 2014, Dar es Salaam's built-up area expanded dramatically, with lower population densities in peripheral areas compared to the older urban cores—reflecting the challenges associated with informal residential development (Bhanjee and Zhang 2018). Similarly, smaller cities such as Arusha and Zanzibar City have experienced significant urban growth, largely driven by regional economic activities, including tourism and trade (Kukkonen et al. 2018).

“Urbanization in Tanzania is primarily driven by migration, though fertility rates also contribute. People move from villages to urban areas, but many also relocate between cities in search of better living conditions.” (Interview with Urban Studies expert, Ardhi University, Tanzania, November 2024)

3.11.3 The rise of secondary cities and small towns

Importantly, urbanization in Tanzania is not limited to major cities. Secondary cities such as Mbeya and Dodoma are also witnessing substantial growth. Dodoma, having been designated as the political capital, has seen a government-led urbanization drive, with the relocation of administrative functions resulting in increased investment in infrastructure and a surge in migration and economic activity (Sumari et al. 2023). In mining regions, smaller towns such as Katoro exemplify how localized economic opportunities can spur urbanization by attracting migrants and fostering regional trade (Bryceson et al. 2012).

3.11.4 Infrastructure, services, and governance challenges

Despite its potential, urbanization in Tanzania presents similar challenges to what we reported in other countries. The rapid and often unplanned expansion of cities has outpaced the development of infrastructure and services, leading to issues such as overcrowding, traffic congestion, and environmental degradation (Alem Gebregiorgis et al. 2022). Informal settlements, which accommodate a substantial portion of the urban population, are particularly vulnerable to flooding and poor sanitation. Governance challenges further exacerbate these issues, as urban planning efforts frequently struggle to keep pace with rapid urban growth. The implementation of master plans—such as those designed for Dar es Salaam—has been inconsistent, with limited integration of sustainable urban development principles (Peter and Yang 2019).

“The number of informal settlements keeps increasing, despite government efforts to manage them. Authorities can provide services like water and electricity, but they are struggling to stop their expansion.” (Interview with Urban Studies expert, Ardhi University, Tanzania, November 2024)

3.11.5 Socio-economic inequalities

Economic disparities are another critical dimension of Tanzania's urbanization. While cities offer opportunities for economic growth and employment (World Bank 2021), the benefits are unevenly distributed. The informal sector dominates urban employment, leaving many residents in precarious economic situations with little job security and low wages. Urban food security is a growing concern, as the expansion of cities disrupts rural-urban food supply linkages. The affordability and availability

of food in urban areas remain uncertain, particularly for low-income households, who are disproportionately affected by rising food costs and supply chain inefficiencies (Wenban-Smith 2015).

3.11.6 Climate change and environmental pressures

The intersection of climate change and urbanization poses a significant challenge for Tanzania's sustainable development. Rapid urban expansion often occurs at the expense of natural ecosystems, with forests and wetlands being cleared to accommodate growing populations and infrastructure demands (Shao et al. 2021). This unchecked growth leads to the degradation of ecosystem services that are critical for urban resilience, such as flood regulation, air purification, and carbon sequestration (Ricci and Williams 2021).

The deforestation and loss of wetlands surrounding urban areas are not only consequences of urban sprawl but also factors that intensify climate change impacts. Wetlands that once served as natural flood buffers are increasingly being converted into informal settlements, making cities more susceptible to flooding during extreme weather events (Hambati and Gaston 2015). Due to inadequate urban planning and housing shortages, informal settlements frequently encroach upon environmentally sensitive areas, further increasing disaster risks and placing additional strain on already limited urban resources (Kemwita et al. 2022).

“Flooding in Dar es Salaam has severe socioeconomic impacts—roads become impassable, schools close, businesses shut down, and many families lose their belongings. People often relocate in anticipation of floods, but they don’t have long-term solutions.” (Interview with Urban Studies expert, Ardhi University, Tanzania, November 2024)

Moreover, the lack of green urban planning in cities like Dar es Salaam has contributed to rising pollution levels, driven by unregulated waste disposal and increasing vehicle emissions. These environmental pressures undermine both human health and ecosystem integrity, creating a feedback loop in which environmental degradation exacerbates vulnerability to climate-related disasters while simultaneously weakening the city's capacity to adapt and respond effectively (Ricci and Williams 2021).

3.11.7 Policy measures and urban governance

Tanzania has implemented various policy measures to manage the challenges of urbanization. The *Local Government Reform Program* was introduced to decentralize planning and strengthen local governance capacities, aiming to empower municipalities to address urban challenges more effectively. However, implementation has faced persistent challenges, including limited financial and technical resources, as well as coordination gaps between national and local authorities. Efforts to integrate informal settlements into formal urban planning frameworks and encourage vertical development in cities represent important steps toward addressing land scarcity and infrastructure deficits. Yet, the financial and institutional resources required to sustain and scale these initiatives remain insufficient (Lupala et al. 2015).

In short, urbanization in Tanzania is a dynamic and evolving process characterized by rapid population growth, spatial expansion, and significant socio-economic challenges. Despite these complexities, urban growth holds immense potential for economic transformation, as cities serve as hubs of innovation, trade, and industrialization, providing opportunities for economic diversification. Dar es Salaam, for instance, has emerged as a regional economic powerhouse, hosting industries, financial

services, and a thriving informal economy. Meanwhile, secondary cities such as Arusha and Mwanza play crucial roles in regional trade networks, acting as bridges between rural areas and both domestic and international markets (Andreasen, Agergaard, and Møller-Jensen 2017).

3.12 Mapping the national and regional policy framework

Tanzania faces a complex interplay between climate change, migration, and urbanization, as environmental pressures push rural communities to seek livelihood opportunities in rapidly growing towns and cities. Over the past decade, the government has rolled out various policies and strategies to address these interlinked challenges, though gaps in coordination and implementation persist.

A key instrument guiding Tanzania's response to climate change is the National Climate Change Strategy (NCCS) (2012), which aims to promote climate resilience across sectors such as agriculture, water, and energy. This strategy emphasizes adaptation measures, including the adoption of drought-resistant crops, improved irrigation systems, and early warning mechanisms for extreme weather events. Complementing the NCCS is the National Adaptation Programme of Action (NAPA) from 2007, which identified priority actions for vulnerable communities. Although the NAPA served as an early foundation, Tanzania continues to develop more comprehensive adaptation plans to integrate evolving climate risks into broader development goals.

On urbanization, the National Human Settlements Development Policy (2000) and the Urban Planning Act (2007) form the legal framework for planning and managing Tanzania's urban growth. These policies underscore the need for integrated land-use planning, improved infrastructure, and adequate social services in rapidly urbanizing areas. In recent years, government initiatives—such as upgrading informal settlements and expanding public transit—reflect growing recognition of the pressures climate-induced migration places on cities. However, operational details on how to accommodate new arrivals, especially those driven by environmental stresses, remain scattered across various agencies.

Regarding migration, Tanzania does not yet have a standalone, comprehensive National Migration Policy that specifically addresses internal displacement driven by environmental or climate factors. Instead, migration-related issues are partly addressed through broader frameworks like the National Employment Policy and the National Strategy for Growth and Reduction of Poverty (commonly referred to by its Swahili acronym, MKUKUTA). These strategies touch on rural-to-urban mobility and aim to generate inclusive economic growth. Yet the absence of a unified migration policy leaves a policy gap in addressing the underlying push factors—such as drought, land degradation, and resource scarcity—that can force rural populations to move.

At the regional level, Tanzania is a member of the East African Community (EAC), which has introduced the EAC Climate Change Policy and encourages cross-border cooperation on climate adaptation, disaster risk reduction, and sustainable development. The country also aligns with the African Union (AU) Migration Policy Framework, which highlights the necessity of integrating climate resilience and migration management. These regional instruments reinforce the importance of coordinated action and data-sharing among neighbouring countries facing similar environmental and demographic pressures.

Despite these efforts, several gaps in implementation remain. Limited inter-ministerial coordination creates redundancies and hinders the pooling of resources essential for large-scale interventions.

Financial and technical constraints further restrict the capacity of local government authorities to upgrade infrastructure or expand social services in fast-growing urban centers. A shortage of reliable data on internal displacement and climate-related migration complicates evidence-based policymaking, while the fragmented policy landscape dilutes accountability.

Opportunities for improvement include developing a comprehensive National Migration Policy that incorporates climate-related drivers of displacement. Strengthening institutional collaboration—perhaps through a central coordinating body—would help align climate, migration, and urban development initiatives. Targeted investments in capacity-building for local authorities could enhance land-use planning and service delivery in urban areas most affected by inflows of climate migrants. Further, leveraging public–private partnerships and international funding mechanisms, such as the Green Climate Fund, could support infrastructure projects that build resilience to environmental shocks.

Madagascar



Figure 13: Map of Madagascar (Encyclopædia Britannica, 2008)

3.13 Climate trends and impacts in Madagascar

“Madagascar is highly vulnerable to climate change. Every year, we face at least two or three cyclones, along with floods, wildfires, and prolonged droughts, particularly in the south” (Interview with climate risk specialist⁸, University of Antananarivo, Madagascar, November 2024)

Madagascar, an island nation off the southeastern coast of Africa, exemplifies the acute and diverse impacts of climate change. Its unique ecosystems and vulnerable communities are facing increasingly severe climatic disruptions, including cyclones, droughts, and erratic rainfall patterns. These

⁸ Translated from French by Florian Debève

challenges are not uniform across the island; rather, they manifest in distinct ways across different regions, each with its own set of vulnerabilities.

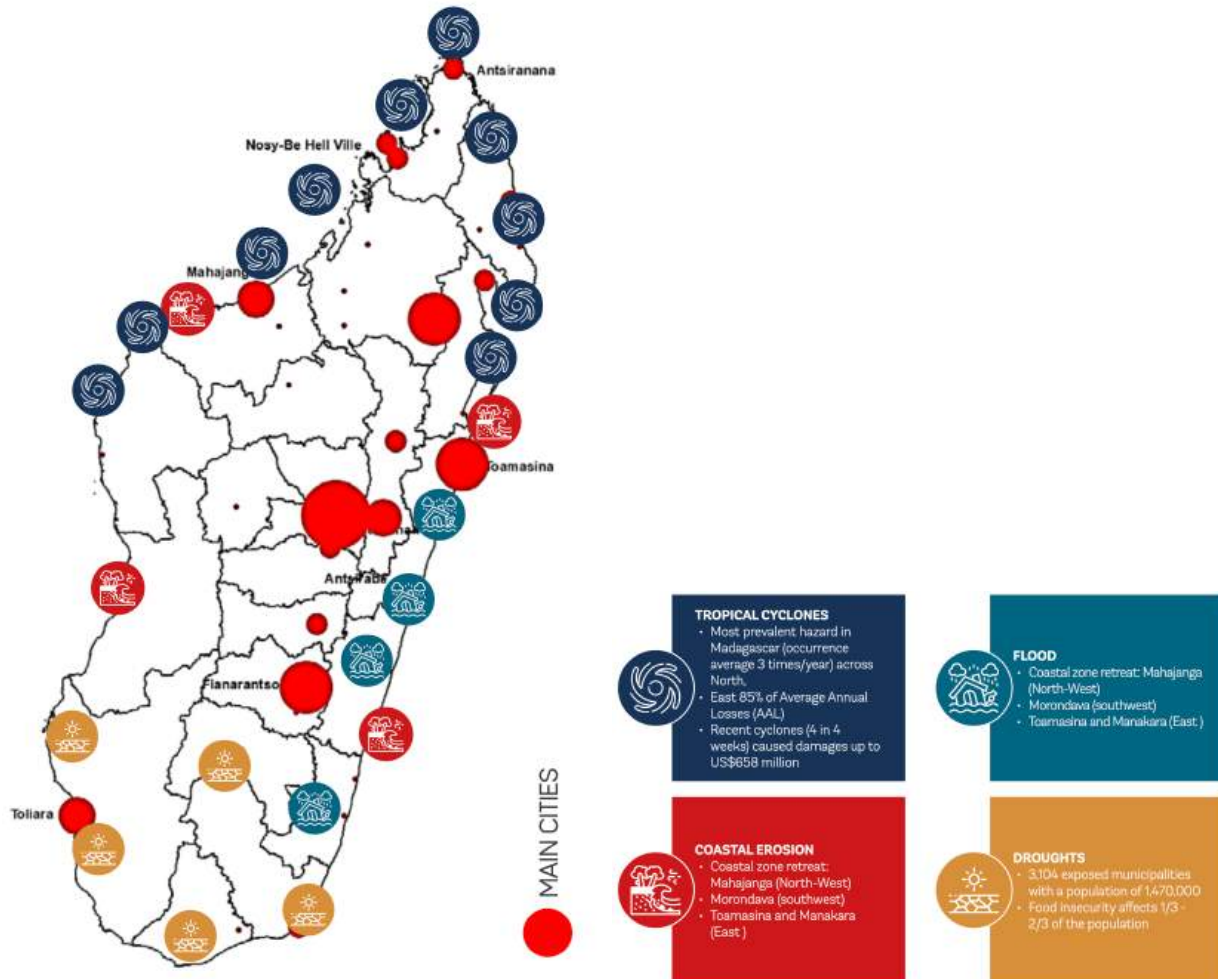


Figure 14: Map of Climate Hazards in Madagascar (World Bank 2024)

3.13.1 Southern Madagascar: drought and food insecurity

In southern Madagascar, drought is the most pressing climate hazard. This arid and semi-arid region has experienced prolonged and worsening dry spells, driven by declining and irregular rainfall patterns (Rigden et al. 2024). Between 2018 and 2022, consecutive rainfall deficits plunged much of the southern population into severe food insecurity, exacerbating hunger and malnutrition (Zambiazzi et al. 2023). In areas such as Androy and Anosy, failed harvests and shrinking pasturelands have severely disrupted traditional subsistence farming and pastoralist systems. In 2021, Madagascar’s “Great South” faced famine-like conditions, with over 1.1 million people requiring emergency food assistance. As discussed in the next section, drought-induced migrations are becoming increasingly common, as residents leave their homes in search of food, water, and alternative livelihoods.

“The biggest issue in the southern region is drought. There is a severe lack of water, and most of the population depends on agriculture. Without water, farming becomes impossible, and

people are forced to migrate north or to urban areas.” (Interview with climate risk specialist⁹, University of Antananarivo, Madagascar, November 2024)

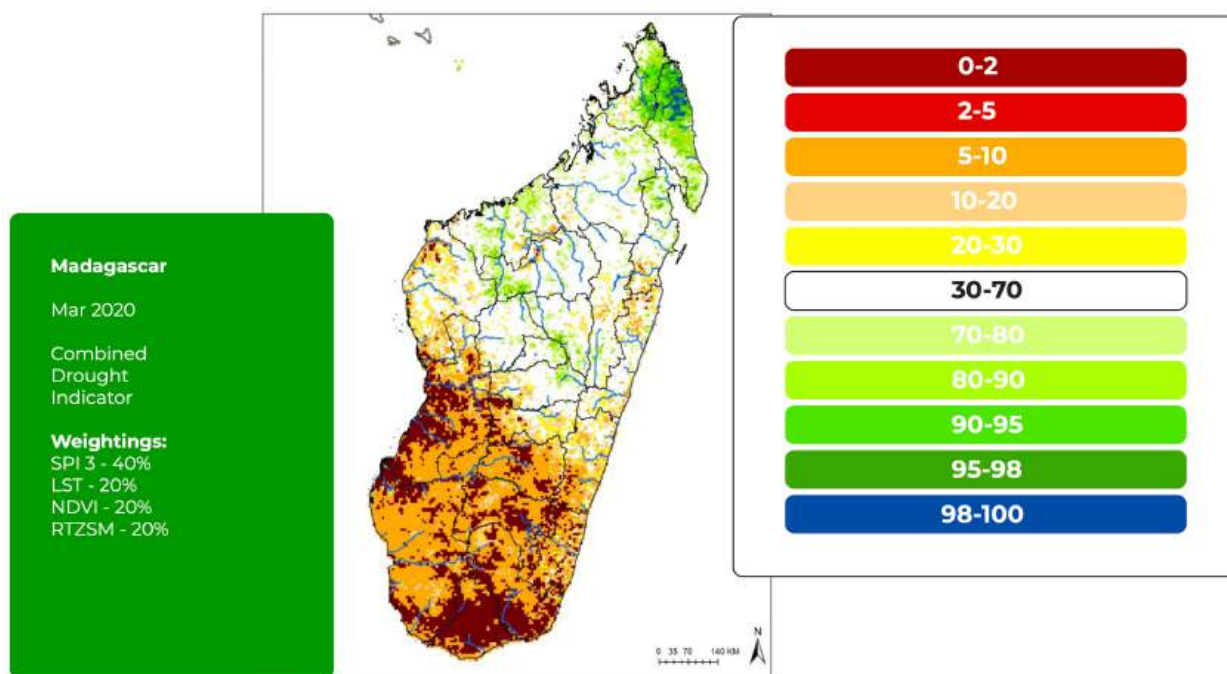


Figure 15: Combined Drought Indicator for Madagascar, March 2020, (NDMC 2021)

3.13.2 Eastern rainforests: cyclones and flooding

In contrast, Madagascar’s eastern rainforests face frequent and intense tropical cyclones (Rakotoarimanana et al. 2022). This region, which receives some of the highest rainfall levels on the island, is particularly vulnerable to storms originating from the Indian Ocean. Cyclone Enawo, which struck in 2017, caused widespread devastation, affecting nearly 420,000 people and displacing over 80,000. The cyclone destroyed homes, agricultural fields, and critical infrastructure (Rakotoarimanana et al. 2022). The eastern regions’ vulnerability is compounded by their dense population and dependence on rice and vanilla cultivation. Cyclone-induced flooding often washes away crops and damages irrigation systems, leaving communities without food and income for prolonged periods. The recurrence of these storms continues to strain local economies and households, which have limited capacity to recover between disasters (Harifidy and Hiroshi 2022).

3.13.3 Central highlands: erratic rainfall and soil degradation

In the central highlands, which serve as Madagascar’s agricultural heartland, erratic rainfall patterns and rising temperatures are posing serious threats to rice production—the staple food of the Malagasy population (Barimalala et al. 2021). Additionally, the region is experiencing heightened soil degradation due to deforestation and unsustainable farming practices, making it more susceptible to climate-induced stresses (Suzzi-Simmons 2023). Frost events, once rare, have become more frequent during cooler months, further jeopardizing crops. Cyclonic rainfall also contributes to landslides, particularly in steep, fragile terrains (Mietton and Razafimahefa 2011). These landslides disrupt

⁹ Translated from French by Florian Debève

transportation networks, isolating rural communities and limiting their access to markets and essential services.

3.13.4 Western Madagascar: water scarcity and cyclone risks

Western Madagascar is facing the dual challenges of water scarcity and increasing cyclone-related risks. Traditionally arid, the region's vulnerability is heightened by its reliance on key river systems, including the Betsiboka and Tsiribihina. These rivers are experiencing declining flows due to irregular rainfall patterns and deforestation in upstream areas, which are disrupting hydrological cycles and sediment dynamics (Weiskopf et al. 2021). The reduced water availability has had cascading effects on irrigation systems, fisheries, and local food security, exacerbating existing vulnerabilities (Harifidy and Hiroshi 2022). Additionally, cyclones making landfall in the west exacerbate these challenges by triggering flash floods that damage infrastructure, disrupt livelihoods, and displace vulnerable communities (Rakotoarimanana et al. 2022). Cyclone Batsirai in 2022, for example, caused extensive flooding and destruction in Madagascar's western regions, underscoring the compounded impact of climate variability and extreme weather events (Carrière et al. 2021; Serele, Kouadio, and Kayitakire 2023).

3.13.5 Northern regions: rising temperatures and biodiversity loss

In the northern regions of Madagascar, including Diana and Sava, rising temperatures are increasingly impacting biodiversity and livelihoods. This area, known for its lush forests and vanilla production, is experiencing more frequent heatwaves and prolonged dry-season conditions. These climatic changes threaten endemic species that depend on stable, humid microclimates and place additional stress on agricultural productivity (Brown et al. 2015). In particular, plant diversity patterns are projected to decline significantly due to the combined effects of climate change and land cover changes, with critical ecosystems such as lowland and sub-humid forests at high risk. Coastal areas in northern Madagascar are also facing the gradual encroachment of the sea due to rising sea levels. Saltwater intrusion into freshwater systems is reducing potable water availability and compromising agricultural activities, further straining local communities. The degradation of coastal ecosystems, such as mangroves, exacerbates these issues, reducing natural resilience against storm surges and erosion (Petzold et al. 2024).

3.13.6 Coastal challenges: coral reefs and marine ecosystems

Madagascar's coastal regions, particularly in the southwest, are grappling with severe marine and climate challenges. The *Grand Récif* of Toliara, one of the country's most critical coral reef systems, is experiencing significant degradation due to ocean warming, acidification, and overfishing. Coral bleaching, driven by rising sea temperatures, has led to a decline in fish stocks, directly impacting coastal communities that depend on fishing for their livelihoods (Bruggemann et al. 2012). The increasing intensity of tropical storms further damages marine ecosystems and coastal infrastructure, making adaptation more difficult for these communities.

3.13.7 Adaptation efforts and resource constraints

Efforts to mitigate and adapt to these hazards remain uneven and are constrained by limited resources. In southern Madagascar, food aid programs and water management initiatives have been implemented to address the ongoing drought crisis; however, these interventions often fall short of meeting the scale of the challenges faced by local populations. In the eastern and central regions, community-based reforestation and soil conservation programs aim to stabilize ecosystems, but their impact is limited by funding gaps and logistical constraints. Western regions have benefited from

small-scale irrigation projects to tackle water scarcity, yet the absence of comprehensive river basin management continues to pose significant challenges to long-term water security (Harifidy and Hiroshi 2022).

3.13.8 International collaboration and local knowledge

International collaboration also plays a crucial role in Madagascar's climate adaptation efforts. Global initiatives, such as REDD+¹⁰ and international climate funds, provide essential support for conservation and sustainable development projects across the country. However, ensuring the equitable distribution of these resources remains a significant challenge. For example, while reforestation efforts are underway in the central highlands, their benefits often fail to reach the most vulnerable farming communities. Challenges such as poor seedling survival rates near forest edges and land tenure insecurity hinder local participation and long-term sustainability (Pareliussen, Olsson, and Armbruster 2006). Similarly, coastal resilience projects have largely focused on infrastructure development but have not adequately addressed the needs of subsistence fishers, who remain vulnerable to resource depletion and struggle to access sustainable livelihood opportunities (Cinner, Fuentes, and Randriamahazo 2009).

Madagascar's situation also underscores the need to integrate local knowledge into adaptation planning. In the south, for instance, traditional rainwater harvesting techniques are being revitalized to combat drought and enhance water security. In the west, community-led mangrove restoration projects aim to protect coastlines and restore critical fish habitats. These initiatives demonstrate the potential of combining scientific insights with indigenous practices to create effective, locally adapted solutions (Zambiazzi et al. 2023).

In conclusion, the impacts of climate change in Madagascar manifest in diverse and region-specific ways, ranging from drought-induced famines in the south to cyclone devastation in the east and biodiversity losses in the north. Each region's unique vulnerabilities call for tailored adaptation strategies that address both environmental and socio-economic challenges. Despite the immense challenges, integrating traditional knowledge, leveraging international support, and fostering community-driven solutions can pave the way for a more resilient future for Madagascar's people and ecosystems.

3.14 Migration dynamics in Madagascar

Population movements within Madagascar are shaped by regional disparities in economic opportunities, environmental challenges, and social factors, with significant variations across the island's diverse geographic and ecological zones. While specific areas such as Tamatave and Morondava illustrate these dynamics, they are part of a broader pattern of migration that spans the entire country.

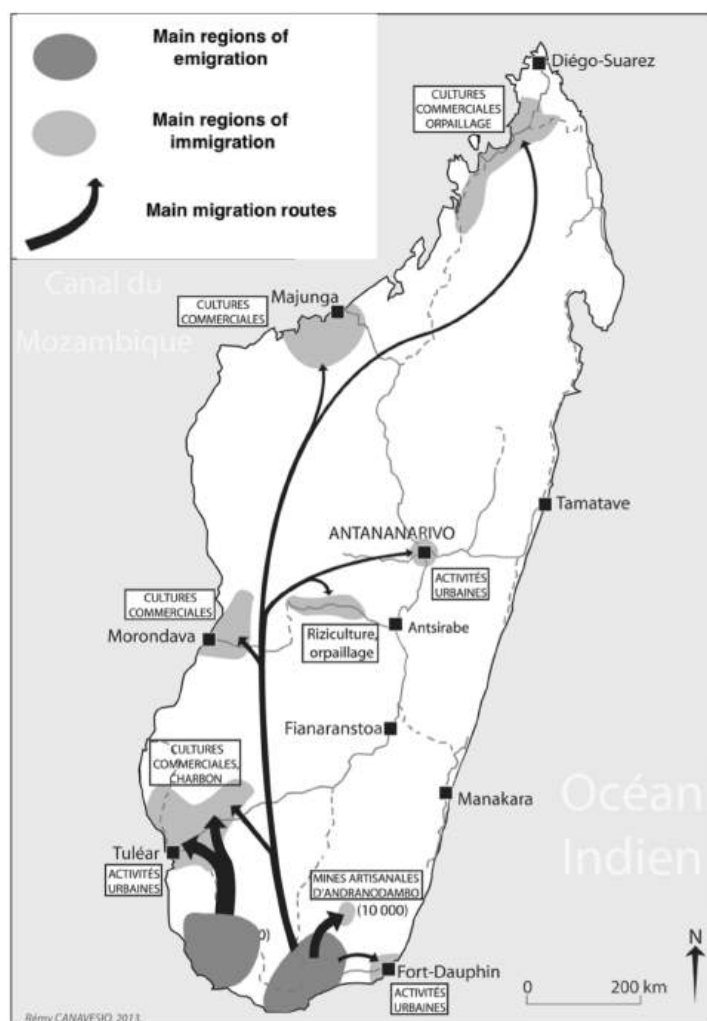
"People don't migrate just because of climate change. Economic pressures, unemployment, and lack of infrastructure in rural areas also play a major role in why they move to the cities."

¹⁰ <https://www.un-redd.org/partner-countries/africa/madagascar>

(Interview with climate risk specialist¹¹, University of Antananarivo, Madagascar, November 2024)

3.14.1 Southern Madagascar: drought and out-migration

Southern Madagascar, particularly the regions of Androy and Anosy, stands out as one of the most significant sources of internal migration. This region faces severe environmental challenges, including prolonged droughts that have been exacerbated by climate change. As discussed in the previous section, rainfall deficits in the south have averaged 40% over the past decade, leading to widespread food insecurity and forcing over 14,000 people to migrate annually in search of better living conditions (Zambiazzi et al. 2023). Many of these migrants move toward urban centers such as Antananarivo or to regions with more stable agricultural conditions, such as the central highlands and western areas like Menabe (Rakoto 2022). The heavy reliance on subsistence agriculture in the south means that environmental degradation directly undermines livelihoods, making migration an essential survival strategy (Weiskopf et al. 2021; Rigden et al. 2024).



¹¹ Translated from French by Florian Debève

Figure 16 Main migration routes out of southern Madagascar. Map created by Rémy Canavesio reproduced from Stratégie Régionale De Gestion Des Migrations Région Androy 2022 – 2026.

3.14.2 Central highlands: agricultural pull and rural-to-rural movement

The central highlands of Madagascar, historically known for their agricultural productivity, have become a focal point for complex migration dynamics. On the one hand, this region attracts migrants from the drought-affected south seeking improved agricultural opportunities. On the other hand, it is also a notable source of rural-to-rural migration, as population pressures and land fragmentation drive families to relocate to less densely populated areas such as Menabe and Sofia in search of arable land. Studies indicate that migration into western regions like Menabe increased significantly between the last decades, largely reflecting the movement of individuals seeking livelihoods through subsistence farming (Scales 2011; Vieilledent et al. 2020).

Despite the promise of new opportunities, migrants in these areas often encounter significant challenges, including inadequate infrastructure, limited access to resources, and the adverse effects of environmental degradation. Deforestation and soil erosion, exacerbated by slash-and-burn agriculture and unsustainable land-use practices, threaten both livelihoods and the long-term sustainability of local ecosystems (Zinner et al. 2014; Ongolo and Krott 2023; Huber 2024). Addressing these challenges requires integrated policies that balance the pressures of migration with agricultural productivity and environmental conservation, ensuring that rural communities can achieve sustainable development without further exacerbating ecological vulnerabilities.

3.14.3 Western Madagascar: the case of morondava

In the western region of Menabe, the city of Morondava offers a contrasting perspective on internal migration. Known for its fertile lands and growing tourism sector, Morondava has become a key destination for migrants seeking agricultural opportunities and seasonal employment in the tourism industry. Between 2010 and 2020, migration to the city increased by 15%, reflecting its role as an economic hub (Harvey et al. 2014). However, despite its attractiveness, the city faces significant challenges. Rising sea levels, coastal erosion, and widespread mangrove deforestation threaten the livelihoods of both residents and migrants. Seasonal workers, particularly in the tourism sector, often face precarious employment conditions and limited access to essential social services (Mercandalli and Losch 2017). Morondava's case highlights the complex interplay between economic and environmental drivers of migration and challenges the conventional narrative that migrants primarily move away from climate hazards towards safer places. In this instance, individuals are relocating to an area highly exposed to environmental risks because they perceive the city as offering greater economic opportunities and a better quality of life despite its exposures and vulnerabilities (Canavesio 2016).

3.14.4 Urban centers: Antananarivo and Tamatave

Urban centers in Madagascar, particularly Antananarivo and Tamatave, play a pivotal role in shaping internal migration dynamics. As the nation's capital and primary economic hub, Antananarivo attracts large numbers of migrants in search of employment opportunities and access to better educational and healthcare services. Over the last decade, the city's population growth rate consistently exceeded 3% per year, largely driven by rural-to-urban migration (Marchetta et al. 2021; UN-HABITAT 2023). This rapid urbanization underscores the widening socio-economic divide between urban and rural areas, further intensifying migration flows toward the capital.

Tamatave, Madagascar's largest port city, exemplifies the dual forces driving migration: economic opportunity and environmental vulnerability. Handling approximately 80% of the country's international trade, Tamatave offers employment opportunities in shipping, logistics, and service industries, attracting migrants from the eastern and southern regions (den Biggelaar and Moore 2016). However, its low-lying coastal geography makes it highly susceptible to environmental hazards such as cyclones and flooding. Cyclone Enawo in 2017, for example, displaced tens of thousands of residents, many of whom lived in informal settlements in flood-prone areas (Rakotoarimanana et al., 2022). Poor urban planning and inadequate drainage infrastructure further exacerbate these challenges, disproportionately affecting economically vulnerable groups who are forced to settle in high-risk zones. Despite the city's economic promise, overcrowding and insufficient urban planning continue to perpetuate precarious living conditions for many migrants.

3.14.5 Coastal regions: economic opportunities vs. environmental pressures

Coastal regions across Madagascar are experiencing significant migration flows, driven by a combination of economic opportunities and environmental pressures. Cities such as Mahajanga in the northwest and Toliara in the southwest have become key destinations for migrants seeking employment in fishing, trade, and small-scale industries. However, these regions are increasingly burdened by environmental stressors, including overfishing, coral bleaching, and rising sea levels. For instance, extensive degradation of coral reef habitats in the *Grand Récif* of Toliara has been documented, driven by overfishing, reef gleaning, and environmental changes such as rising sea temperatures (Andréfouët et al. 2013). Similarly, the rapid expansion of artisanal fisheries and the commercialization of marine resources have placed unsustainable pressure on coastal ecosystems, threatening long-term livelihoods in these communities (Harris 2009).

The Ministry of Fisheries and Blue Economy reported that between 2015 and 2021, approximately 15,000 people migrated annually to coastal areas in search of work in fisheries and related industries, sectors that are increasingly under strain from environmental degradation (Lemahieu et al. 2018). These migration patterns highlight the complex interplay between economic opportunities and environmental vulnerabilities, as migrants are drawn to coastal areas despite the escalating fragility of these regions under the pressures of climate change and resource overexploitation.

3.14.6 Seasonal migration and the vanilla trade

Seasonal migration tied to agriculture, particularly the vanilla trade, represents another critical aspect of internal migration in Madagascar (Mercandalli and Losch 2017). The Sava region in northeastern Madagascar is a global hub for vanilla production, accounting for over 80% of global exports. During peak harvest seasons, thousands of seasonal migrants travel to Sava from across the island to participate in the labor-intensive vanilla harvesting process. In 2020 alone, approximately 35,000 seasonal workers contributed to the region's vanilla harvest, underscoring the vital role of migration in sustaining the local economy (Hänke et al. 2018). Despite the economic significance of vanilla cultivation, seasonal workers often face exploitative labor conditions, including insufficient wages, lack of formal contracts, and inadequate housing and healthcare facilities (Andriamparany, Hänke, and Schlecht 2021). Additionally, food insecurity and social inequalities within the vanilla value chain remain persistent challenges. Studies indicate that only a small fraction of farmers have formal contracts with buyers, forcing many to rely on informal markets where they are vulnerable to price volatility and exploitation (Hänke et al. 2018). While vanilla production has improved the livelihoods of

some households, the majority of seasonal and smallholder workers continue to face economic instability and harsh working conditions.

3.14.7 Socio-economic and demographic influences

These elements underscore how deeply migration in Madagascar is influenced by socio-economic and demographic factors. Migrants tend to be younger and more educated compared to non-migrants. A 2018 report by the IOM found that 62% of migrants were under the age of 30, and individuals with secondary education were 24% more likely to secure formal employment in urban areas compared to those without (Consortium MAGMA 2018; Marchetta et al. 2021). Additionally, gender dynamics in migration are shifting, with an increasing number of women migrating independently for economic reasons, particularly to cities like Tamatave and Antananarivo, where opportunities in the service and trade sectors are more accessible (Canavesio 2016).

3.14.8 Climate change as a catalyst

It is clear that climate change is an important force disrupting and exacerbating migration patterns across Madagascar (Consortium MAGMA 2018). Extreme weather events such as cyclones, droughts, and soil erosion have displaced tens of thousands of people annually. Cyclone Enawo in 2017 and Cyclone Batsirai in 2022 collectively displaced over 370,000 people, many of whom were forced to become internal migrants (Rakotoarimanana et al. 2022). The compounded effects of climate change and environmental degradation create a vicious cycle where vulnerable populations are often displaced to areas that are themselves at high risk, intensifying competition for already scarce resources and services (Harvey et al. 2014). However, internal migration in Madagascar reflects a complex response to economic, environmental, and social challenges. From the drought-stricken south to the bustling port city of Tamatave, and from the agricultural heartlands to coastal hubs like Morondava, migration patterns highlight the resilience and adaptability of the Malagasy people. These movements also underscore the urgent need for comprehensive policies that address the causes of migration while promoting sustainable development in both origin and destination areas. Investments in climate adaptation, infrastructure, and equitable regional development will be crucial to ensuring that migration serves as a pathway to opportunity rather than a marker of vulnerability.

3.15 Urbanization trends and challenges in Madagascar

3.15.1 Major urban centers: Antananarivo, Tamatave, and Antsirabe

Urban growth in Madagascar is primarily concentrated in a few key cities, notably Antananarivo, Tamatave, and Antsirabe. Antananarivo, the capital, is at the center of this transformation. With a population exceeding 1.6 million, the city has rapidly expanded as people from rural areas migrate in search of better opportunities in education, healthcare, and employment (World Bank, 2024). As the nation's political, economic, and cultural hub, Antananarivo accounts for a significant share of the country's urban population (Rakotonirina & Cheng, 2015). However, this rapid growth is placing pressure on the city's infrastructure and services. Informal settlements, which accommodate a substantial portion of the population, often lack access to basic amenities such as clean water and sanitation. Recent studies indicate that over 60% of Antananarivo's residents live in informal housing, underscoring the challenges of urban planning in the face of rapid population expansion (Ramiaramanana and Teller 2021). Furthermore, the city's rapid expansion has led to urban sprawl encroaching on valuable agricultural land, posing challenges for both urban and rural livelihoods. These issues highlight the critical need for integrated urban planning solutions that address informal housing, infrastructure development, and resilience to environmental risks (Andriamanga et al. 2024).

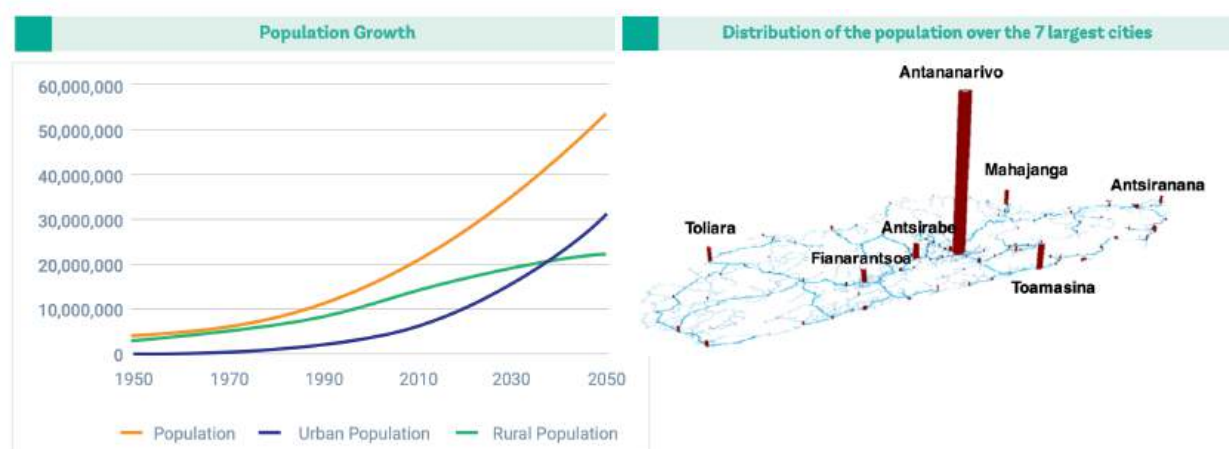


Figure 17: Population growth and distribution in Madagascar (World Bank 2024)

Tamatave, Madagascar’s principal port city, presents a distinct urbanization pattern shaped by its strategic economic role. Its economic activity has fuelled substantial migration to the city, particularly from surrounding rural areas. Over the past decade, Tamatave’s population has grown at an average annual rate of 2.8%, with migrants seeking employment in shipping, logistics, and related industries (den Biggelaar and Moore 2016). However, the city’s rapid expansion has brought considerable challenges. Tamatave’s coastal location makes it highly vulnerable to climate-related hazards such as cyclones and flooding (Rakotoarimanana et al. 2022). The widespread reliance on informal housing and inadequate drainage systems further exacerbates the impacts of these hazards, as vulnerable communities often reside in flood-prone areas with limited resilience to disasters (Lemahieu et al. 2018).

3.15.2 Secondary cities: Antsirabe and Morondava

Smaller cities such as Antsirabe and Morondava offer valuable insights into the varied dimensions of urbanization in Madagascar. Antsirabe, located in the central highlands, has emerged as both an industrial and tourism hub. Known for its cooler climate and scenic landscapes, the city attracts a steady influx of migrants and visitors, contributing to its gradual population growth. Antsirabe’s industrial sector—particularly textile manufacturing—provides employment opportunities that draw workers from surrounding rural areas, making it an important economic center within the region (World Bank 2024). In contrast, Morondava, situated on the western coast, illustrates the intersection of urbanization and environmental vulnerability. As a growing center for agriculture and tourism, the city attracts migrants seeking livelihoods linked to rice farming and the popular *Avenue of the Baobabs*, a key tourist attraction. However, Morondava faces significant environmental challenges, including rising sea levels and coastal erosion, which threaten the city’s long-term sustainability. These challenges underscore the need for local adaptation strategies and conservation initiatives to balance economic development with environmental resilience (Lemahieu et al. 2018).

3.15.3 Pace and distribution of urban growth

Despite regional variations in urban development, Madagascar’s overall urbanization rate remains relatively low compared to global standards. As of 2022, only about 37% of the population lived in urban areas, though this figure is expected to rise as rural livelihoods become increasingly precarious due to environmental and economic pressures (World Bank 2024). The pace of urbanization carries

profound implications for Madagascar’s socio-economic development, as cities play a critical role in driving economic growth, innovation, and access to services. However, the benefits of urbanization are unevenly distributed, and many urban residents continue to face challenges related to poverty, inadequate housing, and limited infrastructure.

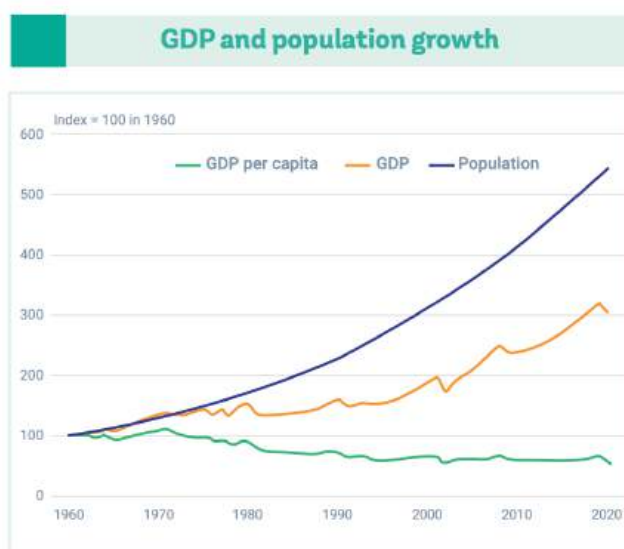


Figure 18: GDP and population growth in Madagascar (World Bank 2024)

3.15.4 Housing and infrastructure deficits

Housing remains one of the most pressing issues in Madagascar’s urban centers. Informal settlements dominate the urban landscape, particularly in rapidly expanding cities like Antananarivo and Tamatave. These settlements are characterized by overcrowding, poor sanitation, and insufficient access to essential services such as clean water and electricity. A 2021 survey found that nearly 70% of urban households lacked access to safe drinking water, highlighting the severity of infrastructure deficits in these growing cities (Ramiaramanana and Teller 2021).

Furthermore, many informal settlements are located in environmentally vulnerable areas, such as floodplains and unstable slopes. In Antananarivo, for example, urban expansion into flood-prone zones has increased dramatically—from 399 hectares in 1953 to 3,675 hectares by 2017. Today, approximately 23% of the city’s buildings are situated in high-risk flood zones (Andriamamonjisoa and Hubert-Ferrari 2019). The lack of effective urban planning and drainage systems exacerbates these vulnerabilities, leaving residents increasingly exposed to extreme weather events, including cyclones and heavy rainfall.

3.15.5 Migration and environmental pressures

Urbanization in Madagascar is closely linked to rural-to-urban migration, driven by a combination of push and pull factors (World Bank 2024). Economic opportunities in cities—such as access to formal employment, better wages, and improved services—act as strong pull factors for rural residents. Meanwhile, environmental challenges, including droughts and soil degradation, push people out of rural areas in search of more stable livelihoods. The southern regions of Madagascar, for instance, have experienced significant out-migration due to prolonged droughts that have devastated

agricultural livelihoods. Many of these migrants relocate to cities such as Antananarivo and Tamatave, further straining already overstretched urban infrastructure and services.

As discussed in the previous section, environmental factors play a critical role in shaping urbanization patterns. Climate change has exacerbated vulnerabilities in both rural and urban areas, driving migration and reshaping the urban landscape. Coastal cities like Tamatave and Morondava face heightened risks from cyclones, rising sea levels, and flooding, while inland cities struggle with challenges related to water scarcity and shifting rainfall patterns. These environmental pressures underscore the urgent need for climate-resilient urban planning and infrastructure development to protect both people and livelihoods.

3.15.6 Policy responses and implementation gaps

Efforts to address the challenges of urbanization in Madagascar have yielded mixed results. Urban development plans, such as those implemented in Antananarivo, have sought to improve housing, transportation, and sanitation, but progress has been slow due to financial constraints and limited institutional capacity. Rapid urban expansion in the capital has led to the proliferation of informal settlements in flood-prone areas, exacerbating the risks posed by climate change and highlighting the critical need for integrated urban planning solutions (Ramiaramanana and Teller 2021).

“If we want to reduce migration pressures on cities, we need to develop regional towns, invest in water infrastructure, and improve agricultural resilience. Otherwise, people will continue leaving rural areas.” (Interview with climate risk specialist¹², University of Antananarivo, Madagascar, November 2024)

International support, including funding from organizations such as the World Bank, has played a pivotal role in addressing these urban challenges. Projects aimed at enhancing urban transport, infrastructure, and environmental resilience have been implemented, yet they often fall short of addressing the full scale of need (Iimi 2024). Significant gaps persist in providing equitable access to essential services and developing sustainable, long-term urban strategies that can effectively respond to Madagascar’s growing urban population (Andriamamonjisoa and Hubert-Ferrari 2019).

In conclusion, urbanization in Madagascar reflects the interplay of economic, social, and environmental forces. While cities like Antananarivo, Tamatave, and Morondava illustrate both the opportunities and challenges associated with urban growth, broader urbanization trends reveal critical issues related to housing, infrastructure, and environmental resilience. As Madagascar continues to urbanize, addressing these challenges will be essential to ensuring that urban areas contribute to sustainable and inclusive development. Achieving this will require coordinated efforts to strengthen urban planning, invest in critical infrastructure, and enhance the resilience of cities to environmental and economic shocks.

3.16 Mapping the national and regional policy framework

Madagascar stands at a critical juncture where climate change, migration, and urbanization converge to shape the country’s development trajectory. Increasingly frequent and intense cyclones, along with severe droughts in the south, have driven internal displacement and placed mounting pressure on

¹² Translated from French by Florian Debève

urban areas such as Antananarivo. While the government has initiated various policy measures to address these challenges, gaps in implementation and coordination persist.

A cornerstone of Madagascar's climate-related efforts is the National Climate Change Policy (Politique Nationale de Lutte contre le Changement Climatique), which sets out a framework for both mitigation and adaptation. This policy emphasizes protecting the country's unique biodiversity, reinforcing disaster risk management, and fostering sustainable economic growth. Complementing this policy are strategic instruments such as the National Adaptation Programme of Action (NAPA), which identifies priority adaptation projects, and Madagascar's Nationally Determined Contribution (NDC) under the Paris Agreement, which outlines the country's ambitions for reducing emissions and building climate resilience.

Additionally, Madagascar has developed a National Disaster Risk Management Strategy, reflecting the country's high exposure to cyclones, floods, and droughts. This strategy seeks to strengthen early warning systems, promote emergency preparedness, and build local capacity to respond to climate-related hazards. In practice, the approach has incorporated components of climate adaptation, recognizing that displacement often results from repeated extreme weather events.

Regarding urbanization, although Madagascar does not yet have a unified national urban policy, various legal instruments and development plans address rapid urban growth. The government's Plan Emergence Madagascar (Plan pour l'Émergence de Madagascar), initiated in recent years, includes provisions for improving infrastructure and public services in urban centers. Local authorities in Antananarivo, Toamasina, and other cities have undertaken projects to upgrade informal settlements, strengthen drainage systems, and enhance transportation networks. However, the integration of climate and migration dimensions in these urban plans remains limited and dispersed across multiple agencies.

On the migration front, Madagascar lacks a standalone national policy explicitly targeting climate-induced displacement or rural-to-urban migration. Existing frameworks, such as the National Employment and Social Protection Policies, tangentially address population movements by focusing on job creation and social safety nets. Yet there is no comprehensive mechanism to manage or monitor internal migration flows—particularly those driven by environmental stressors.

At the regional level, Madagascar is a member of the Southern African Development Community (SADC) and aligns with the African Union (AU) frameworks, including the African Union Migration Policy Framework. These regional instruments highlight the importance of sharing data on displacement, harmonizing migration management, and promoting climate-resilient development. Such platforms also encourage cross-border cooperation to address the transnational aspects of climate change and human mobility.

Despite these efforts, gaps in implementation are evident. First, weak inter-ministerial coordination results in overlapping mandates and fragmented policy actions. Ministries dealing with environment, interior affairs, and urban development often operate in silos, hindering holistic interventions. Second, limited budgetary allocations and reliance on external donors constrain the government's ability to sustain adaptation and disaster risk reduction measures. Third, insufficient data collection on climate-driven migration impedes evidence-based planning.

Opportunities for improvement include creating a dedicated national policy on climate-induced migration, which would clarify institutional responsibilities and bridge gaps in existing frameworks. Strengthening local governance capacities—through targeted training, robust data systems, and inclusive budgeting—can help address urban planning challenges and improve emergency responses. Moreover, fostering public–private partnerships could mobilize additional resources for critical infrastructure projects, from flood defenses to affordable housing. Finally, deeper engagement with regional bodies such as SADC offers avenues for sharing best practices, harmonizing policies, and pooling resources to address the shared threat of climate change.

South Africa



Figure 19: Map of South Africa (Encyclopædia Britannica, 2011)

3.17 Climate trends and impacts in South Africa

3.17.1 Drought-stricken Western Cape and Northern Cape

The arid regions of South Africa, particularly the Northern Cape and parts of the Western Cape, have borne the brunt of climate-driven changes. Over the past two decades, prolonged droughts have severely impacted these areas, crippling agricultural output and leading to critical water shortages. The infamous “Day Zero” crisis in Cape Town in 2018—when the city nearly exhausted its water supply—highlighted the precarious balance of the region’s water resources. Studies have attributed these droughts to a combination of declining precipitation and rising temperatures, which have increased evapotranspiration rates and further depleted water supplies. The Western Cape’s agricultural sector, a cornerstone of the local economy, has suffered substantial losses, with key crops such as wine grapes, apples, and pears experiencing diminished yields due to persistent water scarcity (Mbokodo et al. 2020).

3.17.2 Complex water challenges in the east

In contrast, the eastern parts of the country, including KwaZulu-Natal, Mpumalanga, and the Umzimvubu catchment area in the Eastern Cape, face a dual threat of flooding and prolonged drought cycles, complicating water resource management. The Umzimvubu catchment, one of South Africa's largest, is vital to the livelihoods of rural communities reliant on small-scale agriculture. However, shifting rainfall patterns and intensifying droughts have significantly reduced water availability in this critical basin (Mbele and Mubangizi 2023). Additionally, significant soil erosion, exacerbated by climate variability, further diminishes land productivity and contributes to sedimentation in water bodies (Van Tol et al. 2016). These interlinked challenges make the Umzimvubu catchment a focal point for understanding the complex interactions between climate change, hydrology, and rural development (Ziervogel et al. 2014; Bester, Blignaut, and Crookes 2019).

The eastern regions, particularly KwaZulu-Natal, have also experienced more frequent and severe flooding events. The devastating 2022 floods in KwaZulu-Natal, which resulted in hundreds of fatalities and extensive damage to infrastructure, were exacerbated by climate change, which has intensified rainfall patterns across the region (Dlamini, Nhleko, and Ubisi 2024). The economic cost of these disasters is substantial, with billions of rands spent on recovery and rebuilding efforts, often diverting resources from other critical areas (Masuku et al. 2023). The Umzimvubu catchment is also highly susceptible to such challenges, as its steep gradients and land-use practices increase the risks of flash flooding and landslides, which can devastate agricultural lands and local economies (Ngcamu 2022).

3.17.3 Urban heat and energy pressures

Urban areas across South Africa, particularly Johannesburg and Pretoria, are facing compounded challenges as climate change interacts with rapid urbanization, a topic explored further in a subsequent section. Heatwaves have become more frequent and severe, with projections indicating that average maximum temperatures could rise by up to 6°C by the end of the century under high greenhouse gas emission scenarios (Mbokodo et al. 2020). The urban heat island effect exacerbates this warming, posing serious health risks, especially for vulnerable populations such as the elderly and low-income communities. Additionally, rising temperatures drive increased energy demand for cooling, further straining South Africa's already fragile electricity grid and intensifying ongoing load-shedding crises (Bradshaw et al. 2022).

3.17.4 Agricultural viability and food security

The impacts of climate change on agriculture extend beyond water scarcity to include significant shifts in crop viability and productivity. Research using climate models, including data from CORDEX simulations, predicts that staple crops such as maize, wheat, and sorghum will experience notable yield reductions due to rising temperatures and changing precipitation patterns (Schlenker and Lobell 2010). These changes threaten food security and rural livelihoods, particularly in provinces such as Limpopo and the Free State, where subsistence farming remains a key economic activity. Maize yields, for example, are projected to decline by up to 20% in some scenarios, a trend that could exacerbate malnutrition and poverty in already marginalized communities (Gbetibouo and Hassan 2005). In the Umzimvubu catchment, where subsistence agriculture forms the backbone of local livelihoods, such climatic shifts could have devastating consequences, reducing productivity and forcing communities to adopt costly and often insufficient coping strategies (Hosu, Cishe, and Luswazi 2016).

3.17.5 Coastal erosion and sea-level rise

Coastal regions are also facing climate change related challenges, with rising sea levels and increasing storm surges threatening both ecosystems and human settlements. The Eastern Cape, with its extensive coastline, has experienced accelerated coastal erosion and habitat loss, endangering biodiversity and undermining local fisheries (Fitchett, Grant, and Hoogendoorn 2016). These environmental changes have profound economic implications, as many coastal communities depend on fishing for their livelihoods (Ortega-Cisneros et al. 2021). Moreover, critical infrastructure along the coast, including roads, ports, and residential areas, is increasingly at risk, necessitating costly adaptation measures to protect both human and natural systems (Dube, Nhamo, and Chikodzi 2021).

3.17.6 Health implications of climate change

Health outcomes in South Africa are increasingly intertwined with the impacts of climate change, which pose both direct and indirect threats. Rising temperatures have led to an increase in heat-related illnesses, while shifting precipitation patterns influence the spread of vector-borne diseases such as malaria. Although malaria has historically been confined to the northern regions of the country, climate models project an expansion of transmission zones southward, potentially exposing new populations to the disease (Chersich et al. 2018). Additionally, extreme weather events, including floods, fires and droughts, disrupt healthcare services, further exacerbating existing health inequities and placing additional strain on an already overburdened public health system (Wright et al. 2021).

3.17.7 Socio-economic inequalities and vulnerabilities

South Africa's vulnerability to climate change is compounded by deep socio-economic disparities, which leave marginalized communities disproportionately exposed to climate risks. Women, rural subsistence farmers, and residents of informal settlements face the greatest challenges in adapting to climate impacts. Rural communities in provinces such as the Eastern Cape and Limpopo often lack access to adaptive technologies and resources, making them particularly vulnerable to droughts and declining agricultural productivity (Shackleton, Cobban, and Cundill 2014). Gender disparities further intensify these vulnerabilities, as women in these communities frequently bear the responsibility of securing food and water for their households, increasing their exposure to climate-related stresses (Flatø, Muttarak, and Pelsler 2017). In the Umzimvubu catchment, these challenges are particularly pronounced, with limited infrastructure and the area's remoteness restricting access to vital resources and adaptive technologies, deepening the region's exposure to climate risks (Quinn et al. 2011).

3.17.8 Adaptation and mitigation efforts

Despite the severity of these challenges, efforts to mitigate and adapt to climate change are underway. The *National Climate Change Response White Paper* provides a strategic framework for adaptation and mitigation, but its implementation has faced hurdles due to financial and technical constraints (Ziervogel et al. 2014). At the local level, adaptation initiatives such as water conservation projects in the Western Cape and flood management programs in KwaZulu-Natal present promising solutions, but they require significant scaling up to meet the magnitude of the climate challenge (Mbele and Mubangizi 2023). Similarly, in the Umzimvubu catchment, integrated water management strategies, reforestation initiatives, and sustainable land-use practices are being explored to combat soil erosion, enhance water availability, and increase resilience to climate shocks (Van Tol et al. 2016).

In conclusion, climate change is profoundly reshaping South Africa's physical and socio-economic landscapes, with its impacts manifesting in complex and unequal ways. Vulnerable populations,

particularly those in rural areas and informal settlements, are disproportionately affected, facing heightened risks to their livelihoods, health, and overall well-being. Addressing these challenges requires a coordinated and multi-faceted approach that integrates scientific insights, robust policy frameworks, and community-driven solutions. The Umzimvubu catchment serves as a microcosm of these broader climate challenges, illustrating both the difficulties and opportunities involved in building resilience. Moving forward, sustainable, inclusive, and adaptive strategies will be essential to ensuring a resilient future for all South Africans in the face of ongoing climate change.

3.18 Migration dynamics in South Africa

While mobility has long been a defining feature of South Africa’s socio-economic landscape, the drivers, patterns, and outcomes of migration have evolved significantly since the end of apartheid in 1994. These migrations are closely linked to broader trends such as urbanization, resource distribution, and, more recently, the growing impacts of climate change (Kok 2003).

*“Climate is a factor that contributes and intersects with the others, but the main driver of migration in South Africa is economic inequality—both within the country and in the wider region”
(Interview with expert from South Africa, University of Oxford, November 2024)*

3.18.1 Post-apartheid shifts in internal migration

Post-apartheid South Africa has experienced profound shifts in internal migration patterns, largely shaped by economic opportunities, urbanization, and socio-political changes. The dismantling of apartheid-era restrictions facilitated greater freedom of movement across provinces and cities, leading to a surge in both rural-to-urban and intra-urban migration flows. Between 1996 and 2011, internal migration data revealed a significant increase in movement toward urban economic hubs such as Gauteng and the Western Cape, which together accounted for a substantial share of net in-migration (Statistics South Africa, 2024). Gauteng, the country’s economic powerhouse, attracted over 1.5 million internal migrants during this period, representing 54% of all internal migration in South Africa. Meanwhile, the Western Cape saw a net gain of nearly 400,000 people, reinforcing its status as a key secondary urban destination (Reed 2013).

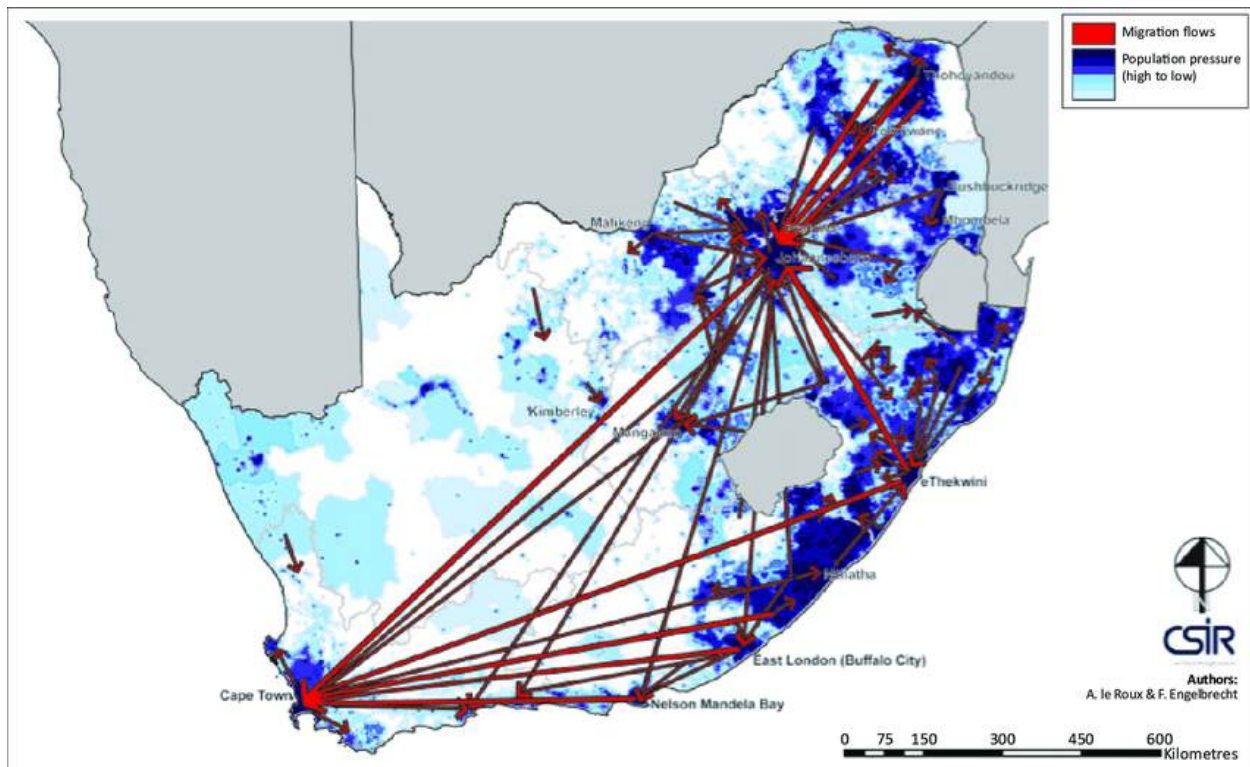


Figure 20: Internal Migration Flows in South Africa (Van Huyssteen, Le Roux, and Van Niekerk 2013)

3.18.2 Economic disparities as a major pull factor

Economic factors remain the primary drivers of internal migration in South Africa. The pursuit of employment opportunities fuels much of this movement, with persistently high unemployment rates in rural areas pushing individuals toward urban centers. According to the 2011 Census, rural provinces such as the Eastern Cape and Limpopo experienced net population losses of 278,000 and 107,000 people, respectively, over the preceding decade. This trend underscores the country's uneven economic development, as Gauteng alone contributes approximately 34% of South Africa's GDP despite occupying less than 2% of the country's land area (Bouare 2002). As a result, provinces such as Gauteng and the Western Cape continue to attract large numbers of migrants, while out-migration depletes human capital from already disadvantaged rural regions (Statistics South Africa, 2024).

3.18.3 Climate change influences on rural out-migration

As showcased in the previous section, climate change has increasingly influenced internal migration patterns in South Africa over the past few decades. Rising temperatures and unpredictable rainfall are placing growing pressure on rural livelihoods, particularly in regions dependent on rain-fed agriculture. Provinces such as the Eastern Cape and Limpopo have experienced considerable rural out-migration, driven by declining agricultural productivity and water scarcity. Research indicates that drought frequency in these areas has nearly doubled over the past 30 years, leading to crop yield reductions of up to 30% and forcing subsistence farmers to seek alternative livelihoods in urban centers (Mastrorillo et al. 2016). Additionally, extreme weather events, such as the 2022 floods in KwaZulu-Natal that displaced over 4,000 people, further contribute to migration, pushing individuals away from climate-stressed areas towards urban regions perceived as more resilient (Dlamini, Nhleko, and Ubisi 2024; Statistics South Africa 2024).

3.18.4 The Umzimvubu catchment: a microcosm

The Umzimvubu catchment in the Eastern Cape serves as a prime example of these climate-induced migration dynamics. Rural communities in the catchment face a combination of environmental stressors and economic stagnation, with soil erosion affecting approximately 60% of the area and erratic rainfall patterns further reducing agricultural viability by up to 20% since 2000 (Van Tol et al. 2016). These challenges have led to a 40% increase in out-migration from the region over the past two decades, with many migrants relocating to urban centers such as East London and Port Elizabeth. However, this influx has contributed to overcrowding in informal urban settlements, where inadequate infrastructure and services perpetuate cycles of vulnerability and poverty (Bester, Blignaut, and Crookes 2019).

3.18.5 Temporary migration and remittances

Temporary migration remains a defining characteristic of South African mobility patterns, particularly among young adults seeking short-term employment opportunities while maintaining connections to their rural households. A 2018 survey revealed that approximately 25% of working-age South Africans engage in temporary migration, with KwaZulu-Natal, Limpopo, and the Eastern Cape being the primary sending provinces. Temporary migrants play a crucial role in supporting rural economies through remittances, which average R1,100 per month from female migrants and R1,500 from males (Arestoff, Kuhn, and Mouhoud 2019). These financial contributions are essential in sustaining rural livelihoods, helping to cover basic needs such as food, education, and healthcare (Oqubay, Tregenna, and Valodia 2021).

“Migrants often do not invest in the places they live, because they see their stay as temporary. Instead, they prioritize sending money home, maintaining their social status in their home communities. Many would rather live in poor conditions in the city than fail to support their families.” (Interview with expert from South Africa, University of Oxford, November 2024)

3.18.6 Feminization of internal migration

Internal migration in South Africa, like in other countries studied, is increasingly becoming feminized, reflecting broader shifts in labour market participation and socio-economic dynamics (Statistics South Africa, 2024). Traditionally, female migration was largely associated with marriage or family reunification; however, women are now migrating independently in search of employment opportunities, particularly in the service and informal sectors. Recent data indicates that women now make up over 55% of all internal migrants in South Africa, with many finding work in domestic services, retail, and hospitality (Camlin, Snow, and Hosegood 2014). This shift has significant implications for household dynamics and resource distribution, as women often send remittances to support education and healthcare in their rural communities, contributing to long-term socio-economic improvements (Von Fintel and Moses 2017).

3.18.7 Socio-political tensions and xenophobia

The socio-economic challenges associated with internal migration are further complicated by systemic issues such as xenophobia and competition for scarce resources. Migrants, particularly those from other African countries, often face hostility and discrimination in urban areas, which hinders their social integration and limits their access to economic opportunities. According to data from the South African Migration Project, nearly 70% of migrants report experiencing xenophobia, reflecting deep-seated tensions within host communities (Adjai & Lazaridis, 2013). These challenges create additional

barriers for migrants, exacerbating existing inequalities and perpetuating cycles of poverty and exclusion.

3.18.8 Policy frameworks and implementation gaps

Government policies have attempted to address some of these challenges, though their effectiveness has been inconsistent. The *Integrated Urban Development Framework (IUDF)* aims to promote inclusive and sustainable urbanization by focusing on housing, infrastructure, and economic development. However, the implementation of such policies has been hindered by resource constraints and bureaucratic inefficiencies, limiting their impact on improving living conditions and access to services (Van Der Berg 2017). Additionally, there is a growing recognition of the need for climate-sensitive migration policies that address the vulnerabilities of both sending and receiving communities, ensuring that climate-induced migration is managed sustainably and equitably (Mpandeli et al. 2020).

In conclusion, while migration provides opportunities for economic advancement and social mobility, it also presents significant challenges for both migrants and host communities. The growing impacts of climate change are intensifying these challenges, particularly in rural areas such as the Umzimvubu catchment, where environmental stressors are forcing many to relocate in search of better opportunities. Addressing the complexities of internal migration requires integrated and forward-thinking policies that strike a balance between urban development and rural resilience. Investments in infrastructure, social services, and economic opportunities in both urban and rural areas are essential to ensuring that migration acts as a catalyst for growth rather than a source of vulnerability. Sustainable, inclusive strategies that address the needs of both sending and receiving communities will be critical in shaping a future where migration serves as a pathway to opportunity for all South Africans.

3.19 Urbanization trends and challenges in South Africa

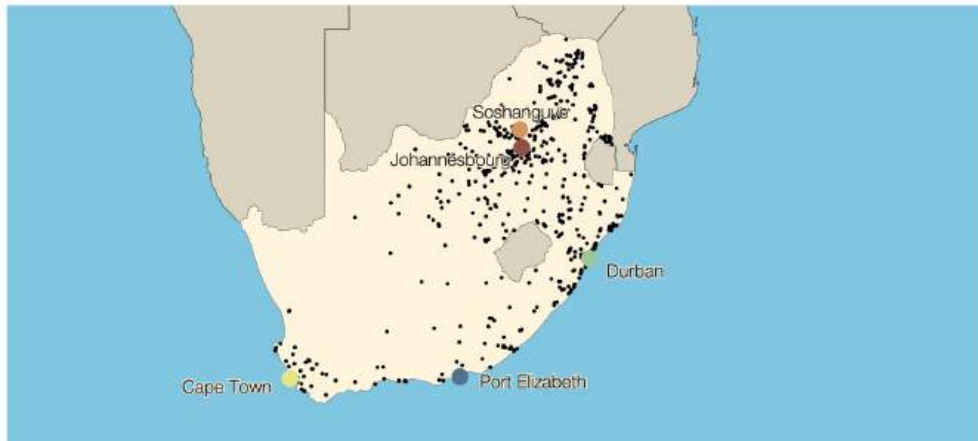
3.19.1 Historical context and legacy of apartheid

While apartheid-era policies initially hindered urban growth by imposing strict movement controls, the post-1994 era has seen a surge in urbanization driven by internal migration, economic development, and shifting socio-political realities (Massey and Gunter 2020). This ongoing urbanization process presents both opportunities and challenges, with far-reaching implications for the nation's development trajectory.

“South African cities are highly fragmented, even before considering migration. Low trust, high crime, and weak institutions make integration difficult. New arrivals add to this complexity, and there are few mechanisms for social cohesion.” (Interview with expert from South Africa, University of Oxford, November 2024)

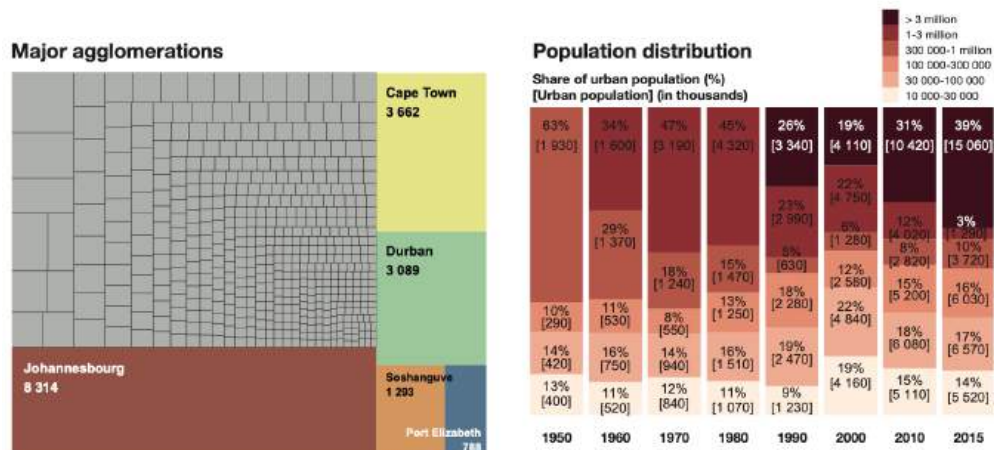
South Africa's urbanization trajectory is deeply rooted in its colonial and apartheid legacies, which established profound racial and spatial divides (McGranahan and Martine 2014; Gambe, Turok, and Visagie 2023). During apartheid, restrictive policies sought to limit the movement of Black South Africans into urban areas, confining them to designated “homelands” or rural reserves. These restrictions resulted in a dualistic urban landscape, characterized by affluent, predominantly White urban cores and underdeveloped, marginalized peripheral townships. The abolition of these policies in the early 1990s triggered a wave of rural-to-urban migration, with cities such as Johannesburg,

Cape Town, and Durban emerging as major centers of population growth and economic opportunity (Bakker, Parsons, and Rauch 2020).



South Africa

Population	Total population 54 647 000	Urban population 38 201 000	Urbanisation level 70 %
Agglomerations	Number of agglomerations 502	Metropolitan population 39 %	Average distance between agglomerations 17 km
Density	Average urban density 3 098 hab./km ²	Urban land cover 12 330 km ²	Urban land cover/ total land cover 1 %



AFRICA'S URBANISATION DYNAMICS 2020 © OECD 2020

Figure 21: Urbanization Dynamics in South Africa (OECD 2020)

3.19.2 Uneven urban growth and migration patterns

By 2011, South Africa's urban population had risen to over 62%, up from 52% in 1990, with projections indicating it could reach 80% by 2050 (Bakker, Parsons, and Rauch 2020). However, this growth has been highly uneven across the country. Gauteng province, home to Johannesburg and Pretoria, has become the primary destination for migrants, boasting an urbanization rate of over 97%. In contrast, rural provinces such as Limpopo and the Eastern Cape continue to experience significant out-migration, exacerbating existing socio-economic disparities between regions (Mlambo 2018). These migration patterns underscore the persistent economic divide between South Africa's urban and rural areas.

The economic appeal of urban centers remains a major, if not the primary, driving force behind urbanization. Cities such as Johannesburg and Cape Town contribute disproportionately to South Africa's GDP, offering employment opportunities across diverse industries, including finance, manufacturing, and technology. However, the concentration of economic activity in urban hubs has also deepened inequalities, with stark contrasts between urban affluence and persistent poverty in informal settlements. Although urban areas generate over 80% of the country's economic output, a significant portion of urban migrants live in informal housing, facing inadequate access to basic services and employment opportunities (Rogerson 1996).

3.19.3 The rise of informal settlements

Informal settlements have become a defining feature of South Africa's urbanization landscape. As rural migrants move to cities in search of employment opportunities, many find themselves living in overcrowded and under-resourced areas on the urban periphery. By 2016, an estimated 13% of urban households were residing in informal housing, highlighting a persistent housing backlog that successive governments have struggled to address (Turok, Seeliger, and Visagie 2021). The rapid expansion of these settlements places many residents in situation where they lack reliable access to essential services such as water, sanitation, and electricity (Makalima 2024).

3.19.4 Spatial legacies and urban fragmentation

The enduring spatial legacy of apartheid continues to shape urban growth patterns across South Africa. Decentralization and the proliferation of suburban developments have contributed to the fragmentation of cities, exacerbating socio-economic inequalities. This urban sprawl is being driven by a combination of market forces and policy shortcomings. In Gauteng, for example, the expansion of gated communities and shopping malls on the urban fringe has deepened spatial divides, reinforcing the socio-economic disparities inherited from the apartheid era and creating what some scholars term the "post-apartheid city" (Jürgens and Gnad 2002).

3.19.5 Opportunities for economic growth and social mobility

Despite these challenges, urbanization has also unlocked significant opportunities for economic growth and social mobility. The concentration of populations in urban areas enables economies of scale, making it more efficient to deliver services and infrastructure. Cities have evolved into hubs of innovation, attracting investment and fostering dynamic entrepreneurial ecosystems. However, realizing the full potential of urbanization requires addressing the persistent inequalities and inefficiencies that continue to characterize South Africa's urban landscape (Katumba and Everatt 2021).

“Despite public perceptions, businesses benefit significantly from migration. Many skilled migrants fill labor gaps, particularly in areas like healthcare and construction, where there are shortages.” (Interview with expert from South Africa, University of Oxford, November 2024)

3.19.6 Environmental sustainability challenges

Environmental sustainability is another pressing concern within South Africa’s urbanization trajectory. Rapid urban expansion has encroached upon ecologically sensitive areas, contributing to biodiversity loss and heightening vulnerability to climate change impacts. Cities such as Cape Town face growing challenges related to water scarcity, underscoring the urgent need for resilient and adaptive urban planning. Promoting green infrastructure and adopting sustainable building practices will be crucial to mitigating the environmental impacts of urban growth while ensuring long-term sustainability (Swilling 2006; Mboup and Oyelaran-Oyeyinka 2019).

3.19.7 Social cohesion and persistent inequalities

Social cohesion is a crucial factor in the success of South Africa’s urbanization journey. The country’s cities remain deeply divided along lines of race, class, and geography—a lingering legacy of apartheid that continues to fuel social tensions and economic disparities. Informal settlements and low-income neighbourhoods frequently lack access to essential services such as quality education, healthcare, and recreational facilities, perpetuating cycles of poverty and social exclusion. Addressing these entrenched inequalities requires inclusive urban policies that prioritize marginalized communities and promote equitable access to resources and opportunities (Turok 2014). Building social cohesion in urban areas involves fostering a sense of belonging and community while ensuring that all residents benefit from the opportunities urbanization brings.

3.19.8 Governance and institutional capacity

Governance plays a central role in shaping the trajectory of South Africa’s urbanization. Effective urban management is essential to address the complexities of rapid growth and increasing service demands. However, many municipalities face significant capacity constraints, struggling to deliver basic services and maintain critical infrastructure. Persistent challenges such as financial mismanagement, bureaucratic inefficiencies, and resource shortages undermine efforts to create well-functioning urban environments (Madumo and Koma 2019). Strengthening local government institutions and fostering collaboration between public, private, and civil society actors are critical to overcoming these obstacles and ensuring sustainable urban development (Bouwer, Pasquini, and Baudoin 2021). Enhancing governance capacity through improved planning, transparency, and community engagement will be key to addressing the evolving needs of urban populations.

In conclusion, urbanization in South Africa is shaped by the nation’s historical, economic, and social realities. While urban growth presents significant opportunities for economic advancement, social development, and innovation, it also introduces profound challenges that must be addressed to foster inclusive, sustainable, and equitable cities. Tackling issues such as housing shortages, infrastructure deficits, and social inequality is essential for unlocking the transformative potential of urbanization. By adopting comprehensive, forward-thinking policies and fostering a collaborative approach, South Africa can harness urbanization as a powerful tool for national development and adaptation to climate change.

3.20 Mapping the national and regional policy framework

South Africa faces a complex interplay of climate change, migration, and urbanization, shaped by historical patterns of spatial inequality and socio-economic disparities. Climate impacts—ranging from droughts and heatwaves to intensified flooding—are increasingly driving both internal displacement and rural-to-urban migration, placing further strain on cities already grappling with high levels of inequality and service delivery backlogs. While South Africa has established multiple policy instruments to address these issues, gaps in coordination and implementation remain significant.

A central policy guiding South Africa's climate action is the National Climate Change Response Policy (NCCRP), published as a White Paper in 2011. This framework outlines strategies for both mitigation (reducing greenhouse gas emissions) and adaptation (enhancing resilience to climate impacts). It emphasizes stakeholder collaboration and mainstreaming climate responses across all levels of government. The National Development Plan (NDP) 2030 further underscores the importance of environmental sustainability, inclusive growth, and human development, acknowledging the influence of migration and urbanization on national development goals. Nonetheless, the NDP does not comprehensively address the growing challenge of climate-induced mobility.

On urbanization, the Integrated Urban Development Framework (IUDF) (2016) serves as a strategic guide for more inclusive, resilient, and liveable cities. The IUDF aims to promote spatial transformation, equitable access to services, and integrated land-use planning—objectives that are particularly relevant as climate-driven pressures contribute to rapid urban population growth. Additionally, the Spatial Planning and Land Use Management Act (SPLUMA) (2013) provides a legal basis for coherent and coordinated development planning, requiring municipalities to create Spatial Development Frameworks. However, these instruments do not explicitly integrate climate-induced migration considerations, often leaving local governments ill-prepared for surges in population linked to environmental stressors.

In terms of migration policy, South Africa's approach historically focused on international migration, documented through instruments like the White Paper on International Migration (2017). Internal migration, while recognized as a major factor shaping the country's urban landscape, has not been addressed with an equivalent, dedicated policy framework. Instead, internal mobility is partially governed by broader housing and labor policies—such as the Housing Act (1997) and the National Housing Code—which attempt to facilitate access to shelter and basic services. However, the lack of a coherent policy tailored to managing internal climate-displacement flows leaves municipalities with limited direction for planning and resource allocation.

At the regional level, South Africa is a member of the Southern African Development Community (SADC) and aligns with instruments such as the SADC Protocol on the Facilitation of Movement of Persons (though not fully ratified) and the African Union (AU) Migration Policy Framework. These frameworks encourage regional cooperation on migration management, data-sharing, and disaster risk reduction, particularly as the region contends with transnational climate hazards (e.g., droughts and cyclones). While these regional guidelines stress the importance of harmonized responses, implementation remains inconsistent.

Gaps in implementation persist due to several factors. First, siloed governance structures and overlapping mandates among national departments—such as Environment, Home Affairs,

Cooperative Governance, and Human Settlements—complicate the integration of climate, migration, and urban development policies. Second, resource constraints in many municipalities limit the capacity to plan for and absorb growing numbers of internal migrants. Third, inadequate data collection on climate-induced mobility hampers evidence-based policymaking and targeted interventions.

Opportunities for improvement include fostering interdepartmental collaboration through a central coordinating body that explicitly tackles climate-driven migration and urbanization. Strengthening local governance capacity via dedicated training and increased funding can bolster municipal resilience measures, particularly in informal settlements prone to climate shocks. Moreover, establishing a comprehensive internal migration policy—or integrating climate mobility into existing frameworks—could clarify institutional responsibilities and streamline service delivery to vulnerable populations. By aligning national and local strategies within broader regional initiatives, South Africa can more effectively manage the nexus of climate change, migration, and urbanization, supporting equitable and resilient development for all.

4 Discussion and key insights

In the previous chapter, we explored the intricate relationship between climate change, migration, and urbanization in Sub-Saharan Africa, highlighting the diverse ways in which environmental stressors interact with socio-economic and demographic dynamics in Ghana, Kenya, Tanzania, Madagascar and South Africa. Here, we take a step back to place these findings within a broader perspective. This discussion aims to clarify how climate change shapes migration and urbanization patterns, while also exploring how these processes are mediated by pre-existing vulnerabilities, socio-political structures, and economic constraints.

To do so, this chapter draws on the insights gained from case studies, as well as interviews conducted with experts on these topics. The objective is not only to summarize key findings but rather to provide a set of insights that can guide practitioners, researchers, and policymakers in better understanding these interlinked phenomena. By identifying common trends and critical challenges, we hope to offer valuable perspectives that inform strategies for adaptation, urban planning, and governance in the face of climate-induced mobility and urban transformations.

“We need to be careful with the narrative that more climate change leads directly to more migration and then to more urbanization. The relationship is not linear; there are many intervening factors, including social and economic conditions.” (Interview with expert, UGHANA, November 2024)

4.1 It is not only about climate change

Mobility spans everything from short daily commutes to long-term international relocations (Meekan et al. 2017). Throughout history, people have used migration to optimize opportunities, minimize risks, and fulfill personal aspirations—whether those risks are environmental, economic, or social (de Haas 2009; Black et al. 2011; Wiederkehr et al. 2019; Rao 2019). Today, as climate change intensifies, livelihoods across the globe—especially in SSA—are experiencing new disruptions, making the intersection of climate and migration an increasingly pressing issue.

4.1.1 Climate pressures but not the only driver

In 2024, the global temperature rise passed 1.5°C, and forecasts suggest we could exceed 2°C by 2030—well above the Paris Agreement goal (Xu et al. 2020). Even though the numbers are largely discussed and contested, some estimates warn that up to 150 million people might be displaced by climate-related stresses by 2050 (Rigaud et al. 2018). Our analysis of Ghana, Kenya, Tanzania, Madagascar, and South Africa shows how environmental stressors—including storms, droughts, and sea-level rise—already affect where and how people live. Yet climate factors are only one influence among many, coexisting with economic, social, and technological factors (Hoffmann et al. 2020; Kaczan and Orgill-Meyer 2020).

Despite intensifying climate hazards, research suggests that most migrants do not cite environmental change as their primary motivation (Abu, Codjoe, and Sward 2014). A large survey of 2,310 households in low-lying coastal areas of India and Bangladesh found that only 3% of respondents mentioned environmental stress as the main reason for migrating (Safra De Campos et al. 2020).

Similarly, HABITABLE project findings, in SSA, reveal that economic opportunities (e.g., jobs, education) remain the chief driver of mobility (Reckien, Keeton, and Dou Yet to be published), even in areas grappling with climate pressures.

4.1.2 Climate as a “threat multiplier”

However, climate change often amplifies existing vulnerabilities—acting as a “threat multiplier” (Hoffmann et al. 2020). Environmental stressors like drought and flooding worsen livelihood insecurities, especially in coastal or arid regions (DECCMA 2019). In fact, a third of surveyed coastal migrants in one study reported that environmental threats (e.g., coastal erosion, storm surges) have grown more frequent or severe in recent years (Safra de Campos et al. 2020).

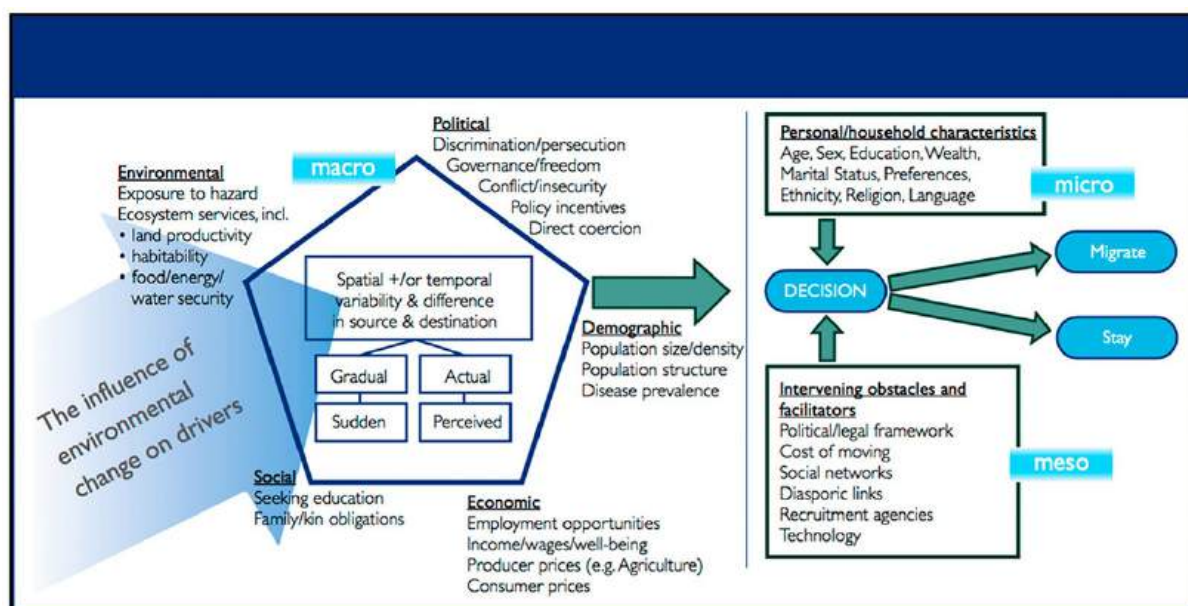


Figure 22 : Migration Decision-Making Process (Foresight 2011)

Crucially, as further discussed below, mobility is not equally accessible to everyone. Poverty, limited resources, and lack of information can force people to remain in high-risk locations (Rikani et al. 2023). Over time, this immobility can trap entire communities in degraded environments—deepening socioeconomic inequalities and eroding resilience (Zickgraf 2019; Cundill et al. 2021).

4.1.3 Policy implications: a holistic lens

Focusing exclusively on whether “climate drives migration” oversimplifies a far more complex process (Singh 2019). Migration choices reflect a tangle of shifting labor markets, infrastructural changes, and cultural norms (Black et al. 2013; Figure 22). Sometimes, climate stress tips the balance toward migration; in other scenarios, it reinforces poverty and blocks people from moving.

To address these challenges effectively, policymakers must adopt a holistic lens. Beyond mapping “hotspots” for sea-level rise or drought, they must understand the local socio-economic conditions that shape how people respond to environmental stress. Urban centers, which absorb many internal migrants, need to plan for an inclusive approach—promoting resource-sharing and reducing the risks

of tension or conflict. Likewise, rural development is essential to reduce so-called “distress migration” by supporting more resilient local livelihoods.

4.1.4 Key messages

- Climate change matters—but it is only one driver among many (Hoffmann et al. 2020).
- Environmental threats act as “multipliers,” heightening pre-existing vulnerabilities (DECCMA 2019).
- Not all who face climate risks can actually move; immobility can trap households in vulnerable areas (Cundill et al. 2021).
- Holistic interventions—linking urban planning with rural development—are essential to address both the mobility and immobility dimensions of climate risk.

4.2 Climate and migration: a non-linear relationship

Popular narratives often suggest a linear chain—more climate stress leads directly to more migration, which then fuels rapid urbanization (Boas et al. 2019; de Haas 2024). Yet, this view underestimates the intricate feedback loops and local contexts that shape migration processes. Focusing on “root causes” of migration purely through a climate lens can also obscure other powerful factors, such as employment opportunities, governance quality, and social aspirations (Gemenne 2011). Indeed, numerous reports project large numbers of “climate refugees” by 2050 or 2100, emphasizing crisis and displacement while paying less attention to broader socio-economic transformations (de Haas 2024; Gemenne 2011).

4.2.1 Diverse drivers and complex feedbacks

Climate-related mobility is neither straightforward nor inevitable. It emerges from a blend of:

- Governance structures (policy, local institutions)
- Economic conditions (job markets, cost of living)
- Cultural norms (family ties, aspirations)
- Social networks (remittances, diaspora support)
- Environmental stressors (drought, flood, land degradation)

Each factor influences how people decide when, how, and whether to move. Climate change can heighten vulnerabilities, but it does not act alone (Black et al. 2011; W. Neil Adger and Winkels 2014). In many cases, individuals and communities use mobility as one strategy among several—alongside livelihood diversification, in-situ adaptation, or risk-sharing within extended families (Tacoli 2009).

4.2.2 A spectrum of outcomes: the example of northern Ghana

In northern Ghana, HABITABLE project findings show how erratic rainfall and soil degradation produce a range of migration responses. Some households opt for seasonal mobility to southern cocoa-growing areas, earning supplemental income (Van Der Geest 2011). Others stay put but leverage remittances from relatives who have already migrated, investing in climate-resilient crops or water-

harvesting systems (Owusu-Ansah 2016; Hashmiu, Agbenyega, and Dawoe 2022). Thus, even under similar environmental stress, migration patterns vary widely according to social networks, household resources, and personal aspirations.

4.2.3 The aspirations–capabilities framework

Evidence also supports the aspirations and capabilities model (Schewel 2020; de Haas 2021). While people may aspire to leave a high-risk area, they need capabilities—savings, transport, legal documents—to do so (Carling and Schewel 2018). Conversely, wealthier or more informed and educated individuals can sometimes move in search of better opportunities even if they experience fewer climate threats (Cattaneo and Peri 2016). Environmental stress alone, therefore, is no guarantee of displacement; it interacts with each family’s resources and agency (McLeman 2014; Zickgraf 2019).

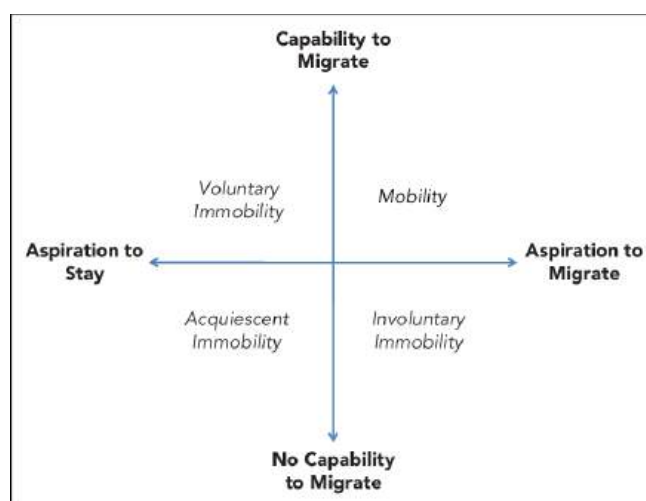


Figure 23: Aspirations and Capabilities framework to understand immobility (Schewel 2020)

4.2.4 Policy implications: non-linear thinking

Designing interventions that assume a direct, linear link from climate crisis to human migration may mislead policymakers. In practice, effective measures need to:

- Support multiple adaptation pathways: from local resilience-building (e.g., drought-resistant agriculture) to safe migration channels.
- Incorporate social and economic incentives: ensuring that if migration becomes necessary, it is informed, voluntary, and adequately supported.
- Recognize migrants’ agency: mobility can be a deliberate choice to improve livelihoods, not just a forced outcome of environmental decline.

Ultimately, the climate–migration nexus functions within systemic transformations driven by globalization, demography, and policy shifts. By acknowledging non-linearity—where both climate pressures and socio-economic forces shape outcomes—stakeholders can foster more holistic and equitable solutions.

4.2.5 Key messages

- No one-size-fits-all chain reaction: Climate stress may push some people to move while others choose—or are forced—to stay.
- Aspirations vs. capabilities: Individuals’ resources and social networks often outweigh direct climate factors in migration decisions
- Policy focus: Encouraging safe, dignified mobility and local resilience—rather than presuming forced exodus—better reflects the real drivers of human movement.

4.3 Immobility is as important as mobility

While migration often reflects economic or social opportunity, it is also a selective process (Black et al. 2013; Tebboth, Conway, and Adger 2019). Generally, those with stronger financial means and more robust social networks can relocate under relatively favorable circumstances. In contrast, poorer households face limited options and sometimes migrate only as a last resort—or, in many cases, not at all (Foresight 2011).

4.3.1 The trap of immobility

Crucially, people in the most hazard-prone regions may be unable to move, even if conditions deteriorate dramatically (W. Neil Adger and Winkels 2014; Zickgraf 2021). Factors include:

- Lack of finances (no transport costs or savings)
- Ties to family (elderly relatives or caregiving duties)
- Land tenure complexities (inheritance rules, restricted property rights)
- Cultural or emotional attachments (long-standing community ties)

Over time, this “trapped” immobility (Zickgraf 2019) compounds vulnerabilities and perpetuates inequality. If public services are scarce and extreme events—like floods or droughts—grow more frequent, these populations face disproportionate risks with few escape routes (Cundill et al. 2021).

4.3.2 Why staying can be a strategy

Not everyone who remains in high-risk areas does so unwillingly. For some, staying is an expression of cultural identity or a determination to maintain family land. Others believe in in-situ adaptation, using local knowledge to cope with climate stress. From building flood barriers to shifting to drought-tolerant crops, certain groups see “staying put” as an intentional choice (Tacoli 2009). This underscores the need to differentiate voluntary immobility (staying by choice) from involuntary immobility (trapped populations), and address them accordingly.

4.3.3 Policy implications: recognizing those who stay

Interventions too often focus on “managing” migration, while overlooking those left behind (W. Neil Adger et al. 2020). It is vital to:

- Integrate immobility into climate adaptation plans, ensuring resources reach communities that remain in place.
- Expand safety nets for households lacking the resources to move, from social protection to local infrastructure upgrades.
- Respect local decision-making: Some communities may prefer on-site adaptation over relocation; policies must align with these preferences where feasible.

4.3.4 Key messages

- Migration is selective: wealthier or better-connected people can move more freely, while the poorest often cannot.
- Involuntary immobility poses major risks: those unable to relocate remain acutely vulnerable to climate hazards.
- Policies must simultaneously support adaptive mobility and strengthen in-place resilience, addressing both sides of the mobility/immobility coin.

4.4 Beyond the migration–urbanisation causal framework

Urbanization and migration are often presented as a straightforward chain: more migration causes more urbanization—or vice versa (de Haas 2024). However, this overly simplistic view neglects the deeper forces that transform both rural and urban regions. In reality, migration and urban growth arise together from broad socio-economic shifts, including industrialization, market integration, and shifts in agricultural labor (Elmqvist et al. 2021; Fry, Zickgraf, et al. 2024).

4.4.1 Structural transitions and the pull–push dynamic

Industrialization creates new jobs, drives infrastructure investments, and expands market opportunities, pulling rural populations toward cities (Kasarda and Crenshaw 1991; Todaro and Smith 2012). At the same time, modernizing agriculture can reduce on-farm employment and push people to move elsewhere (Barrios, Bertinelli, and Strobl 2006). This dual pull–push dynamic helps explain why sub-Saharan African cities have grown so rapidly, echoing patterns also seen in countries like China and India (Zhang and Song 2003). Instead of a neat cause-and-effect sequence, urbanization and migration reinforce one another—which can intensify both opportunities and challenges (Davis and Henderson 2003; de Haas 2010).

4.4.2 A complex system, not a simple model

Focusing solely on rural “push” factors—like climate risks or failing farms—or urban “pull” factors—like better jobs—misses a more intricate web of influences. For instance, poor governance, underinvestment in rural infrastructure, and global market pressures often converge to shape local decisions about whether to stay or move (Mercandalli and Losch 2017; Hao 2012). At the same time, globalization and technology accelerate urban growth by connecting cities to international flows of capital and labor (Lall, Selod, and Shalizi 2006). Such interconnections demand policies that look beyond simplistic push–pull logics (Ahani and Dadashpoor 2021).

4.4.3 Policy implications: an integrated approach

To plan responsibly, governments need to invest in both rural and urban development. That means:

- Reducing rural–urban disparities: Provide healthcare, education, and market access in rural areas to prevent “distress migration.”
- Coordinated urban planning: Ensure housing, transport, and social services keep pace with incoming populations, turning migration flows into opportunities rather than burdens (Fry, Zickgraf, et al. 2024; Fry, Boyd, et al. 2024).
- Multi-level governance: Align national industrial policies with local land-use plans, so rural modernization and urban expansion complement each other rather than clash (de Haas 2024).

4.4.4 Key messages

- Urbanization and migration are mutually reinforcing, not simply cause and effect.
- Industrialization, agricultural mechanization, and global market integration are major forces behind these twin processes.
- Effective policy must bridge rural and urban needs, recognizing that development imbalances often drive migration, while uncoordinated urban growth can exacerbate inequality.

4.5 Acknowledging trans-locality and the rural-urban systems

Across sub-Saharan Africa, people do not simply relocate from rural villages to distant cities and break ties with home. Instead, many lead multi-local lives—maintaining strong social, economic, and cultural links across multiple locations (Greiner and Sakdapolrak 2013). This “translocality” challenges the traditional notion of a strict rural–urban divide and reveals a network of dynamic flows of people, resources, and knowledge (Sakdapolrak, Naruchaikusol, and Ober 2016; Figure 24).

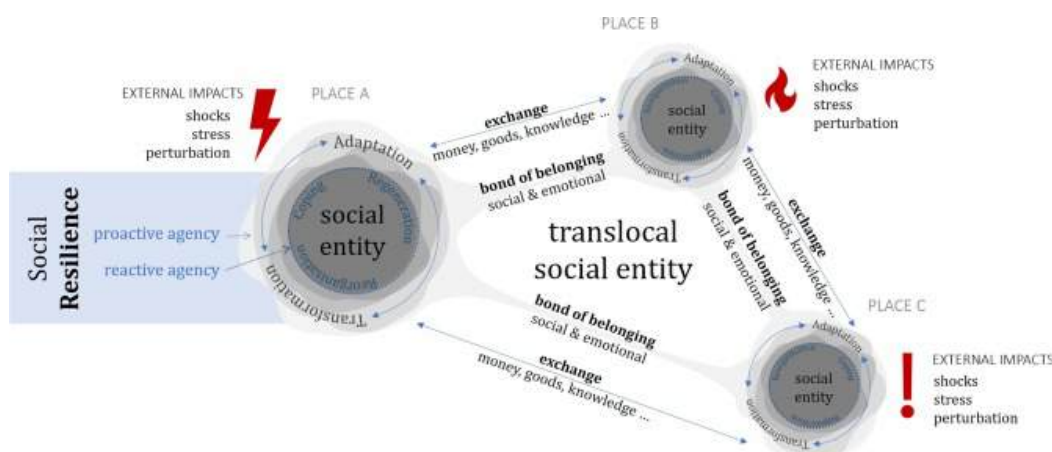


Figure 24: Translocal Social Resilience (Peth and Sakdapolrak 2020)

4.5.1 Why translocality matters

Rather than a one-way move, households can sustain circular or seasonal migration, diversify income streams, and retain social safety nets in both origin and destination communities (Porst and Sakdapolrak 2018). For example, a migrant in Nairobi might send remittances back to rural relatives, who then invest in better seeds or small businesses (Sakdapolrak, Naruchaikusol, and Ober 2016). At times, return migrants bring new skills—like climate-smart farming—home, further blurring the line between “rural” and “urban.”

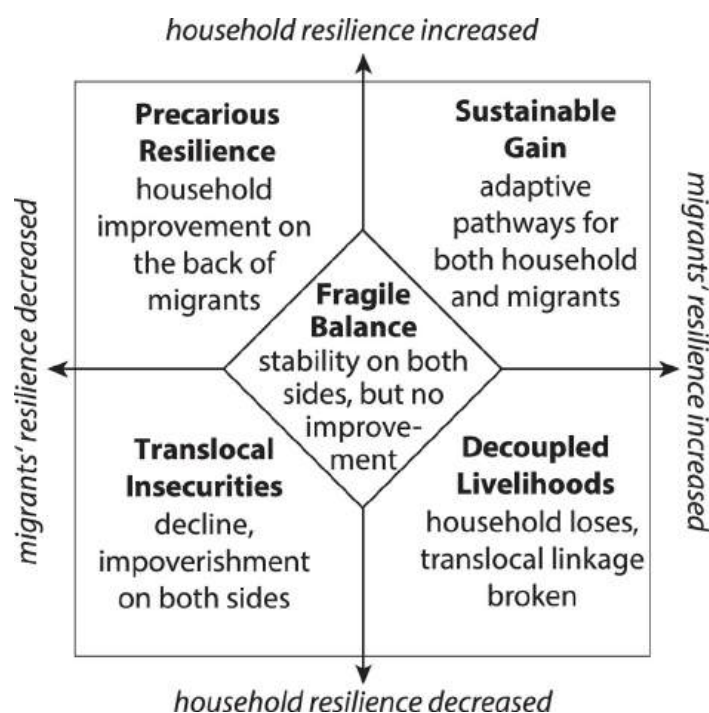


Figure 25: Translocal Resilience Outcome Matrix (Sakdapolrak et al. 2024)

4.5.2 Remittances and “social remittances”

Financial remittances often serve as a lifeline for rural economies by funding education, healthcare, and climate adaptation (Peth and Sakdapolrak 2020). Equally important, social remittances—the transfer of ideas and practices—can boost local governance, spur entrepreneurial thinking, and foster resilience (Greiner and Sakdapolrak 2013). As people circulate, they carry knowledge of urban markets, new technologies, or resource-management strategies back to their places of origin (Sakdapolrak et al. 2024; Figure 25).

4.5.3 Policy implications: adapting across scales

Focusing solely on either rural development or urban policy risks overlooking the translocal realities that connect the two. Better outcomes might include:

- Infrastructure for mobility: Safe roads, public transport, and digital connectivity facilitate regular contact between migrants and their home regions.

- Financial services: Enabling secure, low-cost remittances and credit access can help migrants invest in climate resilience.
- Social protection: Coordinated schemes must extend across both rural and urban jurisdictions, so translocal families are not forced to “choose” one location for health or education benefits (Sakdapolrak, Borderon, and Sterly 2024).

4.5.4 Key messages

- Multi-local livelihoods are common: migrants often maintain strong ties with hometowns, diversifying income and reducing risk.
- Remittances (financial and social) strengthen both rural and urban resilience, bridging service gaps and spreading innovations.
- Integrated policies—across rural and urban contexts—are vital for tapping the adaptive potential of translocality, rather than treating migration as a purely one-way phenomenon.

4.6 Cities as adaptation hubs

Cities in Sub-Saharan Africa are often seen as hotspots of climate vulnerability—particularly where rapid migration and limited infrastructure collide (Amoako 2018). Indeed, municipal services such as housing, water, and sanitation can be quickly overwhelmed by incoming populations, leading to informal settlements in hazard-prone areas. Yet cities are also key nodes of resilience, offering:

- Economic diversification and broader job markets
- Better access to healthcare, education, and social networks
- Innovation potential, driven by cultural and professional diversity

These factors can enhance adaptive capacity and facilitate rapid responses to climate-related shocks (W. Neil Adger and Winkels 2014; Fry, Zickgraf, et al. 2024; Fry, Boyd, et al. 2024).

4.6.1 Balancing vulnerabilities and adaptive strengths

Urbanization in SSA often outpaces local government budgets and technical capacity, creating socio-economic inequalities that worsen climate risks for the poor (Amoako 2018). Rising informal settlements—frequently found on floodplains or coastal fringes—are highly exposed to flooding, heat stress, and disease outbreaks (Juma et al. 2023; Tacoli 2009). Meanwhile, marginalized groups, including many recent migrants, face hurdles such as insecure land tenure, legal status issues, and discrimination, impeding their ability to adapt effectively.

Nevertheless, inclusive policies can help cities function as “adaptation incubators.” Evidence from Nairobi and Accra, for example, shows that flood management systems, public housing initiatives, and early-warning mechanisms reduce local vulnerabilities while integrating migrant communities (Fry, Boyd, et al. 2024). Broader examples include:

- Green corridors in Johannesburg to enhance biodiversity and create recreational spaces

- Community-driven adaptation in flood-prone neighborhoods of Nairobi (Satterthwaite et al. 2020)

4.6.2 Governance and social cohesion

Urban governance is pivotal in determining whether cities realize their full potential as adaptation hubs (Fry, Zickgraf, et al. 2024). Migrants bring diverse knowledge and coping strategies, contributing positively to local economies (Gemenne et al. 2017). However, if job competition and resource shortages go unaddressed, social tensions may deepen (Awumbila et al. 2016). Discrimination and exclusion undermine social cohesion, which is crucial for coordinated disaster response and collective risk management (Fry, Zickgraf, et al. 2024).

Participatory governance approaches—where migrants and long-term residents jointly shape local planning—enable more equitable adaptation efforts (Birkmann et al. 2016). Institutions that link urban climate initiatives (e.g., upgrading drainage systems, waste management) with social policies (e.g., vocational training, microfinance for small enterprises) often generate co-benefits that enhance overall resilience.

4.6.3 Climate-smart urban development

As poverty declines, education improves, and labor markets expand, more people see urban centers as avenues for upward mobility (de Haas 2010; 2021; Schewel 2020). These trends can bolster city-level adaptation when integrated into long-term planning:

- Land-use regulations to prevent building in floodplains
- Climate-resilient infrastructure (e.g., flood detention basins, protective seawalls)
- Green building codes, limiting urban heat islands and promoting resource efficiency (IPCC 2022; W. Neil Adger and Winkels 2014)

Conversely, cities like Dar es Salaam highlight the consequences of insufficient investment: migrant-dense settlements lacking drainage, reliable water, or waste services remain locked in cycles of poverty and heightened risk (Dodman et al. 2017; Juma et al. 2023) (Dodman et al. 2017; Juma et al. 2023).

4.6.4 Multi-level collaboration and inclusive growth

Ultimately, turning cities into adaptation hubs depends on:

- Financial and technical resources for local governments
- Cross-sectoral cooperation, linking health, housing, and disaster management (Pelling et al. 2018)
- Migrant integration—so new arrivals can actively participate in local economies and governance (Gemenne et al. 2022)
- Strategic land-use planning, balancing environmental sustainability with economic development (W. Neil Adger et al. 2020)

By balancing economic growth with social equity and environmental sustainability, cities can become engines of climate resilience, creating new opportunities for both migrants and long-standing residents (World Bank 2021).

4.6.5 Key messages

- Cities face dual pressures: intense climate risks and rapid migration, but also house the resources and networks needed for resilient strategies.
- Inclusive infrastructure and governance—incorporating migrant perspectives—is vital for reducing risks tied to informal settlement growth.
- Long-term success relies on multi-level cooperation (local, national, and international) to fund, plan, and sustain climate-smart urban development.
- Ensuring that migrants contribute—and benefit—requires investments in public services, social cohesion, and adaptation measures that address the needs of all urban dwellers.

4.7 Migration towards cities as a sustainability force

Migration toward cities has the capacity to spark positive change, particularly in regions experiencing climate stress and rapid urban growth. Scholars have long recognized that flows of ideas, remittances, and people can serve as powerful drivers of social and economic transformation (de Haas 2007; Black et al. 2011; Adaawen and Owusu 2013; Arestoff, Kuhn, and Mouhoud 2019). Yet mainstream sustainability policies often overlook how migrants can enrich destination areas, focusing more on challenges than opportunities (W Neil Adger et al. 2019). As a result, the transformative potential of migration for sustainable urban development remains underappreciated.

4.7.1 Beyond the “temporary phenomenon” narrative

A dominant view frames migration as a short-term coping strategy, rather than an integral dimension of sustainable development (W Neil Adger et al. 2019). Such a perspective can obscure the ways in which migrants contribute to urban resilience, innovation, and cultural dynamism (World Bank 2023; Clark and Harley 2020). When cities only see new arrivals as a “burden,” they miss opportunities to leverage migrant skills, entrepreneurship, and social capital (Castles 2010; Fry, Zickgraf, et al. 2024). Conversely, acknowledging migrants as permanent or semi-permanent residents opens space for policies that harness their long-term contributions (Zickgraf et al. 2024).

4.7.2 Social and knowledge flows

Migrants carry practices, technologies, and social norms that can enhance sustainability (Fry, Zickgraf, et al. 2024). This includes everything from climate-smart agriculture methods to entrepreneurial ideas about waste management or urban gardening. Some migrants share these with their home villages via remittances or return visits, creating a two-way exchange of resources (Zickgraf et al. 2024). However, precarious living conditions—such as inadequate housing and insecure employment—can limit their ability to apply or spread these innovations (Abu, Codjoe, et al. 2024; Abu, Heath, et al. 2024; Siddiqui et al. 2021).

4.7.3 Addressing inequalities and enabling participation

For migration to act as a force for sustainability, incoming populations need fair access to infrastructure (water, sanitation, energy), credit, training programs, and social services (Sakdapolrak et al. 2024; Fry, Boyd, et al. 2024). Barriers such as legal restrictions or discrimination can undermine migrants' potential to invest in local economies (William Neil Adger et al. 2024; Etzold and Mallick 2016). In some cases, regulatory frameworks even prohibit migrants from owning property or operating certain businesses (O'Dell, Fransen, and Jolivet 2023). Ensuring that migrants can thrive as co-creators of sustainability demands:

- Inclusive governance: representation of migrant interests in city planning
- Supportive legal frameworks: secure land rights, flexible documentation
- Social cohesion policies: community-based platforms that encourage dialogue between newcomers and long-standing residents

4.7.4 Reframing migration for sustainable development

Ultimately, seeing migration only as a crisis-driven problem leads policymakers to underestimate how migrants can strengthen social networks, support local adaptation, and drive inclusive growth (Clark and Harley 2020). As cities continue to expand, enabling migrants to shape sustainability strategies—by contributing diverse knowledge, expanding cultural horizons, and developing new economic sectors—can promote both climate resilience and social equity (Fry, Boyd, et al. 2024).

4.7.5 Key messages

- Migrants bring vital knowledge, capital, and social networks that can accelerate sustainability transformations in urban areas.
- Viewing migration as purely temporary overlooks long-term contributions to innovation, urban resilience, and cultural diversity.
- Inclusive policies—from secure land tenure to vocational training—are crucial for realizing migrants' potential as co-creators of sustainable, equitable cities.
- Addressing inequalities and legal barriers allows newcomers to participate fully in local economies and governance, forging stronger pathways to adaptation and development.

4.8 Going beyond a sedentary and static vision of climate adaptation: embracing mobility as a key strategy

Many existing adaptation frameworks assume that people should remain in place, emphasizing in-situ interventions like improving irrigation or strengthening buildings. This “sedentary bias” views migration as a last resort or a sign of adaptation failure (Robins et al. 2024). While place-based solutions are essential, they are not always enough, especially when climate impacts—such as rising sea levels or repeated droughts—jeopardize long-term habitability (Kaczan and Orgill-Meyer 2020; McLeman 2014).

4.8.1 Mobility as a valid and proactive response

In many cases, mobility is a legitimate form of climate adaptation (Black et al. 2011; Sakdapolrak, Naruchaikusol, and Ober 2016). Individuals or households who relocate—even temporarily—can:

- Diversify income sources and reduce reliance on vulnerable livelihoods
- Spread risk across multiple locations and economic sectors
- Access better healthcare, education, and social networks, bolstering overall resilience

Evidence shows that rural–urban migration can offer new job opportunities and reduce pressure on degraded environments, though it depends on stable governance and economic conditions (Cundill et al. 2021; Gemenne et al. 2017).

4.8.2 Essential supportive frameworks

Recognizing mobility as an adaptive strategy requires policy frameworks that safeguard migrants' rights, ensure safe living conditions, and facilitate legal pathways (Etzold and Mallick 2016). Yet, these frameworks are often absent, leaving newcomers in precarious informal settlements or without formal documentation (Cundill et al. 2021). This gap can compound vulnerabilities, especially where poverty intersects with climate hazards (Rikani et al. 2023). Therefore:

- National Adaptation Plans should incorporate mobility as a strategic response, clarifying support mechanisms like relocation grants or portable social benefits (Nabong et al. 2023).
- Cross-sectoral alignment (e.g., land-use, housing, labor policies) can help ensure that migrants are not pushed further into marginal areas lacking basic services (Tacoli 2009).
- Local governance must be empowered to accommodate inflows, connecting humanitarian, development, and climate agendas (Cundill et al. 2021).

4.8.3 Community-based adaptation in rural and urban contexts

Even as migration becomes part of adaptation planning, it is crucial to strengthen community resilience for those who stay—be it in rural or urban areas (Black et al. 2011). Grassroots organizations and local actors often hold the key to effective strategies (Salerno et al. 2017). For instance, in Tanzania, collective resource management (shared irrigation, cooperative farming) mitigates water scarcity and stabilizes rural livelihoods (Tacoli 2009). Meanwhile, in cities like Accra, community-based waste management or flood prevention can protect low-income neighborhoods—where many migrants settle—against worsening climate impacts (I. Adams, Ghosh, and Runeson 2023).

4.8.4 Better data and ethical considerations

Adopting mobility as a climate strategy also demands improved data on who moves, why, and under what conditions (Singh 2019; Nabong et al. 2023). Frequent, high-resolution surveys—plus tracking short-term displacement—help planners anticipate demographic shifts and direct resources effectively (Cundill et al. 2021). Ethical questions also arise: who decides if or when communities should relocate? Do vulnerable populations have a genuine choice, or are they coerced by deteriorating conditions

(Cundill et al. 2021; Robins et al. 2024)? Policies must ensure equitable participation in decision-making, particularly for marginalized groups.

4.8.5 Key messages

- Sedentary-centric adaptation is insufficient when climate impacts grow unmanageable; mobility can be a proactive strategy.
- To embrace mobility as adaptation, policies must protect migrant rights, provide safe relocation pathways, and integrate climate planning with urban development.
- Community-based adaptation remains vital for those who stay—balancing strategies for in-situ resilience with support for those who need or choose to move.
- Ethical and data-driven approaches are crucial: migration should be voluntary and informed, not forced by a lack of local options or insufficient planning.

5 Policy and Governance Gaps

Effective governance is critical in addressing the interconnected challenges of climate change, migration, and urbanization in Sub-Saharan Africa (SSA). However, significant policy and governance gaps persist, hindering comprehensive and coordinated responses. Weak institutional frameworks, fragmented policies, and resource constraints exacerbate vulnerabilities and limit the potential for sustainable adaptation.

5.1 Fragmentation of policy frameworks

Policy responses to climate change, migration, and urbanization often lack coordination, with national adaptation plans, urban policies, and migration frameworks operating independently, leading to inefficiencies. In Kenya, for example, urban planning efforts have failed to integrate climate migration considerations, resulting in disorganized settlements and heightened climate risks.

Jurisdictional conflicts between national and local governments further exacerbate these challenges, as urban governance bodies frequently lack the authority and resources to manage climate-induced migration effectively, leading to service delivery and infrastructure gaps.

5.2 Limited institutional capacity and resources

Governance challenges in SSA often stem from limited institutional capacity to manage climate migration effectively. Local governments frequently lack the technical skills and financial resources needed to implement adaptation measures and support migrant communities. In fast-growing cities like Accra and Dar es Salaam, insufficient infrastructure funding has contributed to the expansion of informal settlements in climate-vulnerable areas.

Corruption and bureaucratic inefficiencies further hinder policy implementation, with resources for climate resilience initiatives often misallocated or failing to reach those most in need, worsening social inequalities and vulnerabilities.

5.3 Data gaps and monitoring challenges

Accurate data is crucial for effective policy planning, yet significant gaps persist in tracking climate migration patterns across SSA. The lack of comprehensive migration data limits policymakers' ability to design targeted interventions and allocate resources effectively. Without reliable data, future migration projections remain uncertain, hindering proactive planning and response efforts.

Enhancing data collection through household surveys, remote sensing, and participatory mapping can provide deeper insights into climate-induced migration trends. Strengthening collaboration among governments, research institutions, and international organizations is key to improving data accuracy and supporting evidence-based policy decisions.

5.4 Inadequate stakeholder engagement

Effective stakeholder engagement is essential for developing inclusive and context-specific policy responses. However, many climate and migration policies overlook the perspectives of affected communities, resulting in interventions that fail to meet their needs or priorities. In SSA, informal settlement residents—who comprise a large share of climate migrants—are often excluded from urban planning processes, deepening their marginalization and fueling social tensions.

Adopting participatory approaches that engage local communities, civil society organizations, and the private sector can improve policy effectiveness and ensure interventions align with on-the-ground realities. Collaborative governance models that empower local stakeholders in decision-making processes are crucial for enhancing resilience and promoting social cohesion.

6 Policy recommendations by actors

6.1 For national governments: integrated policies for climate resilience and urban planning

National governments play a pivotal role in addressing the challenges at the intersection of climate change, migration, and urbanization. To foster climate resilience and sustainable urban planning, governments should:

- *Develop climate-responsive urban policies:* national urban policies must integrate climate resilience measures, ensuring that cities are prepared to accommodate climate-induced migration. This includes updating zoning laws, investing in climate-resilient housing, and incorporating green infrastructure.
- *Strengthen institutional coordination:* ministries responsible for climate change, urban planning, and migration should collaborate more effectively. A national task force on climate-induced migration could enhance policy coherence and implementation.
- *Enhance data collection and monitoring:* governments must invest in systematic data collection to track internal migration trends and climate impacts. Strengthening national statistical offices to integrate climate and migration data will support evidence-based policymaking.
- *Increase investments in climate adaptation:* public investment in climate adaptation measures, such as flood-resistant infrastructure, water conservation projects, and drought-resistant agriculture, will help mitigate displacement risks.
- *Promote equitable development:* addressing socio-economic disparities between urban and rural areas can reduce forced migration and the pressures on urban areas. Policies such as investment in rural infrastructure, sustainable agriculture, and job creation programs can reduce the pressure to move in vulnerable areas.

6.2 For regional bodies (AU¹³, ECOWAS¹⁴, SADC¹⁵): coordinated responses and funding opportunities

Regional organizations have a crucial role in fostering cross-border collaboration and resource mobilization for climate resilience and migration management. Key recommendations include:

- *Harmonizing regional migration policies:* establishing shared frameworks for managing climate-induced migration within regional blocs will facilitate orderly and safe mobility across borders.
- *Creating regional climate adaptation funds:* a dedicated funding mechanism for climate adaptation in vulnerable areas can support infrastructure development, emergency response systems, and livelihood diversification programs.

¹³ African Union, <https://au.int/>

¹⁴ Economic Community of West African States, <https://www.ecowas.int/?lang=fr>

¹⁵ Southern African Development Community, <https://www.sadc.int/fr>

- *Enhancing transboundary resource management:* regional bodies should promote joint management of critical resources such as water basins and forests to mitigate climate-induced displacement and reduce resource-based conflicts.
- *Facilitating knowledge exchange and best practices:* countries within regional groupings should share successful adaptation strategies, urban planning approaches, and policy innovations to enhance collective resilience.
- *Strengthening and regionalizing early warning systems:* developing and implementing regional early warning systems for climate hazards can enable proactive responses to extreme weather events and reduce forced displacement.

6.3 For development partners: supporting capacity-building and research initiatives

Development partners, including international organizations, donors, and research institutions, can support national and regional efforts by:

- *Funding research on climate and migration dynamics:* more empirical studies are needed to explore further the links between climate change, migration, and urbanization, particularly in rapidly growing cities and vulnerable rural regions.
- *Building local capacity:* development partners should invest in training programs for urban planners, policymakers, and local authorities to enhance climate adaptation and migration governance.
- *Supporting pilot projects and scalable solutions:* testing innovative approaches, such as climate-resilient housing and nature-based solutions for flood management, can inform broader policy adoption.
- *Promoting inclusive stakeholder engagement:* development partners should facilitate dialogue between national governments, civil society, the private sector, and affected communities to ensure that policies are participatory and locally relevant.
- *Leveraging climate finance mechanisms:* international financial institutions should expand access to climate adaptation financing for vulnerable communities, particularly in low-income countries facing climate-induced displacement.

6.4 For local and urban authorities: strengthening local governance and participatory planning

Local governments are at the frontline of addressing urbanization and climate migration challenges. Strengthening their capacity and governance structures is essential for effective climate adaptation and service delivery. Recommendations include:

- *Developing climate-sensitive urban planning strategies:* local authorities should prioritize climate-resilient infrastructure, integrate green spaces, and enforce land-use planning regulations to reduce disaster risks.

- *Enhancing public participation in decision-making:* community engagement in urban planning processes ensures that policies reflect local needs and foster social cohesion among migrants and host communities.
- *Improving service delivery in informal settlements:* many climate migrants settle in informal urban areas with inadequate infrastructure. Targeted investments in sanitation, housing, and transportation will improve living conditions.
- *Strengthening local disaster preparedness:* municipalities must enhance their capacity to respond to climate hazards through contingency planning, emergency response training, and resilient infrastructure investments.
- *Fostering local economic opportunities:* supporting small businesses, skill development programs, and inclusive labor policies will help integrate migrants into urban economies and reduce economic vulnerabilities.
- *Developing intersectional approaches to migration:* Local authorities should acknowledge the specificities of different migrant groups, recognizing their diverse backgrounds, vulnerabilities, and needs. Migration policies should move beyond treating migrants as a homogeneous group and ensure tailored support mechanisms for different communities, including women, youth, and marginalized groups.

By implementing these policy recommendations, stakeholders at all levels can foster more resilient urban and rural communities, ensuring that climate change, migration, and urbanization challenges are managed in a sustainable and equitable manner.

7 Policy recommendations by country

7.1 Ghana

Policy Recommendation	Local Context / Rationale	Potential Lead Institutions
1. Mainstream climate-induced migration into the National Migration Policy	<ul style="list-style-type: none"> Northern Ghana's droughts and coastal erosion in the south heighten mobility pressures. Climate factors are only loosely integrated in migration governance. Strengthening the National Migration Policy can harmonize development, climate adaptation, and migration. 	Ministry of Interior; Ministry of Environment; National Disaster Management Org.
2. Invest in integrated flood management for Accra & Kumasi	<ul style="list-style-type: none"> Accra & Kumasi face recurring floods due to heavy rainfall & poor drainage. Flood-prone informal settlements are most vulnerable. Coordinated drainage upgrades, early warning systems, and resilient infrastructure are critical. 	Ministry of Works & Housing; Local Metropolitan Assemblies; NADMO
3. Expand rural development programs (e.g., 'One District, One Factory')	<ul style="list-style-type: none"> Persistent north-south inequalities push migrants to urban centers. Strengthening rural industries, infrastructure, and social services can reduce 'distress migration' and support local resilience. 	Ministry of Trade & Industry; Northern Development Authority
4. Enhance data collection on internal mobility and climate impacts	<ul style="list-style-type: none"> Existing censuses/surveys rarely capture short-term, seasonal, and climate-driven moves. Improved data can inform targeted interventions, especially in drought-prone regions. 	Ghana Statistical Service; Ministry of Planning
5. Strengthen local governance & capacity for climate adaptation	<ul style="list-style-type: none"> Decentralized governance means local authorities need training/resources to manage flood risks & influx of migrants. Strengthening District Assemblies fosters more effective disaster response and climate planning. 	Ministry of Local Government; Metropolitan, Municipal, & District Assemblies

7.2 Kenya

Policy Recommendation	Local Context / Rationale	Potential Lead Institutions
1. Refine the National Climate Change Action Plan to address internal climate mobility	<ul style="list-style-type: none"> ASALs face recurrent droughts; displaced pastoralists move to cities (Nairobi, Mombasa). Incorporating mobility into climate planning ensures timely support (housing, water, services) in receiving areas. 	Ministry of Environment & Forestry; National Drought Management Authority
2. Strengthen early warning systems in drought-prone regions (Turkana, Garissa)	<ul style="list-style-type: none"> ASAL communities rely heavily on pastoralism; timely drought onset info can reduce livestock losses & forced displacement. Early warning can trigger local-level mitigation & reduce humanitarian crises. 	National Drought Management Authority; County Govts in ASAL regions
3. Upgrade urban infrastructure & services in informal settlements	<ul style="list-style-type: none"> Rapid urbanization in Nairobi, Mombasa, Kisumu outstrips service delivery. Flooding & poor sanitation in informal settlements multiply health risks. Targeted slum upgrading & resilient housing reduce hazard exposure. 	Ministry of Transport, Infrastructure, Housing & Urban Dev.; County Govts
4. Expand rural livelihood diversification (e.g., irrigated agriculture)	<ul style="list-style-type: none"> Persistent droughts threaten subsistence farming & pastoralism. Irrigation, climate-smart agriculture, & value addition can reduce 'distress migration' & boost local economies. 	Ministry of Agriculture; ASAL & Regional Development Ministries
5. Enhance policy coordination for rural-urban migration	<ul style="list-style-type: none"> Multiple agencies handle migration, land use, & disaster management with limited inter-agency cooperation. A central coordinating body can align policies for pastoralist support, social protection, & urban planning. 	Department of Immigration; Ministry of Devolution; Council of Governors

7.3 Tanzania

Policy Recommendation	Local Context / Rationale	Potential Lead Institutions
1. Integrate climate mobility into the National Climate Change Strategy	<ul style="list-style-type: none"> • Recurrent drought in Dodoma & Singida spurs rural-urban migration. • Coastal flooding in Dar es Salaam is a growing concern. • Mainstreaming migration can guide adaptation priorities & resource allocations. 	Vice President’s Office (Environment); National Environment Management Council (NEMC)
2. Enhance local government capacity for planning in Dar es Salaam & secondary cities	<ul style="list-style-type: none"> • Dar es Salaam is among Africa’s fastest-growing cities, with sprawl & flood-prone informal settlements. • Limited urban planning capacity heightens vulnerability. • Training & resources can help local authorities implement land-use plans & upgrade settlements. 	Ministry of Lands, Housing & Human Settlements; Local Gov. Authorities
3. Promote climate-smart agriculture in drought-prone regions	<ul style="list-style-type: none"> • Agriculture remains the main livelihood; recurrent droughts threaten food security. • Investments in irrigation, drought-tolerant seeds, & market access reduce forced migration. 	Ministry of Agriculture; Tanzania Agricultural Development Bank (TADB)
4. Strengthen data systems & research on migration drivers and hotspots	<ul style="list-style-type: none"> • Reliable info on climate mobility is scarce. • Coordinated surveys & remote sensing can capture short-term & seasonal movements, guiding targeted interventions. 	National Bureau of Statistics; Universities & Research Institutes
5. Expand flood mitigation & coastal protection measures	<ul style="list-style-type: none"> • Low-lying coastal areas exposed to storm surges & sea-level rise. • Infrastructure upgrades (drainage, seawalls, mangrove restoration) needed to safeguard expanding urban areas. 	Ministry of Works & Transport; Coastal Regional Administrations

7.4 Madagascar

Policy Recommendation	Local Context / Rationale	Potential Lead Institutions
1. Develop a national policy on climate-induced displacement & rural-urban migration	<ul style="list-style-type: none"> Southern droughts displace thousands annually; east & north face frequent cyclones. No dedicated policy addresses internal climate-driven mobility. A coordinated framework can link humanitarian relief, adaptation, & urban planning. 	Ministry of Population & Social Affairs; Ministry of the Interior; National Disaster Agencies
2. Integrate migration into Plan Emergence Madagascar	<ul style="list-style-type: none"> Migration to Antananarivo & port cities (Tamatave) spurred by ag. failures & job-seeking. Including climate migration in dev. plans aligns infrastructure investments (housing, transport, drainage) with demographic pressures. 	Prime Minister's Office; Ministry of Economy & Planning
3. Strengthen reforestation & nature-based solutions for flood/cyclone risk	<ul style="list-style-type: none"> Coastal erosion & deforestation worsen flood/cyclone impacts. Community-based mangrove restoration & watershed protection can reduce forced displacement in vulnerable areas. 	Ministry of Environment & Sustainable Development; Local Communities
4. Improve urban infrastructure & slum upgrading in Antananarivo & Tamatave	<ul style="list-style-type: none"> Inadequate drainage, housing deficits, and flooding hamper resilience. Targeted investments to support migrants from the south & other vulnerable groups. 	Ministry of Territorial Planning; Local Municipalities
5. Enhance cyclone early warning & disaster risk reduction	<ul style="list-style-type: none"> Cyclones (e.g., Enawo 2017, Batsirai 2022) displaced hundreds of thousands. Upgraded warning systems & local evacuation planning reduce losses & limit prolonged displacements. 	National Disaster Risk Management Agency; Meteorological Services

7.5 South Africa

Policy Recommendation	Local Context / Rationale	Potential Lead Institutions
1. Incorporate climate migration into the National Climate Change Response	<ul style="list-style-type: none"> • Eastern Cape & Limpopo face rising out-migration due to drought & crop failure. • KZN floods also displace local residents. • Linking migration with climate frameworks ensures cross-sector coordination (housing, social services). 	Dept. of Forestry, Fisheries & the Environment; Dept. of Home Affairs
2. Strengthen local government capacities for informal settlement upgrading	<ul style="list-style-type: none"> • Rapid urbanization in Gauteng & Western Cape => sprawling informal settlements with inadequate infrastructure. • Municipalities need technical & financial support to integrate climate resilience in upgrading programs. 	Dept. of Cooperative Governance & Traditional Affairs; Municipalities
3. Improve data systems on internal migration & climate impacts	<ul style="list-style-type: none"> • Post-apartheid mobility is under-recorded, including climate-driven relocation. • Enhanced data is crucial for planning (service delivery, housing, disaster preparedness, social cohesion). 	Statistics South Africa; SA Local Government Association (SALGA)
4. Tackle xenophobia & enhance social integration policies	<ul style="list-style-type: none"> • Economic competition & inadequate services in major cities spark anti-immigrant sentiment, affecting internal & cross-border migrants. • Inclusive dialogues & community policing reduce tensions & support adaptation. 	Dept. of Social Development; Local municipalities; Civil Society
5. Expand climate-resilient economic opportunities & skills training	<ul style="list-style-type: none"> • Just transition from coal to renewables can create green jobs. • Tailored upskilling programs for urban migrants reduce poverty & enhance adaptive capacity. 	Dept. of Employment & Labour; Dept. of Small Business Development

8 Knowledge gaps and research needs

While the existing body of research has made significant strides in understanding these relationships, substantial knowledge gaps persist. Addressing these gaps is crucial for developing effective policies and interventions to mitigate adverse effects and enhance resilience in affected communities. This section gathers the key areas, identified during our literature review and interviews, where further research is needed to strengthen the evidence base and inform policy decisions.

8.1 Data deficiencies and methodological challenges

A critical challenge in studying climate-induced migration and urbanization in SSA is the lack of comprehensive and high-resolution data. Many migration studies still rely primarily on national census data, which are often outdated, incomplete, or inconsistently collected. Additionally, the absence of standardized methodologies for tracking climate-induced migration makes it difficult to compare findings across different regions and time periods.

Research Needs:

- Development of harmonized and high-frequency data collection mechanisms to capture real-time migration flows.
- Use of remote sensing and big data analytics to monitor climate impacts and migration patterns.
- Improved integration of qualitative and quantitative research methods to capture lived experiences of affected populations.

8.2 Climate-migration-urbanization nexus

To move beyond the linear understanding that postulates that climate change exacerbates migration and urbanization trends, the specific ways in which climate impacts interacts with other drivers of migration, as well as the feedback loop between migration and urbanization remain too poorly understood. In particular, the extent to which migration serves as an adaptive strategy versus a response to economic and environmental distress requires further exploration.

Research Needs:

- Highly contextual studies of the interactions between various drivers of migration in the decision-making process.
- Longitudinal studies examining the long-term impacts of climate-induced migration on urbanization patterns.
- Analysis of how urban planning and governance structures can accommodate and support climate migrants.
- Investigation into the role of remittances in enhancing resilience among migrant-sending communities.

8.3 Socioeconomic and health implications of migration

The socio-economic consequences of migration, including labor market integration, access to social services, and the well-being of migrants, remain inadequately addressed in policy frameworks. In urban areas, climate migrants often settle in informal settlements, where they face precarious living conditions, limited employment opportunities, and heightened exposure to health risks.

Research Needs:

- Assessments of labor market dynamics and employment opportunities for climate migrants in urban areas.
- Studies on health vulnerabilities and access to healthcare among displaced populations.
- Examination of gender-specific challenges faced by migrating populations, particularly among women and children.

8.4 Governance and policy responses

Existing policy frameworks often fail to integrate climate migration into urban planning and governance structures. Many national adaptation strategies do not adequately address internal displacement caused by climate change, leaving local governments to manage these challenges with limited resources.

Research Needs:

- Evaluation of policy effectiveness in managing climate migration and urbanization.
- Case studies of best practices in integrating migration considerations into national climate adaptation plans.
- Policy simulations to assess the potential outcomes of different migration governance approaches.

8.5 Environmental degradation and resource competition

Rapid urbanization, partly driven by climate migration, intensifies pressure on natural resources, leading to deforestation, water scarcity, and increased vulnerability to climate hazards. However, the extent to which these environmental challenges are exacerbated by migration remains underexplored.

Research Needs:

- Impact assessments of climate migration on urban environmental sustainability.
- Studies on the effectiveness of nature-based solutions in mitigating urban environmental degradation.
- Exploration of community-led adaptation strategies to reduce resource conflicts.

8.6 Resilience and adaptation strategies

Although migration is often framed as a challenge, we have seen that it can also serve as a resilience strategy for vulnerable populations. However, there is limited research on how migrants adapt to new environments and how host communities can be supported to facilitate integration.

Research Needs:

- Studies on successful adaptation strategies employed by climate migrants in urban settings.
- Examination of social cohesion and conflict dynamics between migrants and host communities.
- Evaluations of livelihood diversification programs that enhance migrant resilience.

8.7 Translocal relationships between origin and destination areas

The connections between migrants' origin and destination areas play a crucial role in shaping both urban and rural resilience. The extent to which urban policies influence rural development and the support networks that migrants maintain with their communities of origin remain understudied.

Research Needs:

- Examination of how inclusive urban policies impact rural resilience and economic stability.
- Studies on financial, social, and knowledge transfers between urban migrants and their home communities.
- Exploration of the role of translocal networks in sustaining livelihoods and adaptive capacities in both rural and urban areas.

8.8 Conclusion

Addressing these knowledge gaps is essential for crafting more effective policies and interventions that support climate migrants and promote sustainable urbanization. A multidisciplinary approach—incorporating insights from climate science, migration studies, urban planning, and socioeconomics—is necessary to develop holistic solutions. By advancing research in these key areas, policymakers and practitioners can better navigate the complex interconnections between climate change, migration, and urban development in Sub-Saharan Africa.

9 Conclusion

The findings of this report underscore the intricate and multifaceted relationship between climate change, migration, and urbanization in Sub-Saharan Africa. Traditional linear narratives that portray climate change as a direct cause of migration, which subsequently leads to increased urbanization, fail to capture the complexity of these interconnected processes. Rather than a simple chain of causation, migration and urbanization are shaped by a confluence of environmental, socio-economic, and political factors, each exerting distinct influences at different scales. As climate variability intensifies, a more nuanced understanding of migration as both an adaptive strategy and a challenge is essential for formulating effective policy responses that safeguard livelihoods, enhance resilience, and ensure sustainable urban development.

9.1 Beyond the simplistic climate-migration-urbanization narrative

The report challenges the oversimplified assumption that "more climate change = more migration = more urbanization." While climate stressors such as droughts, floods, and resource depletion indeed contribute to displacement, they are rarely the sole drivers of migration. Economic opportunities, governance structures, land tenure policies, and social networks all influence mobility patterns, often mediating or amplifying the effects of climate change. Moreover, migration should not be framed solely as a crisis response but also as an agency-driven decision that can enhance adaptive capacities, both for those who move and for those who remain behind.

Urbanization, in turn, is not merely a byproduct of migration but a dynamic process that interacts with mobility in profound ways. Cities serve as economic hubs and social melting pots, offering both opportunities and vulnerabilities to new arrivals. However, the capacity of urban areas to absorb migrants varies significantly depending on infrastructure, governance, and planning mechanisms. Without proactive policies, rapid urban expansion can exacerbate inequality, strain public services, and heighten exposure to climate risks in informal settlements.

9.2 Key challenges and policy gaps

Several governance and policy gaps hinder effective responses to climate-induced migration and urbanization. The fragmentation of policy frameworks across climate adaptation, urban development, and migration governance has resulted in disjointed interventions that fail to address the root causes of displacement or promote sustainable settlement patterns. Weak institutional coordination further exacerbates these challenges, as responsibilities are often split across multiple agencies with limited collaboration.

A persistent lack of reliable data complicates policy formulation, making it difficult to assess migration trends, identify vulnerable populations, and design targeted interventions. Current datasets, often derived from outdated census records, fail to capture the fluidity and temporality of climate-induced migration. Strengthening data collection through household surveys, participatory mapping, and remote sensing technologies will be critical in bridging this knowledge gap.

Inadequate stakeholder engagement is another major obstacle. Many policy responses are designed without meaningful input from affected communities, leading to interventions that are misaligned with local realities. Migrants, particularly those settling in informal urban areas, often face exclusion from decision-making processes, further deepening social and economic vulnerabilities. Ensuring participatory governance that integrates migrant voices into urban planning and adaptation strategies is essential for fostering inclusive and sustainable urbanization.

9.3 Recognizing mobility as a climate adaptation strategy

A key insight from this report is that migration should be recognized as a legitimate and often beneficial adaptation strategy rather than solely as a failure of resilience. Historically, mobility has been an integral part of coping mechanisms in response to environmental and economic shocks. Seasonal migration, translocal networks, and remittance flows play crucial roles in sustaining livelihoods and redistributing resources between rural and urban areas.

To capitalize on the adaptive potential of migration, policies must move away from containment approaches that seek to restrict movement and instead focus on enabling safe, dignified, and planned mobility. This requires targeted investments in transportation infrastructure, labor market integration programs, and legal frameworks that protect migrant rights. Additionally, translocal resilience should be strengthened by fostering economic linkages between origin and destination areas, ensuring that migration benefits both sending and receiving communities.

9.4 Strengthening urban planning for climate resilience

Urban areas in Sub-Saharan Africa are at the frontline of climate migration, facing growing pressures to accommodate displaced populations while mitigating climate risks. Yet, many cities lack the institutional capacity and financial resources to implement climate-resilient planning strategies. Informal settlements, where many climate migrants reside, are particularly vulnerable to flooding, heat stress, and infrastructure deficits.

Integrating climate adaptation into urban planning is imperative. This includes investing in resilient housing, upgrading informal settlements, and enforcing zoning regulations that prevent construction in high-risk areas. Nature-based solutions such as urban greening, floodplain restoration, and coastal protection can enhance environmental sustainability while reducing disaster risks. Moreover, promoting inclusive urban governance that engages migrant communities in decision-making can foster social cohesion and equitable service provision.

9.5 Regional and international cooperation for climate mobility

Given the transboundary nature of climate migration, regional cooperation is essential for developing coherent and harmonized policy responses. Organizations such as the AU, the ECOWAS, and the SADC have a crucial role to play in facilitating cross-border mobility frameworks, resource-sharing mechanisms, and regional adaptation funds.

Creating dedicated climate adaptation financing mechanisms at the regional level can help address funding gaps for infrastructure development, emergency response systems, and livelihood diversification programs. Enhancing early warning systems for climate hazards and fostering knowledge exchange between countries can further support proactive responses to displacement and urban growth challenges.

At the international level, development partners, donors, and research institutions should continue to support empirical research on climate-migration-urbanization dynamics. Funding pilot projects and scalable solutions—such as climate-resilient housing, renewable energy initiatives, and community-led adaptation programs—can provide valuable lessons for broader policy adoption. Ensuring that global climate finance mechanisms prioritize vulnerable communities, particularly those affected by climate-induced displacement, is also paramount.

9.6 Future research priorities

Despite significant progress in understanding climate-migration-urbanization linkages, substantial knowledge gaps remain. Further research is needed to:

- Develop high-frequency and standardized data collection methods to monitor migration trends in real time.
- Conduct longitudinal studies on the long-term impacts of climate-induced migration on urban development and socio-economic well-being.
- Investigate the role of remittances in enhancing resilience in migrant-sending communities.
- Assess labor market dynamics and employment opportunities for climate migrants in urban areas.
- Examine gender-specific vulnerabilities and adaptation strategies among migrating populations.
- Evaluate best practices in integrating climate migration considerations into national and local adaptation plans.

9.7 Towards a resilient and adaptive future

The evolving interplay between climate change, migration, and urbanization necessitates a paradigm shift in policy and planning. Rather than viewing migration as an anomaly to be controlled, embracing it as a component of resilience and adaptation offers a more forward-thinking and equitable approach. By reinforcing rural-urban linkages, strengthening governance structures, and scaling up community-led adaptation initiatives, decision-makers can transform mobility into a cornerstone of inclusive, future-oriented responses to climate change.

The report's findings ultimately call for a reimagining of urbanization in a changing climate—one that prioritizes social justice, environmental sustainability, and economic inclusivity. Only through integrated, cross-sectoral strategies that recognize the agency of migrants and the transformative potential of mobility can Sub-Saharan Africa navigate the complex challenges of climate-induced displacement and urban growth, ensuring a more resilient and prosperous future for all.

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