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From ‘Scarcity to Sustainability’

Strengthening the Regional Food-Water Nexus Amid Migration Challenges in Sub-Saharan Africa

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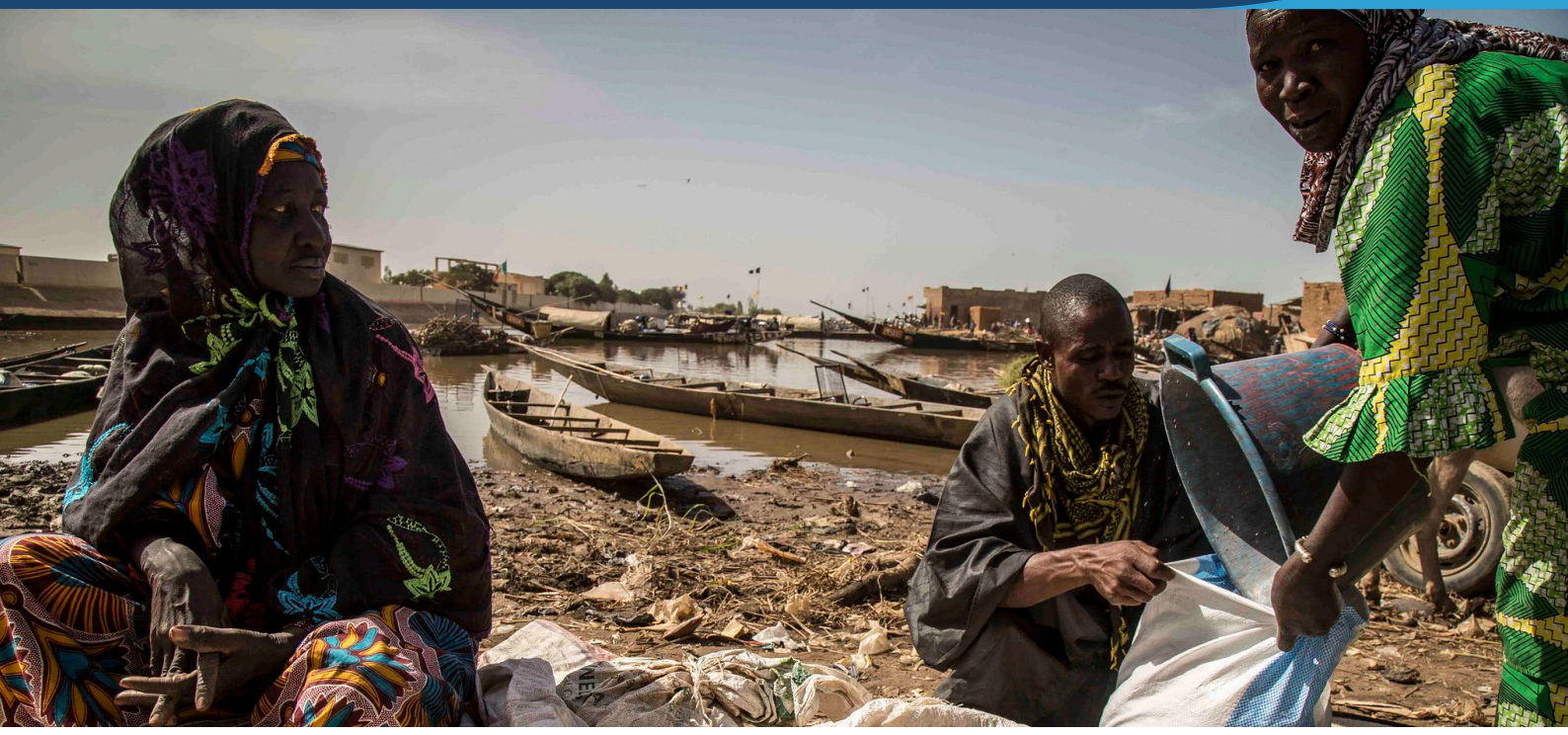

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Acknowledgments

We would like to acknowledge the pivotal role of both the WASAG (Global Framework on Water Scarcity in Agriculture) and the UNU Migration Network in supporting and shaping this initiative. See Boxes 1 and 2 for details about these networks. WASAG has served as a crucial platform bringing together diverse partners to address the interlinkages between water scarcity, agriculture, and migration, particularly in rural areas. Through its dedicated working group on Water and Migration, WASAG helped share learning, knowledge exchange, and the development of context-sensitive solutions, offering insight into how water insecurity can be both a driver and consequence of migration dynamics. The network's convening power and commitment to fostering dialogue ensure that the experiences and priorities of multiple stakeholders are integrated. UNU Migration network also facilitated drawing attention to the complexity of climate–migration relationships and encouraged interdisciplinary discourse on the topic.

About the authors

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Foreword by UNU-CRIS Director

The report, "From Scarcity to Sustainability: Strengthening the Regional Food-Water Nexus Amid Migration Challenges," arrives at a critical juncture for Sub-Saharan Africa, a region grappling with the escalating impacts of climate change on its most vital resources—food and water. As climate variability intensifies, the entangled challenges of water scarcity, food insecurity, and migration are deepening the vulnerabilities of millions across the continent. This assessment offers insights into these interconnected dynamics and proposes actionable pathways to enhance resilience and sustainability.

The nexus of climate change, food production, water resources, and human mobility is inherently complex and multifaceted. Sub-Saharan Africa exemplifies these complexities with its heavy reliance on rain-fed agriculture, uneven distribution of water resources, rapid population growth, and socio-political fragilities. As agriculture faces increasing disruption from erratic rainfall and extreme weather, food security becomes threatened, driving migration flows both within and beyond borders. Simultaneously, regional and local competition over scarce water amplifies tensions and fuels conflicts, exacerbating displacement and social instability.

This report integrates research and case studies to illuminate the multiple, often overlapping, challenges through the lens of environmental, social, and economic dimensions and explains how the dual crises of climate extremes and prevailing political instability underscore the urgent need for integrated, cross-sectoral responses in the region.

Yet, amid these challenges lie significant opportunities for innovation and collaboration. The report synthesizes examples of promising interventions—from advances in smart irrigation technologies to the adoption of innovative farming practices and community-led resource management. These interventions demonstrate how technology, knowledge exchange, and inclusive regional, national, and local governance processes can collectively mitigate risks and build adaptive capacity. In particular, the role of migration emerges as both a risk factor and a source of resilience; remittances and the transference of knowledge support households and communities in navigating climatic shocks.

Furthermore, the report stresses the importance of multi-level governance mechanisms and cross-border cooperation. Regional initiatives such as the Lake Chad Basin Commission and intergovernmental policy frameworks testify to the power of collective action in managing transboundary resources and addressing migration challenges. National policies promoting social integration of migrants and equitable access to services further contribute to stabilizing vulnerable regions.

The insights presented here set a foundation for policymakers, researchers, practitioners, and civil society actors to collaboratively design and implement context-specific solutions. The joint report reiterates that achieving sustainable food and water security amid migration pressures requires coordinated efforts across sectors and scales, grounded in evidence and community participation. The work contributes to this critical dialogue by framing the challenges and opportunities holistically, emphasizing scalable, inclusive, and resilient pathways.

The authors appreciate how WASAG (FAO) and UNU Migration networks platforms facilitated discussion on complex topics and helped advance the understanding of one of the most pressing environmental and societal challenges facing Sub-Saharan Africa today. This report is not only an academic contribution but also a call to action to prioritize integrated, forward-looking governance to foster resilience and sustainability in the region.

It is my hope that the findings and recommendations herein will inform strategic planning, stimulate research investments, and inspire collaborative initiatives that uphold the well-being of affected populations while safeguarding the critical food and water systems upon which their futures depend. The time for transformative action is now—this report is a key step on that journey.

Dr Philippe De Lombaerde
Director
United Nations University Institute on Comparative Regional Integration Studies

Executive Summary

Africa faces significant challenges at the intersection of migration, food, and water insecurities, including the escalating and multifaceted impacts of climate change. The sub-Saharan African region is particularly vulnerable, with rising temperatures, changing rainfall patterns in the past, and extreme weather disrupting agriculture and water availability. Over-abstraction and consumption of water for farming and industry further depletes resources, fuels conflict, and exacerbates human displacement. Much of Africa's agriculture is rain-fed, making it highly sensitive to changes in precipitation amount and frequency. Climate extremes are jeopardizing food production and increasing hunger and malnutrition. Limited investment in agriculture (on average just 4% of annual government budgets in the region) further weakens adaptive capacity, driving some segments of rural populations to migrate in search of more secure livelihoods. Water availability is uneven, with some regions facing severe scarcity while others lack infrastructure to manage overabundance. Furthermore, competing water use triggers conflicts at the local and subnational levels, destabilizing communities and undermining food and livelihood security. Overall, these challenges are worsened by climate change, rapid population growth, and major socio-economic disparities, necessitating urgent and more integrated 'fit to context' solutions.

This assessment presents a synthesis of the complex challenges of migration in general, food, and water insecurities in Sub-Saharan Africa gleaned from literature, shedding light on the interconnectedness and impact of these challenges across climate-vulnerable countries.

Four Key Trends Towards the Complex Relationships Between Migration, Water, and Food Security at Sub-Regional Levels

1. Migration impacts food security across various African countries, with both positive and negative outcomes depending on the socioeconomic, socio-political, and socio-cultural context.
2. Migration channeled financial remittances play a critical role in addressing both short- and long-term household food security challenges in sub-regions and states like Nigeria, northern Ghana, Malawi, Tanzania, and southern Ethiopia. The remittances provide financial resources for agricultural investments, healthcare, and education, thereby strengthening household resilience.
3. Migration also affects community food security negatively. In Zimbabwe, for instance, labour shortages and shifts in attitudes away from traditional agricultural practices disrupt the capability of communities to sustain food production.
4. While migration from dry, arid, and semi-arid regions to water-surplus areas is an established adaptive strategy in some communities, the interplay between water scarcity and climate change in countries such as Burkina Faso and Senegal has impacted migration opportunities, further complicating food security and resilience efforts.

We recommend a two-pronged approach that combines climate adaptation strategies to reduce forced migration with targeted migration-support interventions that enable safe, voluntary, and adaptive mobility, coordinated by regional multilateral organizations such as the African Development Bank, the Alliance for a Green Revolution in Africa, the Food and Agriculture Organization of the United Nations, the World Bank, the African Union, and the Economic Community of West African States and other stakeholders and major groups:

Strategy 1: Helping Communities Stay Where They Are

Boosting climate-smart farming: promote farming methods that are resilient to climate change, like using drought-tolerant crops, efficient irrigation, and sustainable soil practices. This helps ensure people have enough food and can maintain their livelihoods in times of stress related to water availability or income generation.

Strengthening social safety nets: expand programs like cash transfers and food aid, especially during droughts or floods, to provide financial stability and prevent people from being forced to move, overall augmenting the social support structures.

Improving early warning and action systems: develop better systems to warn communities about upcoming climate disasters (like droughts or floods) so they can prepare and buffer against the need to evacuate.

Building resilient infrastructure and restoring nature: invest in strong infrastructure, like better water storage, and restore natural areas such as forests and wetlands. In the long term, these actions protect communities from climate impacts and improve access to land and water resources.

Strategy 2. Supporting Migration as a Positive Choice

Creating rural job opportunities: support businesses, especially for young people in agriculture, to create jobs in rural areas and reduce the need to move to cities.

Facilitating safe migration: make it easier and safer for people to move within and between African countries for work (regulated regional migration pathways-RRMP), especially when climate change impacts their ability to earn a living in their current settings. This includes strengthening existing agreements on free movement, taking reference from ECOWAS (Economic Community of West African States- a regional political and economic union of 15 West African countries established in 1975 with the signing of the Treaty of Lagos).

Planned relocation: for communities in areas becoming uninhabitable, develop voluntary and well-managed plans for relocation, ensuring new homes and livelihoods value chains.

Supporting 'context-specific needs' of displaced populations: provide context-specific support systems to help those already displaced by climate disasters, including food, water, housing, and ways to earn a living, building on a comprehensive assessment (stocktake of skills).

Steering circular migration: support temporary (seasonal) migration for work, particularly during dry seasons, and encourage people living abroad to invest and share their skills back home to create circular loops that help support need-based mobility at local, sub-national, or regional levels.

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Introduction

Migration, food, and water security are critical policy issues often interlinked and affecting the well-being of Africa's population (Daoudy et al., 2022). In sub-Saharan Africa, the population experiencing malnutrition and limited access to clean water rose from 181 million in 2010 to 222 million in 2016. During this period, Africa recorded the highest prevalence of undernourishment globally, with an estimated 20% of its population affected (Adeyeye et al., 2023). Chimimba (2023) revealed that 281 million Africans were undernourished in 2022, while over 300 million people lacked access to safe drinking water (Hoddinott, 2023). These intertwined crises pose significant threats to the continent's social and economic stability, worsened by the negative impacts of climate change. Sub-Saharan Africa (SSA) is particularly vulnerable, with projections of a 10% decline in rainfall by 2050, which would worsen water shortages and declining agricultural productivity (Nyika & Dinka, 2023). This is especially of great concern in arid and semi-arid regions such as the Sahel, parts of the Horn of Africa (including Somalia and Ethiopia), and the northern regions of Nigeria, where rain-fed agriculture remains the backbone of local livelihoods (Kidane, 2024). As food and water resources become increasingly scarce, economic instability may force many Africans to migrate within and outside the continent in search of better opportunities (Adeyeye et al., 2023).

Migration is part of many livelihood strategies in Africa and has been for centuries, responding to environmental challenges, the need for economic opportunities, and the search for improved living conditions (Teye & Nikoi, 2022). More recently, migration has been increasingly recognized as a key strategy for building resilience and adapting to the impacts of climate change and environmental degradation (Balsari et al., 2020). However, while migration can offer solutions, it also depletes the human resources needed to build resilience in origin communities and puts considerable strain on infrastructure and services in destination regions (Maenetja & Kgobe, 2024). This dynamic leads to complex and interconnected challenges involving food security, water availability, and resource management. Understanding the intricate relationships between migration, food security, and water availability is essential for developing comprehensive policies and interventions that address both the root causes and the far-reaching, positive and/or negative consequences of migration.

Despite growing recognition of the interconnectedness of migration, food security, and water security, significant knowledge gaps persist (Daher, 2021; Mishra et al., 2021). Most studies treat these concepts in isolation, rather than as a nexus having collective impacts on climate resilience building. For instance, de Bruin et al. (2021) focus on migration as a key driver of livelihood changes in rural areas, while Bjornlund et al. (2022) examine food security challenges in Sub-Saharan Africa without linking them to migration patterns. Similarly, Mishra et al. (2021) emphasize the critical role of water availability in sustaining agriculture but do not address its relationship with migration. These siloed approaches overlook the complex interrelationships and interconnections between migration, food, and water security. Therefore, a comprehensive understanding of these interrelationships is essential to addressing the challenges, leveraging opportunities, and designing actions that ensure effectiveness and foster a win-win outcome for all dimensions of the nexus.

It is thus critical to unravel the following questions: How does food insecurity drive migration? And how does migration impact food and water (in)securities in both host and destination areas? By examining existing literature, this policy brief delves into these dynamics, discussing its implications for planning and implementing climate resilience interventions across diverse African contexts. The actionable recommendations serve as a framework for the African Union, governments, and development partners to develop holistic strategies that strengthen resilience and promote inclusive development in vulnerable communities.

Approach

The content presented in this research report is based on a two-pronged information synthesis approach: a traditional literature review and a case study analysis of the influence of migration on food and water security in Africa. Search databases such as Google Scholar and Web of Science were used, and only literature published between 2000 and 2024 was included to ensure contemporary relevance. Studies that lacked empirical evidence or focused on regions outside Africa (unless they provided comparative insights) were excluded. The review process included extracting and analysing key data and synthesizing findings to provide an overview of the current knowledge on migration's effect on food and water security. Building on key insights from the literature review, the second component employed a case study analysis of a study from the Congo Basin, demonstrating the interlinkages in migration, food, and water security. In this region, the complex and interconnected drivers of conflict are anticipated to intensify pressure on food, land, and water resources, shaping emerging patterns of human migration.
The WEF nexus is linked to the SDGs as shown in Figure 1, specifically SDG6 (Clean Water and Sanitation), SDG7 (Affordable and Clean Energy), and SDG2 (Zero hunger) (Guerra, Santa, Neto, 2022; Zhang, Shuai S, Pradhan, Zhao, Fu, 2022). Analysis of the interlinkage between the WEF sectors is fundamental to achieving the SDGs in the region (El-Gafy, 2024).

Key Observations: Challenges of Migration, Food, and Water Nexus

The Interplay of Migration and Food Security

The linkage between migration and food security is crucial in Africa, as both issues are deeply intertwined and increasingly central to policy discussions across the continent. Migration and food insecurity influence each other in complex ways, presenting significant challenges to the Sustainable Development Goals (SDGs). According to the 2022 State of Food Security and Nutrition in the World report, nearly 20% of Africa's population faced hunger in 2021, with millions more experiencing varying levels of food insecurity (Zereyesus et al., 2022). Tinazzi (2024) highlights that migration often emerges as a coping mechanism, mainly when climate stress, conflict, or economic hardship make staying in one place unsustainable. For instance, in regions vulnerable to climate shocks, such as the Sahel and parts of East Africa (including Tanzania and Ethiopia), recurrent droughts and floods have forced many farmers and pastoralists to migrate in search of more fertile land and stable food sources. Specifically, Mwambene et al. (2014) observed that agro-pastoralists in Tanzania migrate in search of grazing land, often clashing with other traditional land-use systems. Similarly, Ezra and Kiros (2001, as cited in Adaawen et al., 2019) confirmed food crisis vulnerability as a significant out-migration driver in rural Ethiopia.

In West Africa, migration-food security nexus relationships are also evident, including Senegalese fishers migrating due to droughts and declining fish stocks, impacting regional food security (Binet et al., 2012). In Ghana, migration from rural to urban areas, especially in regions and sub-regions (including local communities) vulnerable to climate shocks, has become a common coping strategy to access more stable employment and achieve improved food security (Jarawura et al., 2024). For instance, Mulazzani et al. (2020) note that urban farmers in Accra, many of whom have migrated from rural areas and possess some level of farming experience, continue to engage in agricultural activity. In fact, 66% of urban farmers have no intention of stopping farming, even if offered regular paid employment. Urban farming by migrants plays a crucial role in local food security (Nyantakyi-Frimpong et al., 2023). However, as Atuoye et al. (2017) point out, while remittances can reduce the likelihood of origin households experiencing severe food insecurity, they are not sufficient to ensure complete food security for these households.

Migration, particularly forced displacement due to conflict or environmental stress, disrupts agricultural productivity in both origin and host communities (George & Adelaja, 2021). Non-mechanized agriculture, the primary livelihood for many rural Africans, suffers when large numbers of able-bodied youth migrate. This outflow of labour significantly reduces agricultural output, as evidenced in conflict-affected regions such as northern Nigeria and South Sudan, where conflict-driven displacement has severely reduced local food production, intensifying food insecurity (Olanrewaju & Balana, 2023). Displaced populations often abandon their farmland, leaving vital agricultural infrastructure derelict, such as irrigation systems and storage facilities. With limited access to essential resources like seeds, tools, and fertilizer, food production declines, worsening food insecurity, and economic hardship in already vulnerable communities (Bjornlund et al., 2022). This situation is further compounded by environmental factors such as drought, which significantly hampers agricultural productivity. For example, in Madagascar's

arid “Grand Sud” region, home to 1.8 million people, about 80% of the population relies heavily on rain-fed agriculture for livelihoods (UN Office of the Resident Coordinator Madagascar, 2016). Since 2013, this region has faced extreme drought conditions, worsened by the 2015 El Niño, pushing the situation into a humanitarian crisis by February 2016 and leaving over one million people food insecure (Adaawen, 2019). In response to these challenges, affected communities often resort to migration as a coping strategy, mirroring broader patterns seen in regions where food security is threatened by both displacement and environmental stress (IOM, 2017).

Furthermore, conflict-driven displacement and migration due to natural disasters disrupt planting and harvesting cycles, straining food systems in both origin and host regions. Balseth (2024) highlights that in Nigeria, the combined impacts of Boko Haram insurgency and climate change in the Lake Chad Basin have displaced 2.18 million people, resulting in severe disruptions to food security. From 2010 to 2016, Boko Haram’s insurgency resulted in over 35,000 deaths, many of whom were farmers. This significantly affected agricultural labour capacity and disrupted important planting timelines, ultimately damaging agricultural production. The conflict had a severe impact on key agricultural states such as Borno, Yobe, and Adamawa, which were once major producers of rice, millet, cowpeas, and tomatoes, as well as livestock and fish. A similar situation was noted in South Sudan, where Sahu (2023) reflects how an ongoing civil war has displaced millions, disrupted agriculture, and led to widespread food insecurity, resulting in a high rate of acute malnutrition, especially among children. In Somalia, decades of civil war and insurgency by Al-Shabaab have similarly caused significant disruptions to food supply chains, leading to chronic food shortages and famine in certain regions (Warsame et al., 2023).

It is important to note that while migration can offer a lifeline for displaced individuals, it also places immense pressure on food systems in host regions. Many African countries, including Nigeria, Sudan, and the DR Congo, are already grappling with food insecurity due to environmental challenges (Otekunrin, 2025). The influx of migrants affects these vulnerabilities, particularly in urban areas, where overcrowded settlements with limited access to food markets or agricultural land intensify competition for food (Ngcamu, 2022). As local food resources become strained, food prices rise, and affordable, nutritious food availability becomes increasingly difficult (Ogwu et al., 2024). In rural host areas, for example, in Ethiopia, the increased demand for land and water resources further burdens food production, resulting in reduced yields (Mulazzani et al., 2020). Additionally, rapid population growth in host regions can overwhelm local infrastructure, including food distribution systems. Governments and international agencies face significant challenges in providing adequate support, especially in regions already dealing with resource shortages. Overcrowding, rising food prices, and limited food availability all heighten social tensions, destabilizing host communities and undermining their capacity to ensure long-term food security (Ngcamu, 2022).

The Nexus Between Migration and Water Security

Water security is a critical factor influencing migration patterns and food security across Africa (Stoler et al., 2022). As Black et al. (2011) highlight, when local environmental challenges, such as water scarcity or pollution, threaten communities, migration often becomes a necessary adaptive strategy. There is evidence linking water insecurity, specifically shortages and pollution, to migration and mobility in Africa (Stoler et al., 2022). In many African regions, including the Sahel and parts of East Africa, where droughts and water scarcity are prevalent, communities are increasingly migrating to access more reliable water sources and better living conditions (Tinazzi, 2024). For instance, a recent drought in West Africa affected 1 million people, worsening water and food insecurity (Adaawen et al., 2019). Sahelian countries, including Niger, Chad, Mali, Burkina Faso, and Mauritania, experienced a 25% decline in food production, with grain harvests dropping to just 1.4 million metric tons (Thapa, 2024). In the Lake Chad Basin, prolonged droughts, climate change, and extensive water withdrawal have led to the shrinking of the lake, threatening the livelihoods of nearly 40 million people in Chad, Cameroon, Niger, and Nigeria, and driving many to migrate in search of water and food security (Adaawen et al., 2019).

Environmental challenges, such as shifting rainfall patterns and desertification, play an important role in shaping the nexus between migration and water security (Tinazzi, 2024). As observed among the Rimaiibe ethnic group of northern Burkina Faso, droughts and high rainfall variability prompt young adults to migrate to urban areas in Burkina Faso and to Abidjan to seek work and earn money for food (Adaawen et al., 2019). Youngstedt et al. (2016) examine the case of Niamey, Niger, where Tuareg and Fulani communities, traditionally reliant on pastoralism, have faced livelihood disruptions due to changing rainfall patterns forcing many to migrate to urban areas in search of economic opportunities. And the study by Adaawen et al. (2019) revealed that at the beginning of 2017, at least 700,000 people were displaced and forced to move due to severe droughts in

Somalia, 316,128 people in Ethiopia, and 41,000 in Kenya (IOM, 2017). These examples demonstrate how water scarcity acts as a push factor driving migration and align with broader observations by Tinazzi (2024) that climate change impacts, including desertification, extreme heat, and resource scarcity, can render regions uninhabitable, displacing communities and compelling them to adapt by seeking refuge and livelihoods in more hospitable areas.

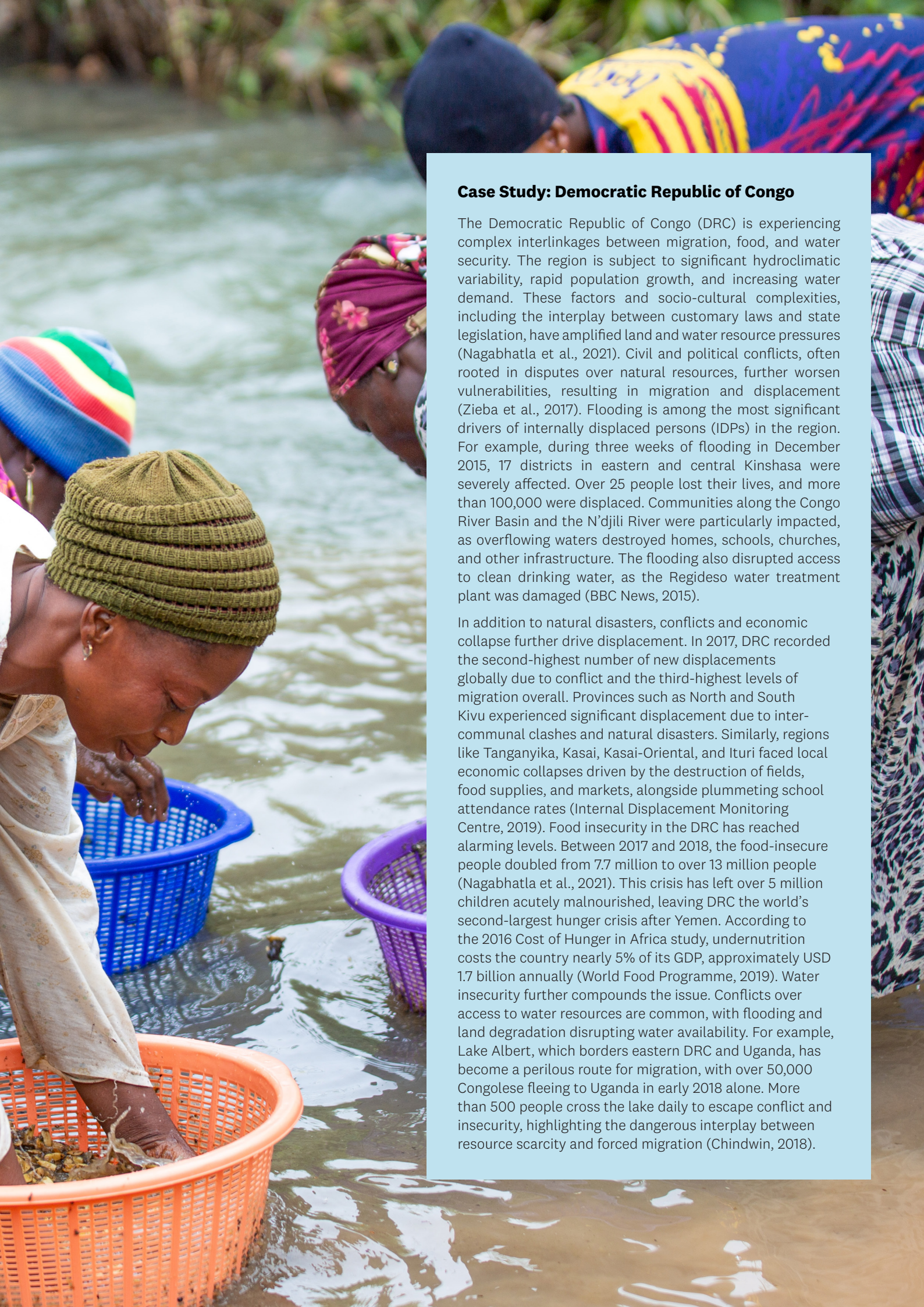
Assessment by Nagabhatla et al. (2021) highlights the growing competition for water resources between migrants and host communities, which exacerbates existing challenges in arid and semi-arid regions of Africa, including parts of Cameroon, Chad, the Central African Republic (CAR), Nigeria, and Sudan. For instance, as migrants such as the Mbororo pastoralists move to the Central African Republic (CAR) from Chad and Cameroon in search of water and pasture, they often find themselves in direct competition with indigenous communities, intensifying pressure on already scarce water and land resources (de Vries, 2020 & Amadou, 2018).

The Mbororo, traditionally nomadic and reliant on transboundary migration for water and pasture, often face additional obstacles due to environmental degradation, shifting migratory patterns, and restrictive land tenure policies (de Bruijn et al., 2016). Their presence in resource-constrained areas often triggers conflicts with the local farming communities, disrupting local livelihoods, straining water and food security systems, and increasing health risks for both migrants and host populations. In turn, increasing pressure on water resources triggers migration, forced mobility, and displacement of the local populations, and disrupts the pastoralists' way of life in a transboundary context (Nagabhatla et al., 2021). These dynamics underscore the complex relationship between water scarcity, migration, and conflict, highlighting the urgent need for integrated water management strategies and conflict-sensitive migration policies (Nagabhatla et al., 2020; Ong'Uti, 2024).

Cross-Cutting Issues and Interconnected Challenges

Governance gaps pose a significant challenge in managing the interconnections between migration, food security, and water security across Africa (Krampe et al., 2020). For instance, weak institutional frameworks, including inadequate regulatory systems, poor policy enforcement, and fragmented decision-making, hinder effective responses and leave communities unprepared for crises, exacerbating vulnerabilities for both migrants and host populations (Termeer et al., 2018). A significant issue is the misalignment between national policies and global frameworks like the UN Global Compact for Migration (GCM) and the SDGs, leading to fragmented approaches that fail to address root causes such as water scarcity and food insecurity, which are closely linked to climate change and environmental degradation (Candel, 2024).

Additionally, policy silos prevent coordinated action; for example, migration policies often overlook environmental drivers of displacement, while agencies managing food and water security rarely incorporate migration patterns into their planning, resulting in inefficient resource allocation (Daher et al., 2021). Migrants, often lacking legal recognition and formal inclusion in governance structures, face barriers to accessing clean water, sanitation, and food security measures. At the same time, host communities experience increased competition for scarce resources, straining fragile systems and heightening social tensions (Krampe et al., 2020). These governance failures not only deepen existing vulnerabilities but also prevent the development of long-term, sustainable solutions to migration-related water and food security challenges, highlighting the urgent need for stronger institutional coordination, integrated policies, and more inclusive governance.



Case Study: Democratic Republic of Congo

The Democratic Republic of Congo (DRC) is experiencing complex interlinkages between migration, food, and water security. The region is subject to significant hydroclimatic variability, rapid population growth, and increasing water demand. These factors and socio-cultural complexities, including the interplay between customary laws and state legislation, have amplified land and water resource pressures (Nagabhatla et al., 2021). Civil and political conflicts, often rooted in disputes over natural resources, further worsen vulnerabilities, resulting in migration and displacement (Zieba et al., 2017). Flooding is among the most significant drivers of internally displaced persons (IDPs) in the region. For example, during three weeks of flooding in December 2015, 17 districts in eastern and central Kinshasa were severely affected. Over 25 people lost their lives, and more than 100,000 were displaced. Communities along the Congo River Basin and the N'djili River were particularly impacted, as overflowing waters destroyed homes, schools, churches, and other infrastructure. The flooding also disrupted access to clean drinking water, as the Regideso water treatment plant was damaged (BBC News, 2015).

In addition to natural disasters, conflicts and economic collapse further drive displacement. In 2017, DRC recorded the second-highest number of new displacements globally due to conflict and the third-highest levels of migration overall. Provinces such as North and South Kivu experienced significant displacement due to inter-communal clashes and natural disasters. Similarly, regions like Tanganyika, Kasai, Kasai-Oriental, and Ituri faced local economic collapses driven by the destruction of fields, food supplies, and markets, alongside plummeting school attendance rates (Internal Displacement Monitoring Centre, 2019). Food insecurity in the DRC has reached alarming levels. Between 2017 and 2018, the food-insecure people doubled from 7.7 million to over 13 million people (Nagabhatla et al., 2021). This crisis has left over 5 million children acutely malnourished, leaving DRC the world's second-largest hunger crisis after Yemen. According to the 2016 Cost of Hunger in Africa study, undernutrition costs the country nearly 5% of its GDP, approximately USD 1.7 billion annually (World Food Programme, 2019). Water insecurity further compounds the issue. Conflicts over access to water resources are common, with flooding and land degradation disrupting water availability. For example, Lake Albert, which borders eastern DRC and Uganda, has become a perilous route for migration, with over 50,000 Congolese fleeing to Uganda in early 2018 alone. More than 500 people cross the lake daily to escape conflict and insecurity, highlighting the dangerous interplay between resource scarcity and forced migration (Chindwin, 2018).

Category	Examples of ways of strengthening resilience and supporting migration that have been applied in different regions
Innovative Solutions	*Using Technology for Better Water Management* • In Kenya's semi-arid Eastern Province, smart irrigation systems are helping farmers use water more efficiently, cutting waste by up to 50% while increasing crop yields (Mutunga et al., 2024). • In the Sahel, remote sensing technologies help track water levels and predict droughts, giving communities the tools they need to prepare and reduce the impacts of water shortages (Sigopi et al., 2024). • In countries like Kenya, Botswana, and Zambia, water-saving irrigation methods, such as drip irrigation, are helping farmers deal with unpredictable rainfall and boost crop production (Hamududu & Ngoma, 2020).
	Sustainable Farming Practices • In the Sahel, farmers are turning to drought-resistant crops like millet and sorghum to cope with erratic rainfall, increasing their resilience to climate challenges (Abubakar et al., 2023). • In Ethiopia's Tigray region, agroforestry—growing trees alongside crops—has been a game-changer, improving soil health, preventing erosion, and offering farmers extra income (Birhane et al., 2019). • The African Union's Climate Resilient Agricultural Program in Mozambique is helping farmers adapt to climate change by providing drought-resistant seeds and teaching new farming skills (Nyika & Dinka, 2023).
	Supporting Urban Growth and Rural Development • In Nairobi, improvements in water infrastructure, such as the Nairobi Water Distribution Network Project, provided better access to clean water for both migrants and local communities (Wamuchiru, 2017). • Rainwater harvesting systems in Ethiopia not only support local communities but also meet the needs of seasonal migrant laborers, especially in areas where water is scarce (Gebreyess & Amare, 2019). • In Burkina Faso and Mali, remittances from migrants are being used to invest in farming, increasing productivity, and supporting sustainable agriculture (Traore et al., 2021). • In Ghana's Northern savanna zones, return migrants are bringing back valuable knowledge from abroad, introducing new farming techniques that boost local food production and resilience (Darkwah et al., 2016). • The Ethiopian Agricultural Growth Program is providing smallholder farmers with credit and training to improve their productivity, reducing the need for migration and improving food security (Berhane, 2013).
Policy and Governance Improvements	*Collaborating Across Regions* The Lake Chad Basin Commission brings together countries like Nigeria, Chad, and Cameroon to manage shared water resources, helping them address the challenges of a shrinking Lake Chad and its impact on food and water security (Onana Ibogo, 2023). The Intergovernmental Authority on Development (IGAD) Regional Migration Policy Framework is encouraging Ethiopia and Kenya to work together on how to integrate migrants from other countries into their economies, especially with climate change creating new migration pressures (Nigusie, 2021).
	National Policies for Migrants and Local Communities In Ghana, the government's National Migration Policy helps internal migrants integrate into local communities by ensuring access to education, healthcare, and social services. This policy has helped reduce tension in northern Ghana, where seasonal migration is a common practice (Kissi-Somuah, 2024).

Table 1: Leveraging Existing Opportunities for Climate Resilience

Five Point Agenda

To enhance the resilience of communities in their habitual places of residence and manage environmental and economic pressures that compel people to leave due to food and water insecurity, we outlined a 5-point agenda.

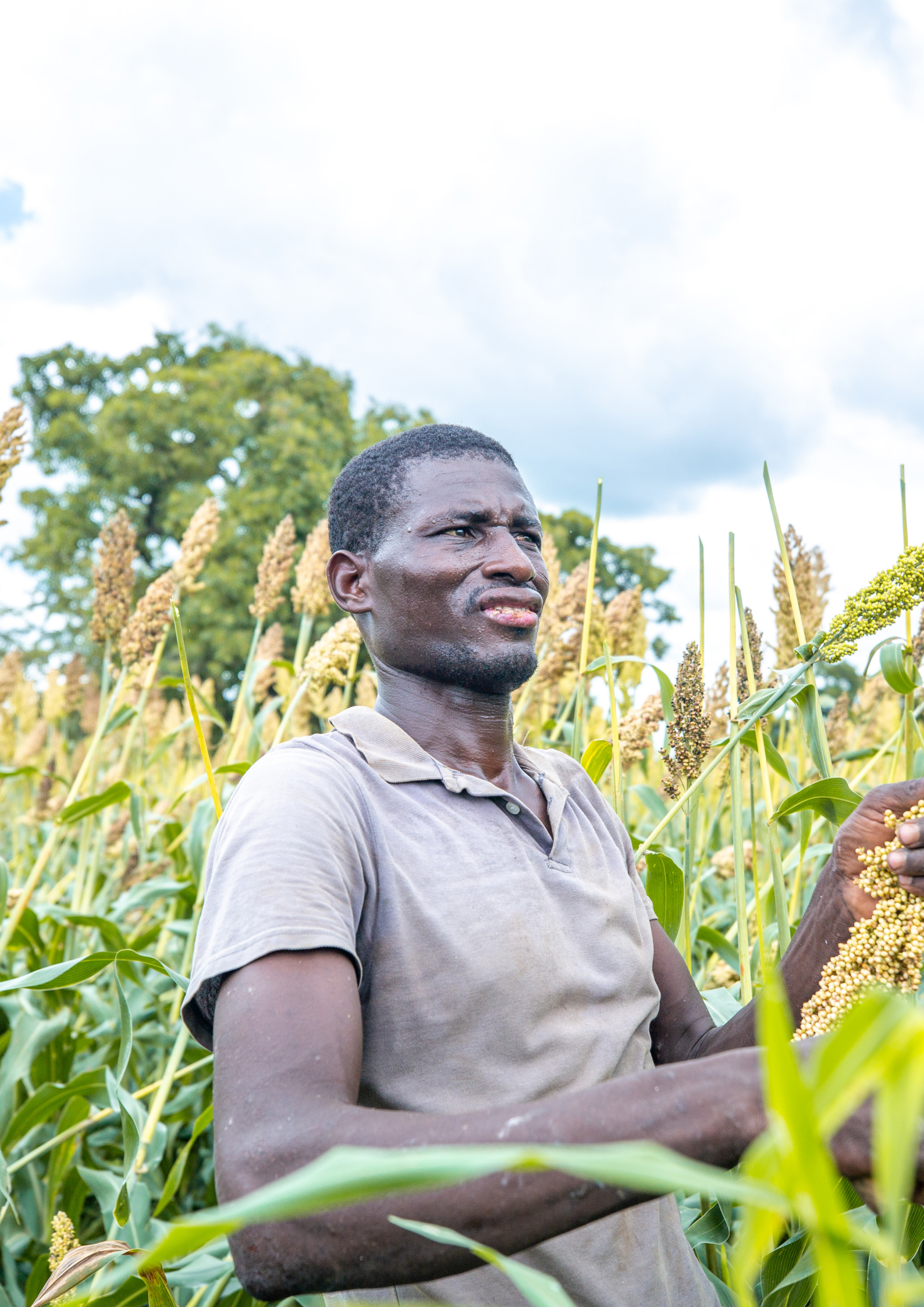
1. *Promoting climate-smart agricultural practices and precision irrigation:* Governments and development partners at regional and national levels should significantly scale up the promotion and adoption of climate-smart agricultural (CSA) practices, including solar-powered drip irrigation, for smallholder farmers in drought-prone regions such as the Sahel and Horn of Africa. Investing in climate-resilient agriculture and sustainable irrigation is crucial for bolstering food security and directly reducing the likelihood of crop failures and livelihood loss, which are primary drivers of distress migration.

2. *Prioritising drought-tolerant, flood-resistant crop varieties and agroforestry:* Policymakers at regional and national scales could prioritize the adoption and widespread scaling up of drought-tolerant and flood-resistant crop varieties, such as those developed under initiatives like the Technologies for African Agricultural Transformation. The development of new crop varieties constitutes a direct adaptation measure to the changing climate. Alongside this, capacity-building programs on agroforestry and soil conservation, coupled with modern farming techniques, must be scaled up to enhance agricultural productivity and sustainability. These measures, when combined, strengthen the resilience of agricultural systems, which form the economic backbone for a large segment of African economies. This directly addresses the "food problem", where a decline in agricultural productivity can lead to poverty traps and subsequent migration.

3. *Expanding adaptive social protection programs.* At all levels, policymakers should enhance social safety nets, including cash transfers, food assistance, and climate risk insurance, to prevent migration caused by food and water insecurity. These programs should be explicitly designed to be adaptive, capable of expanding support to households impacted by droughts or floods, thereby increasing their resilience to climate shocks. They can integrate cash transfers with training and savings groups, empowering individuals to develop valuable skills, start their own businesses, and achieve economic self-reliance. By providing economic stability and enabling investment in livelihoods, these initiatives directly diminish the vulnerability that often leads to migration, allowing people to remain in their homes by choice.

4. *Enhancing early warning and early action systems for climate hazards:* early warning, early action, and targeted finance systems for droughts, floods, and food shortages should be enhanced to enable timely interventions that protect vulnerable populations from displacement. These systems provide timely information and alerts to at-risk communities, enabling them to take proactive measures to prepare for and mitigate the impacts of impending disasters. Community-based adaptation initiatives, when supported by effective early warning systems, are critical for building resilience among populations vulnerable to displacement. By enabling timely responses, these systems can prevent or minimize immediate migration caused by sudden-onset events like floods and facilitate better planning for slow-onset events such as droughts. This directly contributes to reducing migration by making in-situ adaptation more effective and empowering communities to make informed decisions about their safety.

5. *Developing climate-resilient infrastructure and restoring natural ecosystems:* governments and development partners could prioritize investment in climate-resilient infrastructure, such as improved water storage facilities, to withstand extreme weather events and reduce vulnerability to climate-related disasters. Such infrastructure directly protects lives and assets from climate impacts, thereby reducing the need for populations to relocate. Concurrently, scaling up ecosystem-based adaptation approaches, including the restoration and conservation of vital ecosystems like forests, wetlands, and coastal areas, can significantly enhance natural resilience. These initiatives are crucial for reducing flood and landslide risks, improving water availability, and providing alternative livelihood opportunities, all of which directly reduce the likelihood of displacement and migration. This is particularly vital for informal settlements and coastal communities that are highly exposed and at risk.



The New Dimension: Financial Literacy

To build climate-resilient and socially inclusive futures, we emphasize the critical importance of integrating socioeconomic, climate, and mobility data, alongside strengthening financial literacy and access. Empowering vulnerable populations with tools such as credit, savings, insurance, and budgeting skills enhances their capacity to anticipate, adapt to, and recover from climate shocks. Financially literate communities are more likely to adopt sustainable practices, diversify income sources, and make informed decisions about migration versus in-place adaptation. When made accessible through effective visualizations and data integration, these interlinkages can guide policymakers and practitioners toward more targeted and equitable interventions that reduce forced displacement and foster long-term resilience. At the same time, we recognize that fragmented governance and insufficient data continue to hinder effective policy action. Addressing these systemic barriers requires a shift toward inclusive, multi-level governance that aligns climate adaptation strategies with the lived experiences of migrants, host communities, and the most vulnerable. Investing in robust data systems, interdisciplinary research, and open knowledge-sharing platforms will form a foundation for an inclusive, adaptive, and forward-looking climate-mobility policy that protects rights, strengthens resilience, and leaves no one behind.

Nine Strategies Supporting Migration as Adaptation and Development

When migration is planned, supported, and managed, it can serve as a proactive tool for individuals and communities to adapt to changing environments and improve livelihoods, while also contributing to broader resilience and development goals. To this point, we have outlined the following set of strategies.

1. *Supporting youth agribusiness incubators and agro-industrial corridors to create rural employment and manage internal migration:* agencies and actors at national and subnational levels could proactively support the establishment of agribusiness incubators that provide youth with access to land, financing, and technology, specifically targeting high-migration regions to reduce distress migration. A significant driver of internal migration, particularly rural-to-urban movement, is the pervasive lack of economic opportunities for youth in rural areas. Developing agro-industrial corridors with integrated processing, storage, and transport infrastructure will strengthen local food systems and generate meaningful employment for the increasing youth population in these areas. This approach can effectively attract youth back from urban centers, where they often find themselves in low-wage, menial jobs.
2. *Strengthening regional free movement protocols and labor migration schemes:* African Union Member States and Regional Economic Communities should accelerate the ratification and implementation of existing free movement protocols, such as the AU Protocol on Free Movement of Persons, the ECOWAS Protocol, and the SADC Protocol. Intra-African migration is substantial, with a notable increase in migrant workers across the continent. Migration can be an effective adaptation strategy. Strengthening regional frameworks for free movement provides legal and safe pathways, reducing irregular migration and enabling people to leverage mobility for resilience. Furthermore, regional labor migration schemes should be enhanced to facilitate safe, orderly, and regular pathways for climate-affected populations seeking employment. Such initiatives can reduce welfare losses and contribute to structural transformation within economies.

3. *Developing and implementing voluntary, rights-based planned relocation frameworks:* For communities residing in areas that are becoming uninhabitable due to slow-onset climate impacts (e.g., sea-level rise, desertification) or recurrent sudden-onset disasters, planned relocation should be considered a last-resort, voluntary, and developmental adaptation measure. Frameworks for planned relocation must ensure sound governance procedures, clear decision protocols developed through extensive community consultations, and robust data collection mechanisms. This comprehensive approach must address critical aspects such as equitable land acquisition, fair compensation for lost assets, and the deliberate creation of new livelihoods and essential infrastructure in destination areas.

4. *Providing comprehensive support for climate-displaced populations:* For individuals and communities already displaced by climate-induced disasters, comprehensive support systems must be established and strengthened. This includes ensuring immediate access to essential services such as food, water, sanitation, and health care, as well as providing adequate and climate-resilient housing and sustainable livelihood opportunities. Millions are already displaced annually, making support for these populations a direct response to managing climate-induced migration, mitigating vulnerabilities, and enabling recovery and integration. This is about supporting people who are already on the move or have moved.

5. *Promoting circular migration and diaspora engagement for remittances and knowledge transfer:* Policymakers should recognize and actively support the role of circular and seasonal migration as a traditional and highly effective adaptation strategy in Sub-Saharan Africa, particularly for smallholder farmers during dry seasons when rain-fed agriculture is not possible. This form of temporary mobility can significantly ease household food burdens and diversify income sources, thereby building resilience. Furthermore, strategies to engage diaspora populations should be strengthened to leverage their immense potential as a valuable source of additional capital, skills, technology, and knowledge for both adaptation efforts in areas of origin and development in new locations. This includes facilitating financial transfers and encouraging temporary return programs for skill sharing and "brain gain".

6. *Supporting policy coherence and multi-stakeholder collaboration:* Effective implementation of climate and migration strategies necessitates integrated and multi-sectoral approaches. This requires fostering robust collaboration among governments, local communities, researchers, international agencies, and the private sector. Policy frameworks should adopt a "whole-of-government" and "whole-of-society" approach, ensuring coherence across climate change, disaster risk reduction, development, and migration policies.

7. *Boosting, data, research, and knowledge sharing:* There is a critical and urgent need to improve the availability and quality of migration and human mobility data in Sub-Saharan Africa, which is currently unsystematic. Enhanced data collection and analytical capacities are essential to inform evidence-based policies and anticipatory actions. The difficulty in predicting future climate migrant flows is compounded by a lack of baseline data. Further research is needed to deepen the understanding of the complex interactions between climate change and food security, to identify emerging trends, and to assess the effectiveness of various adaptation strategies. Knowledge sharing among countries and stakeholders is crucial for developing and scaling up best practices across the continent.

8. *Ensuring gender-responsive and youth-inclusive approaches:* vulnerable groups, particularly women and children, are disproportionately affected by migration and face heightened risks of malnutrition, disease, and exploitation. Existing gender norms often limit women's adaptive capacity and their ability to leverage migration for risk reduction. Similarly, youth in rural areas face limited opportunities, pushing them towards migration. Policies and programs must therefore adopt explicitly gender-responsive and youth-inclusive approaches. This involves ensuring their active participation in decision-making processes and providing targeted support, such as equitable access to resources, education, and climate-smart job opportunities.

9. *Steering sustainable financing and investment:* Significant and urgent investment in climate-resilient agriculture, sustainable irrigation systems, and other adaptation measures is critically needed, as adaptation costs are rising rapidly. Exploring diverse and innovative funding mechanisms, including African Union climate finance mechanisms, multilateral development banks, and private sector engagement, is critical to meet these needs. Climate finance should be systematically mainstreamed into policies and projects across all sectors of society.

Looking Forward: "From Scarcity to Sustainability' by Addressing the Food-Water-Migration Nexus in the Sub-Saharan African Region

We reiterate that the relationship between migration, water, and food security is complex. Water, food, and other environmental influences synergize to create various impacts and outcomes, of which migration is one example. Two key insights emerge from this analysis:

First, the lack of water security severely undermines people's lives and livelihoods, with access to food and water directly influencing human mobility patterns.

Second, the climate change challenges contributing to migration are compounded by diverse social, political, economic, and demographic factors, which must all be considered in finding sustainable solutions.

Addressing the complex food-water-migration nexus in Sub-Saharan Africa demands a comprehensive and integrated approach that fully acknowledges the dual nature of climate-induced human mobility. We note that effective policy must simultaneously invest in strategies that build resilience specific to the 'context or setting' in order to reduce forced migration and, concurrently, foster policies that facilitate safe, orderly, and dignified migration as a legitimate adaptation and development pathway.

The need for strengthening institutional adaptation through climate-smart agriculture, sustainable water management, robust social safety nets, early warning systems, financial literacy, and resilient infrastructure is outlined as measures that can directly address the root causes of distress migration by enhancing livelihoods and protecting communities from climate shocks. We also acknowledge the inevitability and potential benefits of human mobility, proposing strategies to facilitate safe and regular migration pathways, implement rights-based planned relocation, and provide comprehensive support for displaced populations. This includes leveraging the developmental potential of circular migration and diaspora engagement. To strategically empower migration as an effective adaptation and sustainable development pathway, comprehensive action across multiple fronts is key. Whilst safe, regular, and affordable migration pathways require the development of robust legal frameworks and negotiation of agreements and arrangements at global, regional, and national levels, these measures ensure migration is accessible, secure, and anchored in the protection of migrant rights. Simultaneously, enhancing access to social protection and essential services—healthcare, education, housing, for migrants in host communities is critical for reducing vulnerability and fostering meaningful integration. We call for targeted investments in migrant skills development and the recognition of their skills for the host community/region as an important aspect, as they can accelerate positive socioeconomic contributions.

Further, to maximize adaptive potential, it is vital to strengthen inclusive governance by systematically involving migrants in policy-making at all levels, ensuring that migrant perspectives are integral to the design of adaptive and development strategies. For instance, acknowledging how harnessing remittances helps local development and creating innovative financial instruments that support community infrastructure, resilience-building, and entrepreneurship, multiplying development dividends across regions. A forward-looking approach must also integrate migration into climate adaptation and national development planning, mainstreaming mobility considerations for stronger policy coherence and long-term resilience. Diaspora engagement strategies should be leveraged to promote knowledge transfer, innovation, and investment between home and host countries, strengthening transnational ties and expanding development opportunities. Overall, supporting livelihood diversification, both in migrant-sending and receiving communities, reduces dependency, builds adaptive capacity, and enhances stability. Finally, advancing data collection and research on migration–climate linkages ensures that policies are grounded in robust evidence, enabling adaptive management and systematic monitoring of migration as an adaptation strategy. Collectively, we need to lay the foundation for migration to contribute constructively to climate resilience, human security, and inclusive development.

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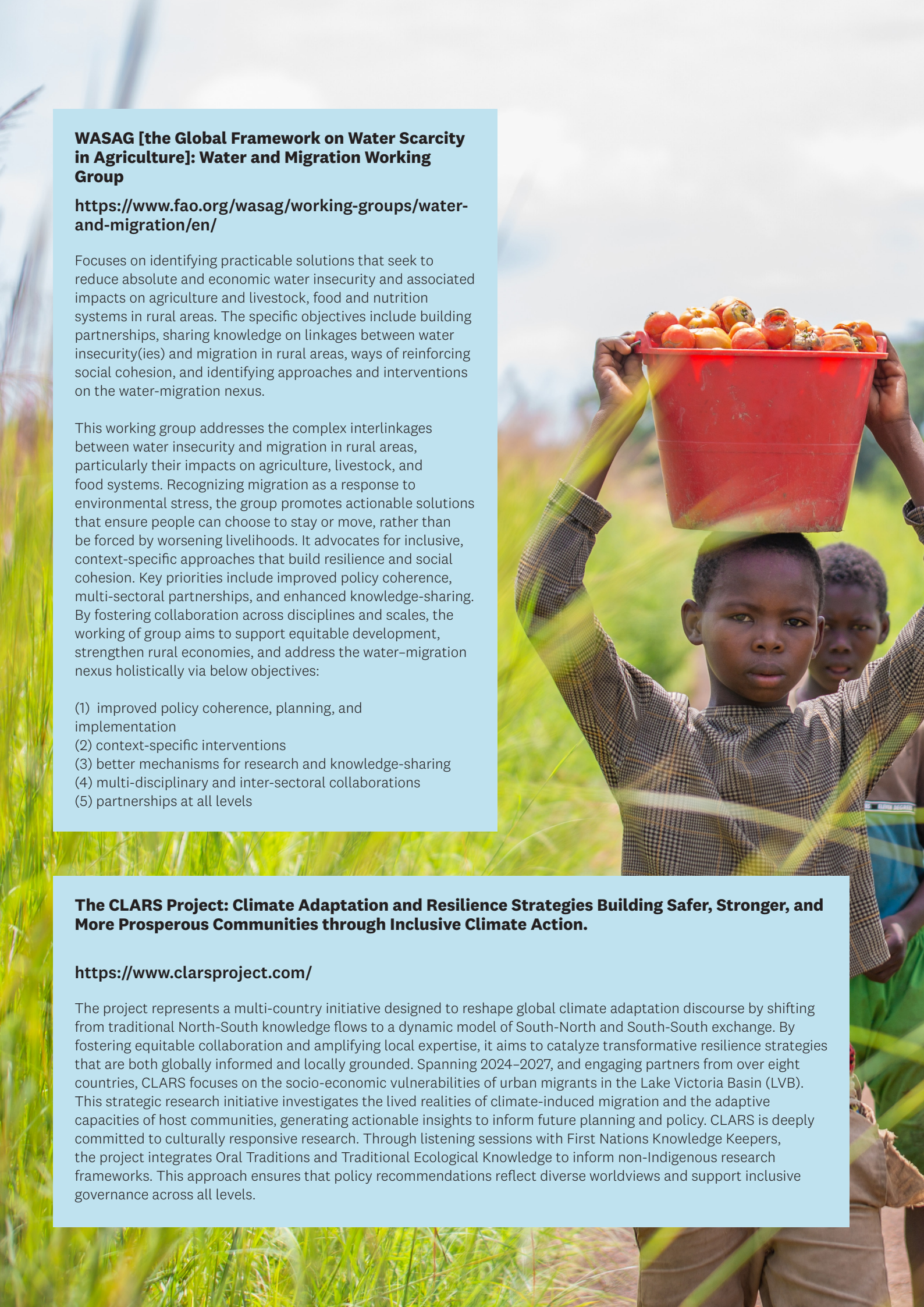
This synthesis is a joint effort of UNU CRIS and IWMI, the network members of WASAG – The Global Framework on Water Scarcity in Agriculture (FAO), and co-leads of the working group on ‘Water and Migration aims to address the complex interlinkages between water insecurity and migration in rural areas, particularly their impacts on agriculture, livestock, and food systems.



WASAG [the Global Framework on Water Scarcity in Agriculture]: Water and Migration Working Group

https://www.fao.org/wasag/working-groups/water-and-migration/en/

Focuses on identifying practicable solutions that seek to reduce absolute and economic water insecurity and associated impacts on agriculture and livestock, food and nutrition systems in rural areas. The specific objectives include building partnerships, sharing knowledge on linkages between water insecurity(ies) and migration in rural areas, ways of reinforcing social cohesion, and identifying approaches and interventions on the water-migration nexus.

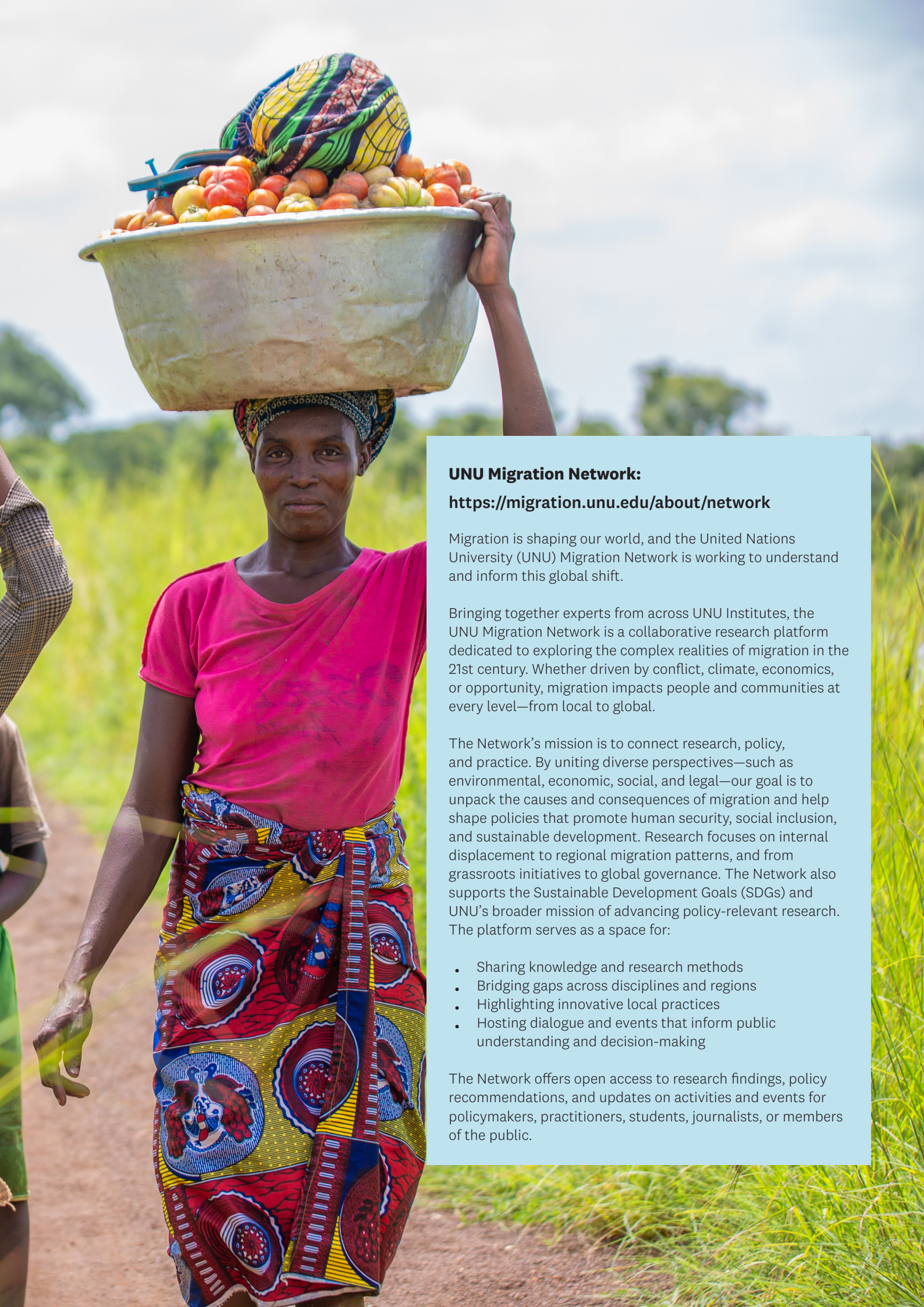
This working group addresses the complex interlinkages between water insecurity and migration in rural areas, particularly their impacts on agriculture, livestock, and food systems. Recognizing migration as a response to environmental stress, the group promotes actionable solutions that ensure people can choose to stay or move, rather than be forced by worsening livelihoods. It advocates for inclusive, context-specific approaches that build resilience and social cohesion. Key priorities include improved policy coherence, multi-sectoral partnerships, and enhanced knowledge-sharing. By fostering collaboration across disciplines and scales, the working of group aims to support equitable development, strengthen rural economies, and address the water–migration nexus holistically via below objectives:

(1) improved policy coherence, planning, and implementation
(2) context-specific interventions
(3) better mechanisms for research and knowledge-sharing
(4) multi-disciplinary and inter-sectoral collaborations
(5) partnerships at all levels

The CLARS Project: Climate Adaptation and Resilience Strategies Building Safer, Stronger, and More Prosperous Communities through Inclusive Climate Action.

https://www.clarsproject.com/

The project represents a multi-country initiative designed to reshape global climate adaptation discourse by shifting from traditional North-South knowledge flows to a dynamic model of South-North and South-South exchange. By fostering equitable collaboration and amplifying local expertise, it aims to catalyze transformative resilience strategies that are both globally informed and locally grounded. Spanning 2024–2027, and engaging partners from over eight countries, CLARS focuses on the socio-economic vulnerabilities of urban migrants in the Lake Victoria Basin (LVB). This strategic research initiative investigates the lived realities of climate-induced migration and the adaptive capacities of host communities, generating actionable insights to inform future planning and policy. CLARS is deeply committed to culturally responsive research. Through listening sessions with First Nations Knowledge Keepers, the project integrates Oral Traditions and Traditional Ecological Knowledge to inform non-Indigenous research frameworks. This approach ensures that policy recommendations reflect diverse worldviews and support inclusive governance across all levels.



UNU Migration Network:

https://migration.unu.edu/about/network

Migration is shaping our world, and the United Nations University (UNU) Migration Network is working to understand and inform this global shift.

Bringing together experts from across UNU Institutes, the UNU Migration Network is a collaborative research platform dedicated to exploring the complex realities of migration in the 21st century. Whether driven by conflict, climate, economics, or opportunity, migration impacts people and communities at every level—from local to global.

The Network's mission is to connect research, policy, and practice. By uniting diverse perspectives—such as environmental, economic, social, and legal—our goal is to unpack the causes and consequences of migration and help shape policies that promote human security, social inclusion, and sustainable development. Research focuses on internal displacement to regional migration patterns, and from grassroots initiatives to global governance. The Network also supports the Sustainable Development Goals (SDGs) and UNU's broader mission of advancing policy-relevant research. The platform serves as a space for:

- Sharing knowledge and research methods
- Bridging gaps across disciplines and regions
- Highlighting innovative local practices
- Hosting dialogue and events that inform public understanding and decision-making

The Network offers open access to research findings, policy recommendations, and updates on activities and events for policymakers, practitioners, students, journalists, or members of the public.

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