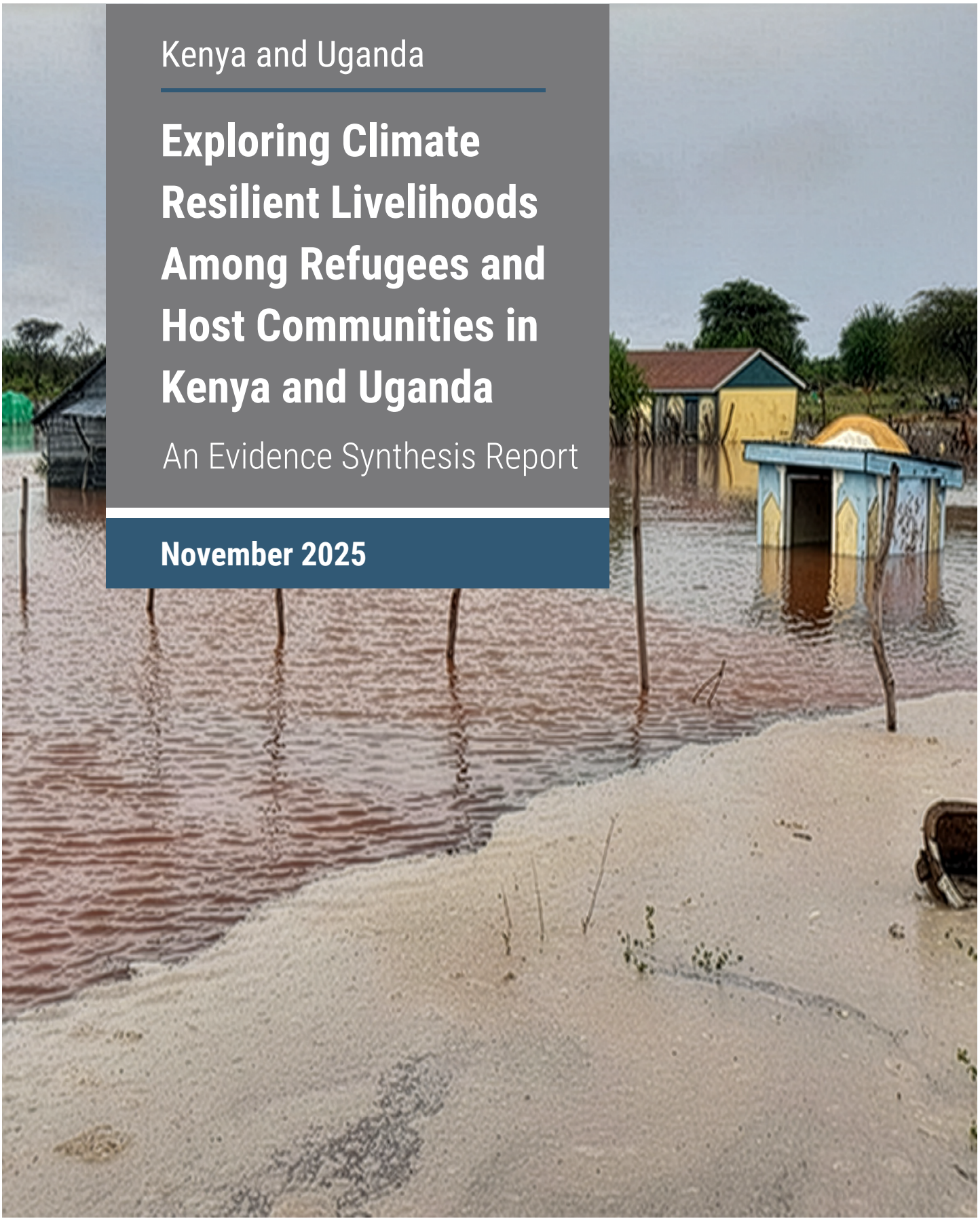
Kenya and Uganda

Exploring Climate Resilient Livelihoods Among Refugees and Host Communities in Kenya and Uganda

An Evidence Synthesis Report

November 2025



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Executive summary

Climate Change and Livelihood Disruption

East Africa, including Kenya and Uganda, is increasingly affected by severe climate hazards droughts, floods, and heatwaves that are undermining livelihoods, damaging infrastructure, and exacerbating service gaps. Displaced and host communities face overlapping risks, with climate stress compounding poverty, food insecurity, and resource pressures. These challenges are expected to intensify over the coming decades, as climate change accelerates. According to the Intergovernmental Panel on Climate Change (IPCC), under current emissions trajectories, East Africa is likely to experience more frequent and intense extreme weather events.[1] This heightens the urgency for timely, locally appropriate adaptation strategies.

Purpose and Scope

This evidence synthesis was commissioned to support the Foreign, Commonwealth & Development Office's (FCDO) future programming in Kenya and Uganda. It identifies key climate-livelihood risks in refugee-hosting contexts, assesses the effectiveness of existing interventions, and maps critical knowledge gaps. The focus is on adaptation strategies relevant to vulnerable populations, with insights drawn from secondary literature, programme evaluations, and climate risk assessments.

Methodology

The review is based on a targeted desk review of qualitative and quantitative sources from 2018 onwards. It includes a programme mapping exercise and three case studies - SPARC, FLLoCA, and CLARE - selected for their relevance, documentation, and diversity in approach. While not exhaustive, the evidence provides a robust foundation for understanding adaptation-livelihood linkages across East Africa.

Livelihood Vulnerabilities

Agriculture and pastoralism remain the main livelihood strategies yet are highly climate sensitive. Irregular rainfall, rising temperatures, and more frequent shocks threaten productivity and income, especially in refugee-hosting areas where access to land, finance, and markets is constrained. Urban-rural mobility and remittances are key coping strategies but are increasingly under pressure.

Gendered and Structural Barriers

Women and marginalised groups face higher climate risks due to unequal access to resources and decision-making. Disparities in land ownership, financial access, and legal protections reduce adaptive capacity, particularly in displacement settings. Structural issues such as weak infrastructure, insecure tenure, and poor data systems further limit effective responses.

Emerging Insights

Despite these challenges, programmes such as SPARC, FFLoCA, and CLARE offer promising models. They demonstrate the importance of co-created adaptation strategies, flexible climate financing, and locally anchored planning. Key enablers include inclusive governance, decentralised implementation, and integration of local knowledge into formal systems.

Way Forward

Building climate resilience in East Africa's refugee-hosting areas requires stronger institutional capacity, tailored adaptation services, and equitable resource access. While gaps remain in monitoring, impact data, and coordination, the lessons from existing programmes point toward scalable, community-informed solutions. The full list of recommendations follows on the next page.

Consolidated recommendations

<table>
<tr><td colspan="3">1. Strengthening Local and Multi-Level Governance
Foster coordination across national, county, and community levels to harmonise climate strategies. Support adaptive and flexible planning in fragile or conflict-affected settings by empowering local institutions to lead climate responses.</td></tr>
<tr><td>Informing Future Programming

- Provide capacity building and training for local partners
- Establish clear communication channels between national, regional, and local levels for climate information sharing.
- Build local government capacity to lead climate adaptation planning in refugee-hosting areas
- Develop locally coordinated early warning and preparedness systems
- Create local climate planning frameworks tailored for fragile and conflict-prone regions</td><td>Opportunities for primary research

- Identify the most critical gap in terms of climate needs adaptation
- How does local institutional leadership affect community-level adaptation uptake
- How do governance gaps impact refugee inclusion in climate policy
- What are the enabling conditions for local ownership of early warning systems</td><td>Specific Examples

Kenya’s FLLoCA programme established Climate Change Units in 45 counties (up from 9), with direct county financing and support for Participatory Climate Risk Assessments and Action Planning. This has enabled counties to lead adaptation planning with community input, coordinated vertically across national, county, and ward levels.</td></tr>
<tr><td colspan="3">2. Promote Inclusive and Cross-Sector Collaboration
Encourage greater alignment among humanitarian, development, and climate actors by breaking down sectoral silos. Integrated planning, shared analysis, and coordinated funding mechanisms are essential for effective climate action</td></tr>
<tr><td>- Regular, multi-stakeholder meetings
- Climate related multisectoral/integrated projects
- framework where we can have all sectors together to talk about climate
- Fund more multisectoral research programming (Pilot multisector area-based planning in refugee and host community settings)
- Design joint humanitarian-development climate response frameworks
- Establish cross-sectoral funding and reporting systems for climate initiatives</td><td>- What models of humanitarian-development coordination produce better climate resilience outcomes?
- What are the incentives and bottlenecks to joint climate programming across sectors?
- How do different sectors interpret and act on shared climate risk data?</td><td>SPARC-supported Ward Development Planning (WDP) in five arid counties (Wajir, Garissa, etc.) brings together community representatives, pastoralists, NGOs, and local government to co-design resilience actions e.g. borehole rehabilitation and grazing zone mapping. More information here and here.</td></tr>
<tr><td colspan="3">3. Enhance and Diversify Climate Finance Mechanisms
Develop flexible, predictable, and innovative financing tools to support locally led adaptation. Encourage accountability and responsiveness through performance-based funding structures that can adapt to evolving climate risks.</td></tr>
</table>

- Designate specific budget to finance climate program - Promote blended finance mechanisms that support local actors - Develop community grant schemes tied to performance on resilience outcomes - Pilot insurance or social protection schemes responsive to climate shocks	- Exploratory research on finance tools that have been used in other countries - pilot research on the tools - What financing models best support flexible and scalable local adaptation? - What are the barriers to uptake of climate insurance among vulnerable populations?	Under FFLoCA's Program-for-Results (PforR) design, grant disbursement is directly linked to milestones such as establishing CCCUs, holding participatory risk assessments, and allocating budget lines enabling results-based funding and improved accountability. More information here and here.
4.Ground Climate Action in Local and Indigenous Knowledge Support the integration of traditional knowledge with scientific data to design culturally appropriate and locally relevant adaptation strategies. Recognise and invest in community-based and indigenous systems as key actors in climate resilience.		
- Ensure climate action plans reflect local priorities and cultural values rather than externally imposed solutions - Making sure indigenous strategies are consolidated into the research and programming - Support participatory vulnerability assessments incorporating indigenous methods - Build platforms that blend traditional forecasting and meteorological services - Co-create adaptation solutions with indigenous institutions and leaders	- What roles do traditional leaders play in mediating adaptation choices? - How is local ecological knowledge evolving in the face of climate change? - How can traditional knowledge be validated and integrated with formal systems?	In Guinea, the World Bank's Local Climate Action (LLCA) process uses community-led ''climate memory'' local observations of changing weather patterns alongside scientific models to inform ward level climate plans, fostering both cultural relevance and ownership.
5. Embed Livelihoods into Climate Services and Adaptation Planning Ensure that climate information systems and adaptation interventions are designed around specific livelihood needs—such as those of pastoralists, smallholder farmers, and fisherfolk. Strengthen institutions that support climate-sensitive sectors and natural resource governance.		
- Plan for sustainable, climate-friendly infrastructure that support traditional livelihoods like drilling boreholes in drought-prone/water-scarce regions - Tailor climate advisories to livelihood calendars (e.g., cropping, livestock) - Support integrated livelihood and climate resilience programming - Strengthen extension systems to deliver actionable climate information	- Find out how adaptation planning is aligned with the specific livelihood needs of pastoralist communities - How do livelihood-specific climate services improve decision-making and productivity? - What institutional barriers limit access to climate-smart livelihood interventions? - How are pastoralist and agropastoralist groups adapting to new climate norms?	SPARC's research identified how borehole development without planning for seasonal mobility can unintentionally attract permanent settlement, disrupting pastoralist livelihoods.

- Co-management of water points and integration of pastoral governance structures, the programme ensures that climate services (e.g. water access) and adaptation planning are aligned with the specific livelihood needs of pastoralist communities.		
6. Address Labour, Land, and Migration Dynamics in Adaptation Integrate labour mobility, youth outmigration, and land tenure considerations into climate programming. Secure access to land and enable households to make productive use of it, while anticipating how employment patterns and remittance flow shape adaptation capacity.		
- Develop livelihood programs that account for seasonal and distress migration - Support communal land access models with climate-smart use approaches - Design youth employment schemes linked to climate resilience	- Monitor trends and migratory patterns of displacement and migration - How employment patterns and remittance flow shape adaptation capacity - What are the links between climate stress, migration, and household labour allocation? - How does land tenure security affect investment in climate resilience? - How do remittances from migrant youth shape adaptation strategies?	SPARC's research maps how drought and resource pressure have driven increased cross-border cattle movement and land disputes. These findings are now informing regional adaptation programmes that integrate mobility corridors, conflict-sensitive land governance, and flexible service provision.
7. Ensure Gender Equality and Social Inclusion Design climate programming to address the specific barriers faced by women, youth, persons with disabilities, and other marginalised groups. Promote equitable access to resources, leadership, and benefits by embedding social inclusion throughout planning and implementation.		
- Address specific barriers faced by women: earning less, MHM - Provide support to women in their small businesses - Sensitization campaigns on gender equality and social inclusion - Promote gender equality and social inclusion in all programming - Build inclusive community decision-making platforms around climate planning - Provide support services for women and persons with disabilities during climate emergencies - Design cash interventions tailored to social protection and care burdens	- How does climate vulnerability intersect with gender, age, and disability in specific regions? - What climate adaptation roles do informal care workers play? - How do gender norms affect uptake of climate-resilient technologies?	CLARE supported women's cooperatives in Ethiopia through micro-grants (Grassroots action Research) that enabled them to establish climate-resilient fruit orchards. This initiative helped diversify incomes, increase food security, and build social capital while explicitly targeting women who had previously lacked access to land and financial resources.

Contents

I. Introduction

Climate change presents an increasingly urgent challenge in East Africa, where its impacts intersect with protracted displacement and vulnerability among both refugee and host populations. In Uganda and Kenya - two of the largest refugee-hosting countries in the region climate-related hazards such as floods, droughts, and heatwaves are already disrupting livelihoods, damaging infrastructure, and straining essential services. These impacts in East Africa are expected to intensify in the future, underscoring the need for forward-looking, evidence-based interventions.[2]

This review was commissioned to support the design and appraisal of FCDO's future programming in Kenya and Uganda by identifying key climate-related risks likely to affect refugee settlements and host communities, highlighting the effectiveness of existing interventions, and shedding light on critical gaps in knowledge. This report synthesises existing evidence on climate impacts and resilience, with particular attention to the self-reliance and climate adaptation strategies of vulnerable populations.

In line with the terms of reference, the review draws on a wide range of qualitative and quantitative sources, including peer-reviewed literature, programme evaluations, climate risk assessments, and grey literature from FCDO-funded and partner programmes. Particular focus is given to lessons learned from ongoing and recent interventions, to map current evidence. The report also outlines where additional field research and context-specific assessments are needed to refine adaptation responses in Kenya and Uganda.

The primary aim is to provide actionable insights for FCDO decision-makers and implementing partners in developing climate-resilient, inclusive, and evidence-informed strategies across refugee-hosting contexts.

II. Methodology

This evidence synthesis draws on secondary data and existing literature to examine climate trends, livelihood vulnerabilities, and climate adaptation programming in East Africa with a focus on Ethiopia, Kenya, South Sudan, and Uganda. A desk review of publicly accessible information was conducted using climate platforms, academic publications, and livelihoods assessments, including those produced by IMPACT.

Additionally, a programme matrix was developed by reviewing climate-relevant interventions both FCDO and non-FCDO funded to identify key adaptation activities, geographic coverage, and target populations, with a particular focus on refugee-hosting areas. All sources had to be publicly available or accessible through implementing partners and pertain directly to either: (i) climate trends and projections in the East Africa region; (ii) the exposure and vulnerability of livelihoods especially in refugee-hosting areas to climate-related hazards; or (iii) documented climate adaptation efforts with a livelihood focus. Priority was given to literature published from 2018 onwards to ensure alignment with current climate science and programming contexts, although foundational studies prior to this were also considered relevant.

From this matrix, three case studies were selected based on the availability of documentation, funder diversity, country focus (prioritising Kenya and Uganda), and variety in adaptation approaches. These case studies were analysed to extract practical lessons, challenges, and success factors. The synthesis also draws from publicly available project evaluations and learning outputs. A final review of the report was carried out by a specialist from IMPACT HQ to ensure methodological rigour and analytical robustness.

This evidence synthesis is based on a targeted review of secondary data and programmatic documentation and should not be interpreted as a comprehensive or systematic academic review. The selection of sources was constrained by the availability and accessibility of documentation, particularly for climate-related programmes in refugee-hosting areas. Many reports lacked detailed outcome evaluations or publicly accessible monitoring data, which limited the ability to assess effectiveness or compare approaches systematically across contexts. In addition, because the review draws heavily on grey literature and programme reports, the findings may reflect institutional priorities or donor narratives rather than independent evaluations. Lastly, causal attribution particularly linking specific outcomes to climate adaptation interventions is limited by the descriptive nature of most programme documents and the lack of counterfactual analysis.

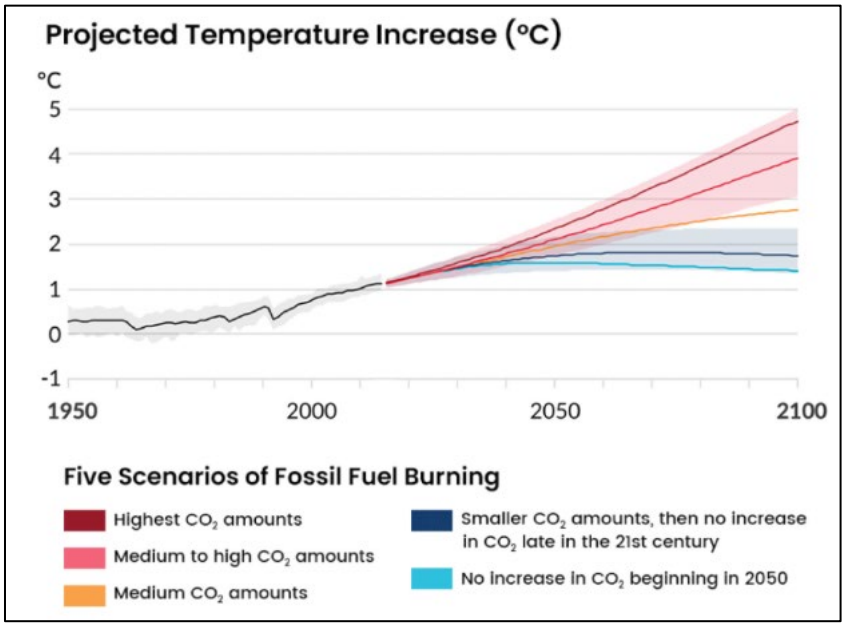
III. Climate trends

(a) Global climate trends

Climate change is driven by global temperature increases, which in turn is caused by various factors, including Greenhouse Gas (GHG) emissions. This report will not delve into the complexity of the drivers but rather focus on the recorded and projected impacts of climate change in the region and the four countries of interest. Projected impacts of climate change, however, are contingent on various global warming scenarios. The most commonly used scenarios for climate projections and planning are the Shared Socioeconomic Pathways (SSPs) outlined in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6, 2021-2023) and can be visualised in the graph below.[3]

- **IPCC Warming Scenarios**

Figure 1: Global warming scenarios based on GHG emissions, source: IPCC Working Group 1, 2021



The ideal scenario, corresponding to SSP1-1.9, assumes rapid and sustained emissions reductions, reaching net-zero CO_2 emissions around 2050. Under this pathway, global temperature rise would be limited to 1–1.5°C above pre-industrial levels by the end of the century, aligning with the Paris Agreement target. In contrast, the worst-case scenario, represented by SSP5-8.5, projects a global temperature increase of 4.5–5°C above pre-industrial levels, driven by continued fossil fuel dependency, high emissions, and weak climate action.[4]

- **Disproportionate Global Impacts**

As global temperatures rise, climate risks escalate, leading to an increased frequency and severity of climate hazards such as prolonged droughts, extreme heat events, and intensified flooding. According to the IPCC, these impacts are unequally distributed globally, with low-income and vulnerable communities particularly in the Global South bearing the brunt of climate-related risks, despite having contributed the least to historical greenhouse gas emissions. Small Island Developing States (SIDS), coastal regions, arid and semi-arid zones, and high-latitude areas are among the most affected, facing challenges such as rising sea levels, prolonged droughts, food and water insecurity, biodiversity loss, and displacement.[5]

(b) Regional climate trends

- **Climate Vulnerability in Africa**

Impacts of climate change are the result of how global temperature and environmental trends interact with socio-economic inequality, poverty, policy, infrastructure, environment, and a host of other factors. Sub-Saharan Africa is an especially vulnerable region to climate change impacts due to both its exposure to climate hazards and socioeconomic status. The Working Group II report of the sixth IPCC assessment (2022) highlights several key risks for the region related to ecosystems, food security, livelihoods, mortality and morbidity, and poverty. According to a 2019 draft by the IPCC, estimates suggest GDP per capita 53 over the period 1991-2010 was on average 13.6% lower for African countries compared to if global warming 54 had not occurred. The WMO State of the Climate in Africa 2023 report notes that African countries are already losing 2–5% of GDP annually due to existing climate extremes and projects those losses will continue increasing as warming intensifies

- **Temperature Changes in East Africa**

The East Africa region is a high-risk area for climate change impacts and losses. Specific areas of concern for the region include vector-borne diseases and heat-related deaths.[6,7] The IPCC AR6 Working Group II report (2022) highlights that East Africa has experienced significant warming, with mean temperatures rising by 0.7°C to 1°C between 1973 and 2013. The greatest increases have occurred in northern and central regions, alongside a growing frequency of hot days, warm nights, and heatwaves. Future projections indicate that at 1.5°C, 2°C, and 3°C of global warming, East Africa's average temperature will rise by 0.6°C, 1.1°C, and 2.1°C above the 1994–2005 baseline, respectively. If global temperatures reach 4.6°C above pre-industrial levels, cities such as Kampala, Lusaka, and Blantyre could experience up to a 2000-fold increase in extreme heat days above 40.6°C. Children born in 2020 will likely endure three to five times more heatwaves than those born in 1960 under a 1.5°C scenario, and four to nine times more heatwaves under 2.4°C warming.[8]

- **Changing Rainfall Patterns and the East African Rainfall Paradox**

Changes in precipitation patterns are also evident, though trends vary across seasons and locations. The short rainy season (October–December) has seen a long-term wetting trend since the 1960s, linked to Indian Ocean warming and a stronger Walker Circulation.[9,10] In contrast, the long rainy season (March–May) has shown a long-term drying trend between 1986 and 2007, with declining rainfall and a shorter wet season. Drought frequency in East Africa has doubled since 2005, now occurring once every three years instead of every six. The Horn of Africa has been particularly affected, with droughts increasingly tied to La Niña events, amplifying risks for arid and semi-arid regions.[11]

- **Rainfall Projections and Uncertainty**

Projections indicate that mean annual rainfall will increase, particularly in eastern East Africa, at 1.5°C and 2°C of global warming.[12] However, according to the IPCC (2022), the additional 0.5 °C of warming from 1.5 °C increases average dry spell duration by between two and four days, except in southern Somalia, where they may shorten.[13] During the short rainy season, a longer duration of rainfall and over 100mm of additional precipitation are expected under 4.5°C warming, particularly in the Horn of Africa and high-altitude areas. The long rainy season, however, remains highly uncertain. While some models predict increased rainfall toward the end of the century, others suggest little to no significant change.[14] This contradiction between observed drying trends and projected wetting trends is known as the "East African Rainfall Paradox", making future rainfall patterns difficult to predict.[15]

- **Extreme Weather Events and Livelihood Impacts**

The frequency and intensity of extreme weather events are expected to rise with continued warming. Heavy rainfall will become more frequent and intense at 2°C[16] global warming and beyond, increasing the risk of flooding and landslides.[17] Meanwhile, drought conditions are expected to worsen in Sudan, South Sudan, Somalia, and Tanzania, while remaining unchanged or slightly reduced in Kenya, Uganda,[18] and the Ethiopian Highlands. These climate shifts pose serious risks to agriculture, water security, health, and livelihoods, particularly for vulnerable communities that already experience high exposure to climate shocks and have limited adaptive capacity.[19]

- **The Adaptation Gap and the Call for Transformational Change**

As noted above, adaptation can play a key role in reducing climate risks and impacts. According to the United Nations Environmental Program's (UNEP) annual Adaptation Gap Report from 2024, climate adaptation is not increasing at the rate required and continues to be underfinanced.[20] The Working Group II report of the 6th IPCC (2022) posits that 'hard adaptation limits could be reached soon for the largely incremental adaptation efforts that are currently being implemented. Hard adaptation limits are reached when no adaptive actions are possible to avoid intolerable risks. The report calls for increased focus on transformational adaptation, referring to systematic changes in the socio-ecological system to avoid adverse and intolerable climate change impacts.[21] This implies fundamental shifts in how human (social, political, economic) and ecological (natural, climatic) systems interact. Rather than tweaking existing systems (e.g. building a slightly bigger dam), it means rethinking the system itself to cope with long-term climate risks.

The upcoming sections will focus on available information related to climate hazards and impacts in Kenya and Uganda, followed by a section on climate-related migration patterns in the region as well as a section on climate-related policies in the region.

(c) Kenya

This section draws primarily from the 2021 GIZ Climate Risk Profile for Kenya, supplemented by additional sources including the IPCC and Agrica.

- **Projected Temperature Increases and Heat Risks**

In tandem with rising mean annual temperatures, the number of very hot days - defined as days with maximum temperatures exceeding 35 °C is projected to increase significantly, with a high degree of certainty, particularly in central and eastern Kenya. Under the medium to high emissions scenario (RCP6.0), the country-wide multi-model median indicates an increase of 25 very hot days per year by 2030 (compared to 2000), rising to 36 additional days by 2050 and 59 by 2080. In some regions, notably northern and eastern Kenya, this could result in up to 300 very hot days annually by 2080.[22]

According to a 2021 Climate Risk Profile by GIZ, this would affect heat-related mortality, which is estimated to rise fivefold.[23] According to the World Bank, on the other hand, hot nights will become more common, reaching 64–93% of nights by the late 21st century.[24]

- **Rainfall Variability and Sea Level Rise**

According to the GIZ Climate Risk Profile (2021), precipitation projections remain uncertain, with models suggesting variations between no change and an increase of up to 53 mm annually by 2080. While heavy precipitation events are likely to increase, future dry and wet periods are expected to become more extreme. Sea levels along the Kenyan coast are projected to rise by 40 cm under high-emission scenarios, threatening coastal communities and increasing saline intrusion into freshwater systems.[25]

- **Declining Water Availability and Agricultural Impacts**

Water availability per capita is expected to decline by 2080, mainly due to population growth, necessitating water-saving measures. Climate change will impact agriculture, with declining yields for millet and sorghum, whereas cassava and cowpeas may benefit from CO_2 fertilisation effects. Crop land exposure to drought may increase, requiring adaptation strategies such as water-saving measures (demand management, efficiency improvements, and conservation efforts) and crop adaptation (adapting by shifting to resilient crop varieties and modifying cropping practices).[26]

- **Infrastructure Vulnerability and Urban Risks**

Infrastructure will be vulnerable to climate change, particularly transport networks, which are critical for trade and livelihoods. Extreme weather events, including floods and droughts, are likely to damage roads and urban settlements, with informal settlements being particularly at risk. In Kibera, Nairobi's largest informal settlement, over 50% of residents reported their homes being flooded in 2015, leading to displacement, disease outbreaks, and destruction of property.[27]

- **Ecosystem Shifts and Biodiversity Changes**

Ecosystem changes include shifts in agro-ecological zones, biodiversity alterations, and changes in species distribution. Tree cover in some regions may increase due to projected higher rainfall, while wetlands and riverine systems may experience ecosystem shifts due to increasing temperatures and drought frequency.[28]

- **Climate and Public Health Risks**

Health risks will escalate due to heatwaves, vector-borne diseases, and extreme weather events.[29] According to WHO, 70% of the population in Kenya in 2017 was at risk of contracting malaria.[30] This is especially concerning considering that malaria transmission may expand to highland areas previously unaffected, while climate-induced food insecurity and malnutrition risks are expected to grow.[31]

- **Climate Risks in Kakuma Refugee Camp and Dadaab Refugee Complex**

Kakuma Refugee Camp is in northwestern Kenya (Turkana County), a region projected to experience higher temperatures and more frequent droughts. The GIZ climate risk profile highlights that northern Kenya will see an increase in very hot days, with some areas experiencing nearly 300 per year by 2080. This will presumably worsen water scarcity, heat stress, and food insecurity critical challenges in Kakuma, where resources are already limited.[32]

Dadaab Refugee Complex is in northeastern Kenya (Garissa County), a dry region vulnerable to extreme heat, droughts, and unpredictable rainfall. The GIZ report notes that eastern Kenya is likely to see some of the highest temperature increases and potential water shortages. Given the reliance of Dadaab's population on groundwater and rain-dependent resources, these shifts will likely exacerbate water access challenges and increase competition for resources.[33]

(d) Uganda

This section draws primarily from the 2021 GIZ Climate Risk Profile for Uganda, supplemented by additional sources including a district report and an assessment on heat risk.

- **Rising Temperatures and Heat-Related Risks**

Uganda is undergoing substantial climate shifts, marked by rising temperatures, more frequent extreme weather events, and increasingly erratic rainfall. According to the GIZ Climate Risk Profile for Uganda (2021), under a medium to high emissions pathway (RCP6.0), national average temperatures are projected to rise by approximately 1.3 °C by 2030, 1.5 °C by 2050, and 2.3 °C by 2080, relative to pre-industrial levels. The greatest warming is expected in northern and eastern regions of the country. The same scenario projects a steady rise in the number of extremely hot days (above 35 °C), with the national average increasing by 13 days per year by 2030, 26 by 2050, and 39 by 2080, compared to the year 2000. In certain areas particularly in the north, this may amount to around 150 very hot days annually by 2080. As a result, the proportion of the population exposed to heatwaves is expected to grow to nearly 10%, and heat-related mortality could rise fourfold by the end of the century.[34]

- **Rainfall Trends, Water Stress, and Hydro power Concerns**

According to the GIZ Climate Risk Profile for Uganda (2021), under a medium- to high-emissions scenario (RCP6.0), annual precipitation is projected to increase by approximately 67 mm by 2080, relative to a baseline period around the year 2000. However, the distribution of rainfall will become increasingly erratic. Both dry spells and extreme precipitation events are expected to intensify, amplifying the risks of seasonal droughts and flooding. These climate stressors pose significant threats to agricultural systems, rural livelihoods, and critical infrastructure.[35]

Uganda's per capita renewable water availability is also projected to decline by approximately 80% by 2080, primarily due to rapid population growth, even though total water availability may remain stable or slightly increase. This decline measured against current access levels—will place additional pressure on agricultural production, domestic water supply, and energy generation, especially hydropower, which already accounts for over 80% of the country's electricity and is highly sensitive to rainfall variability.[36]

- **Agriculture and Infrastructure Vulnerabilities**

Agriculture remains one of Uganda's most climate-sensitive sectors, largely dependent on rain-fed farming systems. Under RCP6.0, crop modelling indicates that yields of key staples such as maize, millet, and sorghum are likely to decline, especially in areas facing more frequent droughts and heat stress. In contrast, crops like cassava and groundnuts may perform more favourably due to their resilience to heat and drought and the potential fertilisation effect of increased atmospheric CO_2, although outcomes remain uncertain and vary by region.[37]

The increasing unpredictability of rainfall patterns and prolonged dry periods will continue to challenge smallholder farmers, who represent the majority of agricultural producers, and will likely exacerbate food insecurity and rural poverty. In parallel, infrastructure systems including transport networks, urban drainage systems, and hydropower plants are at growing risk of climate-induced

damage, particularly due to flooding. Informal settlements and low-income urban communities, often situated in flood-prone or poorly serviced areas, will be among the most vulnerable to the impacts of intense rainfall events and infrastructural failures.[38]

- **Localised Climate Impacts in Kamwenge District**

According to the *Kamwenge District Hazard, Risk and Vulnerability Profile (ca. 2022)*, the district is experiencing increasing occurrences of droughts, floods, hailstorms, and strong winds, which are affecting livelihoods, infrastructure, and food security. Annual rainfall ranges from 972mm to 1,356mm, with droughts leading to crop failures and water shortages, particularly in areas like Nkoma, where Rwamwanja settlement is located. Flooding disrupts transportation and displaces households, especially in low-lying areas of the district, while hailstorms and strong winds contribute to agricultural losses. In Nkoma, land conflicts between refugees and host communities have been reported, particularly over resource access. Environmental degradation, including deforestation and wetland encroachment, is also a concern, partly due to the demand for fuelwood and agricultural expansion in and around Rwamwanja. Additionally, climate variability impacts food security, with refugees and host communities vulnerable to crop and livestock diseases.[39]

- **Climate Risks and Resilience Priorities in Adjumani District**

The Adjumani District Five-Year Development Plan (2015/2016–2019/2020) highlights increasing climate variability as a growing challenge, particularly noting more frequent prolonged dry spells and erratic rainfall patterns, which have been attributed to climate change. These shifts have negatively impacted rain-fed agriculture, water availability, and food security. The plan also points to environmental degradation, especially deforestation, land degradation, and unsustainable land use as contributing factors that reduce resilience to climate shocks. In response, the district underscores the need for sustainable natural resource management and climate-resilient agricultural practices to safeguard livelihoods and improve long-term productivity.[40]

- **Urban Heat and Vulnerabilities in Kampala**

According to the heat perceptions research from 2022, Kampala has experienced a temperature increase of 1.5°C over the last five decades, with extreme heat becoming more frequent, particularly in informal settlements due to high population density, limited vegetation cover, and urban heat island effects. The hottest months are typically July, June, January, and May, with 2022 being reported as one of the hottest years since the 90s. Over 90% of respondents in low-income communities have experienced extreme heat, with the most intense periods occurring between noon and 4.00 PM and late at night due to heat retention by buildings and infrastructure. The study highlights concern over reduced labour productivity, health complications such as dehydration and heat stress, and increased electricity costs for cooling, while also noting limited adaptation strategies at the community level.[41]

IV. Climate policies

(a) East Africa

East Africa's climate adaptation priorities are guided by regional frameworks that align with the African Union's Agenda 2063, Nationally Determined Contributions (NDCs), and the Sustainable Development Goals (SDGs). A key initiative is the African Adaptation Initiative (AAI), launched at COP21 to enhance adaptation action, promote knowledge sharing, and support climate resilience through resource mobilization and policy integration.

The Africa Adaptation Acceleration Programme (AAAP), co-led by the Global Center on Adaptation (GCA) and the African Development Bank (AfDB), aims to scale up financing and implementation of

adaptation measures across the continent. Additionally, initiatives like the Adaptation at Scale in Semi-Arid Regions (ASSAR) project have contributed valuable insights into the social, institutional, and environmental factors that enable or constrain adaptation in East Africa. These findings have helped inform national policies and regional adaptation strategies, particularly in relation to the needs of vulnerable communities. At the national level, National Adaptation Plans (NAPs) play an essential role in operationalizing these commitments by outlining country-specific adaptation priorities, sectoral strategies, and financing mechanisms. These plans help bridge short-term commitments under NDCs with long-term resilience-building efforts.

(b) Kenya

Kenya has developed a comprehensive policy framework to address climate adaptation, integrating it into national planning and sectoral strategies. The country's efforts began with the National Climate Change Response Strategy (NCCRS) in 2010, which laid the foundation for climate action by outlining key risks and opportunities for adaptation and mitigation. This was followed by the National Climate Change Action Plan (NCCAP) 2013–2017, which provided a more detailed roadmap for implementation, focusing on priority sectors such as agriculture, water, and infrastructure. The NCCAP was updated in 2018–2022, expanding its scope to align with Kenya's Vision 2030 and the Paris Agreement, with an emphasis on financing mechanisms, institutional coordination, and local-level adaptation strategies.

The Climate Change Act of 2016 was a significant milestone, providing a legal framework to mainstream climate adaptation across government ministries, counties, and development programs. This Act established the Climate Change Directorate, which oversees national climate policies, and mandated the development of county-level climate change plans. It also led to the creation of the Climate Change Fund, designed to support adaptation initiatives at both national and local levels.

To address the increasing risks posed by climate variability, Kenya adopted the National Adaptation Plan (NAP) 2015–2030, which focuses on reducing vulnerability across key sectors by strengthening climate information services, disaster risk management, and resilience-building interventions. This plan aligns with Kenya's commitment under the United Nations Framework Convention on Climate Change (UNFCCC) and its Updated Nationally Determined Contribution (NDC) submitted in 2020, which reaffirmed the country's goal to enhance adaptation efforts alongside its mitigation commitments.

Recognizing the need for decentralized climate action, Kenya launched the FLLoCA | Financing Loccally-Led Climate Action (FLLoCA), supported by the World Bank. This initiative empowers counties to implement adaptation projects based on local climate risks and community priorities. It builds on Kenya's devolution framework, ensuring that climate adaptation is integrated into county-level development planning.

Additionally, Kenya's National Disaster Risk Management Policy (2017) and the Ending Drought Emergencies (EDE) framework (2013–2027) emphasize resilience-building, particularly in arid and semi-arid regions. The National Water Master Plan 2030 also incorporates climate adaptation strategies to address water security challenges.

(c) Uganda

Uganda has adopted a proactive and policy-driven approach to addressing climate change, recognising its far-reaching impacts on livelihoods, natural resources, and economic development. The Uganda National Climate Change Policy (2015) and the National Climate Change Act (2021) provide the legal and institutional foundation for climate action, emphasising adaptation and mitigation strategies in climate-vulnerable sectors such as agriculture, water, forestry, and energy. The 2021 Act

also established the National Climate Change Advisory Committee and mandates the integration of climate change into national and local development plans.

Uganda is a signatory to the Paris Agreement and submitted its updated Nationally Determined Contributions (NDCs) in 2022, which include targets for reducing greenhouse gas emissions by 24.7% below Business As Usual (BAU) levels by 2030 -a progression from the 22% reduction target communicated in the first NDC in 2016-, and building climate resilience across priority sectors.

In June 2023, Uganda launched a $2.9 million National Adaptation Plan (NAP) development project, supported by the Green Climate Fund (GCF) and implemented by the UN Environment Programme (UNEP). The NAP aims to strengthen institutional coordination, integrate adaptation into national budgeting processes, and build capacity at district and sectoral levels.[42,43]

Uganda has not yet published a standalone Climate Finance Strategy, but several efforts are underway to strengthen climate finance readiness. The Ministry of Finance has explored instruments such as green bonds and carbon markets, while programs like UNCDF's Local support local-level climate finance planning and delivery.[44] Additionally, stakeholder consultations have focused on identifying mechanisms to increase access to both domestic and international climate funding.[45]

Uganda has implemented several mechanisms to integrate climate change considerations at the local government level:

- **District Environment and Natural Resources Committees (DENRCs):** These committees are mandated to integrate climate matters into district plans, and to coordinate activities of lower local government committees. The DENRC therefore, will integrate NAPs into the District Plans to develop District Adaptation Plans (DAPs).[46]

- **Climate Change Focal Points:** Anchored within the Natural Resources Departments of District Local Governments, these focal points are responsible for coordinating climate change activities and ensuring that climate considerations are mainstreamed into district planning processes.[47]

- **Parish Climate Change Committees (PCCCs):** Established under initiatives like the Local Climate Adaptive Living Facility (LIFE-AR), PCCCs operate at the parish level to identify, plan, and oversee the implementation of local adaptation projects, ensuring community engagement and adherence to gender quotas in decision-making processes.[48]

Finally, the government has invested in early warning systems and disaster risk reduction (DRR) in partnership with agencies like the Uganda National Meteorological Authority (UNMA) and the Office of the Prime Minister (OPM), particularly for droughts and floods in northern and eastern Uganda.

V. Livelihoods & Resilience

(a) Regional livelihood & resilience trends

- ### Strong but Uneven Economic Growth in East Africa

East Africa has been one of the most stably growing economies on the continent. Between 2015 and 2021, the average annual growth rate for East Africa was 5%, which was almost double the average of the continent.[49] The growth is projected to sustain, but is subject and vulnerable to political instability and external shocks. The service sector is contributing greatly to economic growth, yet much of the workforce remains in agriculture, which has experienced limited economic growth.[50] There are

structural factors inhibiting East Africa's economic growth, which include widespread informality, climate trends, and political factors. Addressing political instability and climate vulnerability are key to long-term economic stability and growth of the region.[51]

- **Agriculture as the Dominant Livelihood**

Despite agriculture's limited role in the economic growth of the region, it continues to be the primary livelihood for most households and individuals. In Uganda and Kenya, it is estimated that approximately 80-81% of the population is engaged in agriculture.[52,53] Agricultural livelihoods in East Africa are increasingly under pressure due to the mounting pressures on land. The availability and arability of land are impacted by growing populations, political conflicts over land, and environmental degradation and climate change.

- **Land Pressures and Displacement**

Political demands for land -including for the expansion of national parks, tourism infrastructure, or extraction of natural resources- can result in restrictions on land access and use. When policies and regulatory frameworks do not adequately consider the rights and needs of minority groups, such as refugees or pastoralist communities, these developments can inadvertently exacerbate existing vulnerabilities. This underscores the need for inclusive and rights-based approaches to land governance within climate adaptation and development planning.[54]

- **Pastoralist Livelihoods and Climate Vulnerability**

Pastoralism is a common livelihood in several areas in the region, for example in Eastern Uganda and Western Kenya. It is estimated that 30 million people in the Greater Horn of Africa rely on pastoralism for at least 50% of their income. Pastoralists tend to rely on shared and open access pastures and move seasonally with their livestock. Pastoralist livelihoods are especially vulnerable to climate change and land degradation, as well as political and cultural misunderstandings of pastoralist livelihoods.[55]

- **Mobility and Migration in the Regional Labour Market**

Mobility and migration generally play a key role in the labour market in the region. Cross-border migration is largely informal and motivated by perceived economic opportunity and social networks in neighbouring countries.[56] Additionally, seasonal, cyclical, and regular migration motivated by livelihoods is common in both Kenya and Uganda.

- **Emerging Strategies**

In Kenya, urban-rural livelihoods are increasingly common. Urban-rural livelihoods are defined as livelihoods where households are split or commonly moving between rural and urban locations to maintain access to natural resources in rural areas while requiring increased access assets and services available in urban areas.[57] In Uganda, pendular movements among refugee households between Uganda and South Sudan is common among South Sudanese households who retain their land or other productive assets in their area of origin.[58]

Against this backdrop of economic growth combined with sustained reliance on climate-vulnerable agriculture and pastoralist livelihoods, the rest of this section will zoom in on livelihoods in the two countries of interest, with a particular focus on the refugee populations.

(b) Kenya: livelihood & resilience trends

In Kenya, 39% of people live below the national poverty line and 36% live below the international poverty line, as per the latest estimates from 2021 data.[59] Furthermore, the most recent data in 2021

indicates that about 38% of the population in Kenya is multidimensionally poor (i.e., deprived in multiple basic needs such as education, health, housing, and access to services) while an additional 35.8 percent is classified as vulnerable to multidimensional poverty.[60] Rural populations are generally more affected by multidimensional poverty (81%) compared to urban populations (48%).

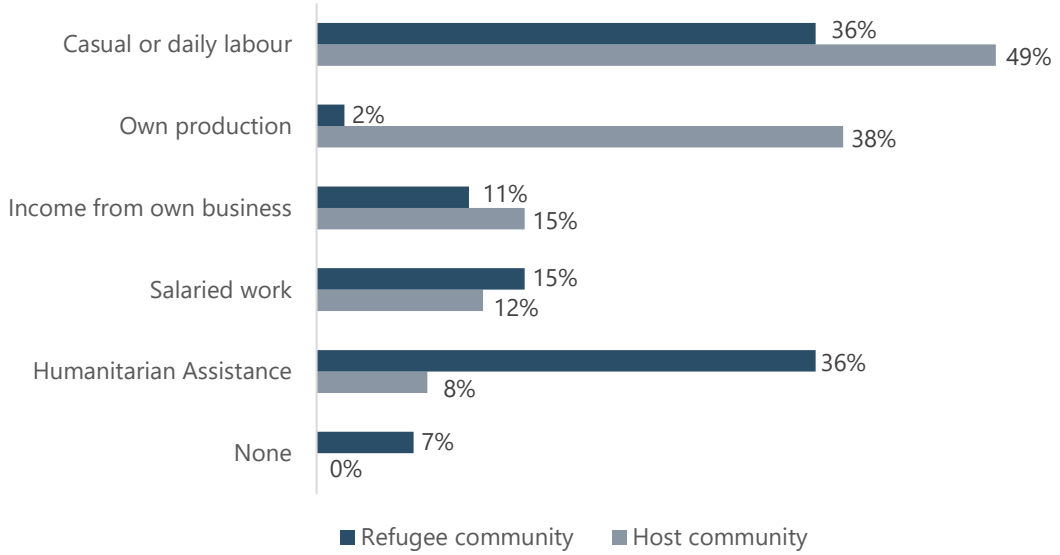
Over 80% of Kenya's landmass is classified as arid or semi-arid (ASAL), characterized by low rainfall, high temperatures, and fragile ecosystems. These areas -spread across 23 counties- are among the country's most marginalized and face high rates of poverty and food insecurity.[61]An estimated 16 million people reside in ASAL counties, with the majority relying on pastoralism and small-scale agriculture for their livelihoods.

ASAL areas are particularly vulnerable to climate shocks, with frequent droughts and occasional flooding. These hazards have cumulative effects, contributing to land degradation, desertification, and biodiversity loss. It is estimated that during drought years, 50–60% of livestock (shoats, camels, cattle) perish, leading to widespread loss of livelihoods and, in some cases, loss of life. The capacity to cope with droughts is undermined not only by increasing frequency and intensity of such events, but also by factors such as population growth, resource-based conflict, limited access to land and water, and food shortages.

Environmental degradation -primarily from deforestation, overgrazing, and unsustainable land use practices- has further reduced productivity in many ASAL regions. This threatens not only livelihood sustainability but also food security and social cohesion.

According to the 2024 Multi-Sector Needs Assessment (MSNA) conducted by IMPACT Initiatives, there are notable differences in the livelihood strategies of host communities and refugee populations in ASAL counties such as Garissa, Mandera, and Turkana. Among host community households, approximately half (49%) relied on casual or daily labour as their main source of livelihood. An additional 38% are engaged in pastoralism or small-scale agriculture, both of which are highly dependent on seasonal rainfall. In contrast, refugee households reported much lower engagement in agriculture (2%) and were more likely to rely on external sources of income, such as casual labour (36%) or humanitarian aid (36%).

Figure 2. The most commonly reported main livelihood activity of the household per population group



The sustainability of casual labour and rain-dependent livelihoods such as pastoralism and small-scale farming is increasingly threatened by climate variability, particularly erratic rainfall patterns. The main rainy seasons -March–May (MAM) and October–December (OND)- are critical to agriculture and pasture regeneration. However, rainfall has become less predictable. During the OND 2024 season, for example, Turkana County experienced intense, short-duration rains leading to flooding and waterlogging. These events destroyed crops, killed livestock, and overwhelmed irrigation systems.[62]

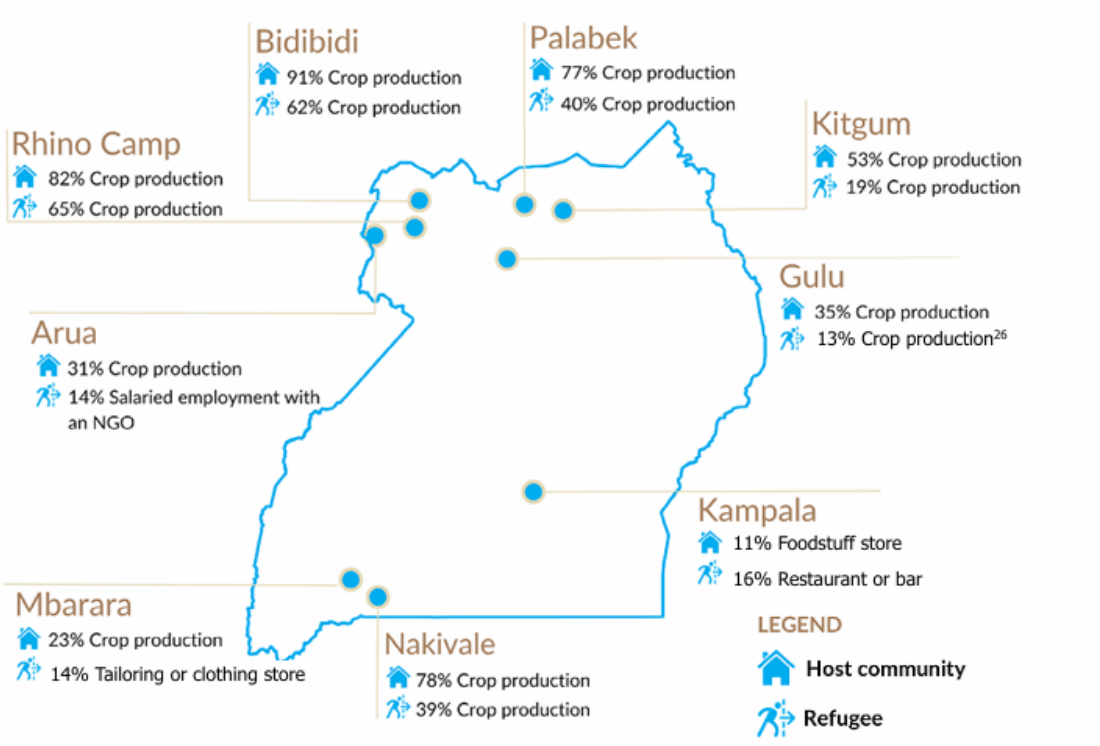
(c) Uganda: livelihood & resilience trends

In Uganda, 20% of people live below the national poverty line and 42% live below the international poverty line, as per the latest estimates from 2019 data.[63] According to the Multidimensional Poverty Index (MPI), approximately 42% of Ugandans are considered multi-dimensionally poor. Multi-dimensional poverty is driven primarily by living standards and access to infrastructure, rather than monetary poverty alone. Rural populations are generally more affected by multidimensional poverty. Among refugee-hosting regions, the Acholi (64%) and West Nile (59%) regions had the highest levels of poverty.[64]

The majority of Ugandans, especially in rural areas, are engaged in and often reliant on agriculture for their food and/or income. There are various different estimates for the reliance on agriculture, depending on the exact indicator and unit of measurement. According to numbers cited by FAO, 81% of Ugandans are engaged in rainfed agriculture, whether through paid employment or for subsistence.[65]

In refugee-hosting districts, agriculture is also the most common livelihood strategy. The U-Learn and REACH livelihoods and self-reliance assessment in 2022-2023 examined the most common livelihoods in selected settlement and urban locations as well as the key barriers and enablers.[66] The map below illustrates the most reported main sources of food and income for refugee and host community households in assessed locations.

Figure 3. Most commonly reported main livelihood activity of the household, per location and population group



Generally, host communities were more likely to report agriculture as their main source of livelihoods than refugee households, due to greater access to land, more secure tenure arrangements, better physical and social access to markets, and comparatively fewer barriers to accessing financial services. It is important to note that the actual number of households engaged in agriculture is likely higher for both groups, as many may cultivate crops for subsistence or as a secondary activity, even if they do not report it as their primary livelihood source. As per the map, households in urban centres are still likely to rely on crop production as their main source of income and food, reflecting the urban-rural livelihoods highlighted in the regional section. Another common form of income for refugee households was found to be remittances. These remittances largely manifested themselves through household or family members travelling back and forth between Ugandan and their country of origin.[67]

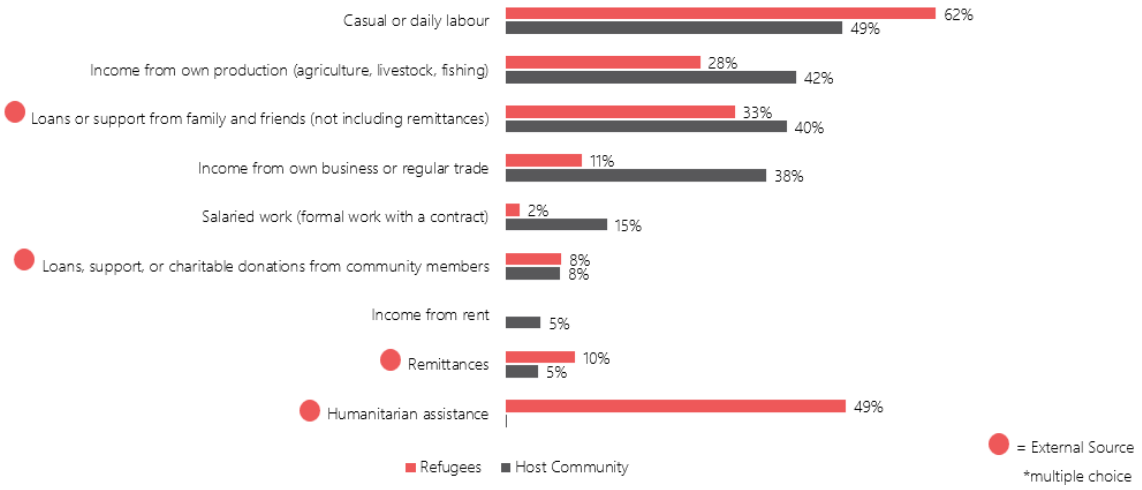
In terms of barriers to livelihoods, three primary challenges were identified. Firstly, both refugee and host communities struggle to access formal financial services to expand or transform their livelihoods. For agricultural activities to become economically and commercially lucrative, investments in land and other assets are typically required. Those investments are often not possible without access to credit from formal financial service providers. Similarly, for those households who wish to develop non-agricultural enterprises, investments are typically required.[68]

Secondly, access to markets is often a challenge in rural areas, especially in the Northern regions. Access to markets can be complicated by physical and social factors. Physical access to markets in refugee-hosting districts is limited by the lack of permanent market structures in many areas, as well as poor roads leading to markets. Social barriers to markets include discrimination and limited social networks. In the absence of easy access to markets, households have to rely on a limited pool of sellers and buyers which can result in poor quality of input and poor prices for outputs.[69]

Finally, access to land is a significant barrier to agricultural livelihoods. Refugees in Uganda are entitled to a small plot of land to do crop production. The land they receive is often not large enough for them to produce sufficient food for both household consumption and selling. Acquiring additional land is complicated for refugees, as they are unable to own land outright, and have to rely on often informal renting or leasing arrangements with host communities. According to the data gathered in selected settlements, the median land size of host community households was 2 acres compared to 0.5 acres for refugee households.[70]

According to the 2024 Multi-Sector Needs Assessment (MSNA), 76% of refugee households and 61% of host community households earned less than the Minimum Expenditure Basket (MEB).[71] In terms of the sources of income, refugees generally were more reliant on external sources. These sources include humanitarian assistance, loans, and remittances. Host community households were more likely to have derived income from agriculture or other forms of labour. The graph below illustrates the breakdown of reported sources of income.[72]

Figure 4. % of households by income source in the 30 days prior to the survey, per population group*



(d) Climate-related migration patterns in East Africa

Climate-related migration in East Africa is both a consequence of disrupted livelihoods and, increasingly, a deliberate adaptation strategy. The growing frequency and severity of climate hazards—such as droughts, floods, and heatwaves directly undermines agricultural and pastoral systems, which remain central to household income and food security in the region. As these livelihoods become less viable, migration emerges as a coping mechanism, allowing households to seek alternative income sources or escape deteriorating environmental conditions.[73]

- **Migration is Multi-Causal and Hard to Attribute Solely to Climate Change**

Importantly, migration decisions are rarely driven by a single cause. Rather, they are shaped by a complex interplay of environmental, social, political, and economic factors including land tenure, employment, insecurity, and household aspirations. As such, it is methodologically very difficult to isolate climate change as a distinct trigger of migration. In most cases, attributing migration to climate change requires a two-step process: first, establishing that migration is occurring due to environmental factors (e.g., land degradation, water scarcity), and then demonstrating that these factors are themselves attributable to climate change rather than to natural variability or socio-political drivers such as land mismanagement or conflict.

Because of this complexity, most researchers refer to climate-related migration rather than climate-induced migration.[74,75] A growing body of literature, including the Africa Climate Mobility Initiative (ACMI)[76] and IOM/UNEP[77,78] studies, acknowledges climate as a compounding factor one that increases pressure on already fragile livelihoods and exacerbates existing inequalities and risks.

- **Migration as Livelihood Adaptation**

In some contexts, migration, especially seasonal, circular, or urban-rural migration is not just a response to livelihood collapse but a longstanding risk-spreading strategy. In the Horn of Africa and northern Uganda, mobility is part of traditional pastoralist and agrarian livelihood systems. Households send members to cities or across borders to diversify income and access markets, while retaining links to land or livestock in rural areas. As climate conditions worsen, however, these strategies become strained and more reactive, with migration increasingly driven by necessity rather than choice.[79]

Remittances from migrants can serve as an adaptive resource, allowing rural households to buffer climate shocks or invest in more resilient practices. However, climate shocks can also disrupt remittance flows by affecting urban informal labour markets where migrants work, creating a feedback loop of vulnerability.[80]

- **Barriers to Migration: The Risk of Trapped Populations**

Paradoxically, those most affected by climate impacts may be least able to migrate. Migration requires access to resources, information, and networks, many of which are lost in the wake of climate shocks. This can create so-called "trapped populations", particularly among elderly people, persons with disabilities, or extremely poor households. These populations are often unable to move despite being highly exposed to deteriorating environmental conditions.[81]

- **Gendered Dimensions of Climate-Related Migration**

Migration patterns are also deeply gendered. Women are less likely to migrate due to caregiving responsibilities, social restrictions, or security concerns. Yet they bear the brunt of climate impacts when male household members leave. In displacement contexts across Uganda and Kenya, women remaining behind often face increased unpaid labour, food insecurity, and reduced access to remittances. Gendered power dynamics also shape vulnerability, as women have less access to land, financial resources, and decision-making limiting their adaptive options.[82]

- **Lack of Legal and Policy Recognition**

Despite growing evidence of climate's role in migration, legal frameworks have yet to catch up. Climate-displaced people, especially across borders, often lack formal recognition or protection under refugee or migration law. For example, South Sudanese refugees entering Uganda may cite crop failure and drought as part of their decision to flee, but are officially registered as fleeing conflict, leaving their environmental vulnerability unrecognised and unaddressed.[83]

- **Emerging Trends in Climate-Related Migration**

Drought-Induced Displacement and Cross-Border Movements: Recurrent and prolonged droughts are among the most visible climate shocks driving migration in East Africa. In Somalia, decades of water scarcity, desertification, and failed rains have pushed rural communities to abandon agricultural land and pastoral livelihoods, often moving toward urban centres or across borders into Ethiopia and Kenya. Similarly, in northern Kenya and southern Ethiopia, pastoralist communities frequently migrate across porous borders in search of pasture and water, heightening tensions over natural resources. The 2020–2023 Horn of Africa drought displaced over 1.5 million people in Somalia alone.[84]

Flooding and River Displacement: While drought drives displacement slowly, flooding often causes rapid-onset displacement. In South Sudan, flooding since 2019 intensified by climate change has submerged entire villages in Jonglei, Unity, and Upper Nile states. The 2021 floods were the most severe in over 60 years, displacing over 800,000 people.[85] Uganda and Tanzania have also experienced flash floods in low-lying lake regions, including around Lake Victoria, where shoreline erosion and water level variability have forced fishing communities to relocate.[86,87]

Rural–Urban Migration due to Livelihood Collapse: In Kenya, agricultural and pastoral livelihoods are increasingly unsustainable in drought-prone areas like Turkana, Garissa, and Marsabit. The loss of crops and livestock has led to rural–urban migration, especially to informal settlements in Nairobi, Mombasa, and Kisumu, where climate migrants often live in precarious conditions.[88,89] Similar patterns have been observed in Addis Ababa and Kampala, where climate-related migration contributes to the growth of slums without adequate infrastructure or services.[90,91,92,93]

Climate and Conflict Interlinkages: Climate-related migration is often intertwined with conflict, especially over natural resources. In Karamoja (Uganda) and Turkana (Kenya), pastoralist migration triggered by drought has led to violent clashes over grazing land and water points.[94,95] In Darfur, Sudan, rainfall variability and desertification have long been cited as environmental stressors that fuel local conflict and displacement.[96]

Planned and Voluntary Migration as Adaptation: Some communities have begun to engage in migration as a form of climate adaptation. In Ethiopia, development actors have piloted labour mobility and livelihood diversification programs, including seasonal migration schemes, as ways to reduce pressure on degraded land and support household income resilience.[97,98] Uganda's Office of the Prime Minister has recognised the importance of planned relocation for flood-affected communities, although implementation remains limited.[99,100]

(e) Gender inclusion

- ### Gendered Impacts of Climate Hazards on Livelihoods

In East Africa, climate change disproportionately affects women due to existing gender inequalities. Women often rely on climate-sensitive livelihoods such as small-scale farming and manual labour, making them more vulnerable to climate-induced shocks like droughts and floods. For instance, during the Horn of Africa drought (2020–2023), women faced heightened risks of food insecurity and displacement, exacerbating their socioeconomic vulnerabilities.[101, 102]

Moreover, climate-induced male outmigration increases women's responsibilities at home, including managing farms and households, often without adequate resources or decision-making power. This shift not only intensifies women's workload but also limits their adaptive capacity to climate change.[103]

- ### Integrating GESI in Climate Adaptation Programming

Evidence suggests that integrating GESI considerations into climate adaptation programs enhances their effectiveness. Programs that actively involve women in decision-making processes and provide them with access to resources and training have shown improved outcomes in building community resilience. For example, initiatives in Ethiopia and Kenya that trained women as solar power technicians not only empowered them economically but also contributed to sustainable energy solutions in their communities.[104]

However, challenges remain in mainstreaming GESI in climate programs. Many interventions lack gender-disaggregated data, making it difficult to assess their impact on different groups. Additionally,

societal norms and limited access to education and financial services hinder women's participation in adaptation initiatives.

- **Potential Gender Impacts**

When developing climate-resilient livelihood strategies, it's essential to consider their gender implications. For example, while CSA can enhance productivity, without targeted support, women may not equally benefit due to limited land ownership and access to inputs. Ensuring women's access to CSA technologies and training is essential.

Migration for livelihood diversification can increase women's workload at home and expose them to risks like gender-based violence. Programs should provide support systems for women left behind and ensure safe migration pathways.

Social protection programs can buffer climate shocks, but if not gender-sensitive, they may exclude women due to barriers like lack of identification documents. Designing inclusive systems that address women's specific needs is vital.

Incorporating GESI considerations into climate-resilient livelihood strategies ensures that interventions are equitable and effective, ultimately leading to more sustainable outcomes for all community members.

Climate & Livelihoods Programmes

This section consists of two parts: (a) an overview of livelihoods and/or climate programmes implemented in the region; and (b) a deep dive into a select number of case studies.

(f) Overview of relevant programmes

The full overview of programmes is annexed to this document. Inclusion of programmes in the annexed overview is dependent on the following criteria:

- Sufficient information about the programme is available online.
- The programme has objectives that are explicitly tied to improving livelihoods, improving climate resilience or adaptive capacity of households, or both.
- The programme directly targets households, local communities, or local businesses.
- The programme was or is implemented in at least one country in the East Africa region.

As a result of these criteria, the annexed list is not comprehensive. Programmes for which insufficient information is available are excluded, as are climate programmes which are not directly aimed at household-level outcomes. For example, reforestation or electrification programmes are not included as they have macro-objectives that are not directly targeted at households or communities. The programmatic overview can be found in Annex 1.

(g) Case studies selection

The objective of the case studies is to delve deeper into specific programmes that are especially relevant to the research questions, to understand the best practices and lessons learned. Case studies are selected based on the following criteria:

- The programme is included in the above overview and therefore meets earlier mentioned criteria.

- The programme contains both livelihoods and climate components.

- The programme is well-documented, ideally with full evaluation reports directly available.
- All case studies jointly represent a diverse set of programmes in terms of type of livelihood and climate activities and approaches.

The case studies selected are Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises (SPARC), Financing Locally Led Climate Action (FLLoCA), and the Climate Adaptation and Resilience (CLARE) programme.

(h) SPARC

Programme overview

The Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises (SPARC) programme is a six-year initiative (2020–2026) funded by the UK Foreign, Commonwealth and Development Office (FCDO). With a budget of approximately **£19.9 million**, the programme is designed to strengthen resilience and climate adaptation across dryland communities in Sub-Saharan Africa and the Middle East. SPARC aims to fill critical evidence and knowledge gaps related to climate resilience, livelihoods, and governance in fragile and conflict-affected contexts, with a particular emphasis on pastoralism and agropastoralism.

The programme is implemented by a consortium led by Cowater International, in partnership with the Overseas Development Institute (ODI), the International Livestock Research Institute (ILRI), and Mercy Corps. These organisations bring together complementary expertise in research, programming, and policy influence. Together, they combine on-the-ground knowledge of livelihood systems with deep technical capacities in climate science, humanitarian response, economic analysis, and conflict-sensitive development.

Core objectives

- Evidence generation: Produce robust, context-specific research that addresses key knowledge gaps in climate resilience and livelihoods in drylands.
- Innovation and testing: Identify and support promising solutions both technological and institutional that enhance adaptation, particularly in fragile and conflict-affected settings.
- Technical assistance and learning: Strengthen the capacity of governments, donors, and implementing partners through technical support, learning events, and policy engagement.
- Policy influence: Translate evidence and insights into policy and programmatic recommendations, working across humanitarian, development, and climate sectors.

A key feature of SPARC is its cross-sectoral and system-oriented approach. Rather than treating climate adaptation, humanitarian response, and development planning as siloed domains, SPARC explicitly aims to bridge these sectors, working at the intersection of climate, conflict, livelihoods, and governance.

Geographic scope

SPARC operates across several countries, including Ethiopia, Kenya, Uganda, and South Sudan, and to a lesser extent, engages with dryland regions in the Middle East. Its geographic scope focuses on areas where climatic shocks such as recurrent drought, prolonged dry spells, and erratic rainfall coincide with

chronic poverty, weak governance, and conflict. These conditions heighten vulnerability and limit traditional humanitarian and development solutions, necessitating new approaches.

Target communities

SPARC targets pastoralist, agropastoralist, and farming communities in drylands, with a focus on low-income, climate-vulnerable, and marginalised populations, including women and youth. The programme's ambition is to not only influence policies and programmes that affect these communities, but also to promote more sustainable and locally appropriate models of development and adaptation. It actively supports the development and scaling of locally led, evidence-based, and gender-responsive climate solutions that reflect the unique socio-ecological dynamics of drylands.

SPARC also commits to an inclusive research agenda. It actively integrates gender equality and social inclusion (GESI) across its portfolio recognising that dryland communities are not homogenous, and that women, girls, youth, persons with disabilities, and marginalised ethnic groups face unique and intersecting forms of vulnerability. Through its GESI approach, SPARC aims to inform more equitable climate interventions and ensure that adaptation strategies are not only effective, but also just.

Lessons learned

- **Reframing Aid and Resilience in Drylands**: SPARC underscores the necessity of transitioning from short-term humanitarian aid to long-term resilience-building strategies in dryland regions. Traditional aid models often fail to address the unique challenges of these areas, which include climate variability, conflict, and marginalization. SPARC advocates for integrated approaches that consider the socio-economic and environmental complexities of drylands.

- **Understanding Land Tenure and Conflict Dynamics**: Secure land tenure is pivotal for the resilience of pastoralist and agropastoralist communities. SPARC's research highlights that land disputes, often exacerbated by unclear tenure systems, can lead to conflicts and hinder adaptation efforts. Addressing land rights and promoting equitable access to resources are essential components of climate adaptation strategies.

- **Supporting Markets and Livelihoods**: Strengthening market systems is essential for enhancing the livelihoods of dryland communities. SPARC emphasizes the importance of improving access to markets, veterinary services, and financial products to support pastoralist economies. By bolstering these systems, communities can better withstand climate shocks and stresses.

- **Working in a Changing Climate**: SPARC's work acknowledges the profound impacts of climate change on dryland regions, including increased frequency of droughts and floods. The programme advocates for the integration of climate risk assessments into planning processes and the development of early warning systems to enhance preparedness and response.

- **Promoting Innovative Solutions**: Innovation is at the heart of SPARC's approach to climate adaptation. The programme supports the development and scaling of context-specific technologies and practices, such as mobile-based information services and climate-resilient agricultural techniques, to empower communities in adapting to changing conditions.

- **Gender Equality and Social Inclusion (GESI)**: SPARC places a strong emphasis on integrating gender equality and social inclusion into climate adaptation efforts. Recognizing that women, youth, and marginalized groups often face disproportionate climate risks, the programme promotes inclusive policies and practices that ensure equitable participation and benefit-sharing in adaptation initiatives.

Recommendations

Based on the available documentation, the SPARC programme does not explicitly list the following recommendations as formal recommendations. However, these points can be inferred from SPARC's research findings and thematic focus areas:

1. **Reframe Risk in Fragile Contexts**: SPARC urges donors and implementers to stop treating conflict-affected areas as "too risky" and instead adopt adaptive, flexible models of programming that allow for meaningful climate adaptation even in volatile environments.

2. **Support Adaptation Across Scales and Actors**: Effective adaptation requires coordinated action from local to national levels. SPARC stresses the need for multi-scalar, multi-actor strategies that engage local **communities**, civil society, and governments together.

3. **Promote Cross-Sector Collaboration**: SPARC highlights the inefficiency of siloed programming. It calls for humanitarian, development, and climate actors to align goals, funding, and strategies to improve impact and coherence in adaptation efforts.

4. **Shift from Short-Term Aid to Long-Term Resilience**: Humanitarian aid alone cannot build resilience. SPARC recommends investing in sustainable livelihoods, infrastructure, and local systems, especially in dryland areas where shocks are recurrent.

5. **Back Locally Led and Traditional Systems**: SPARC underscores the value of local knowledge and calls for direct funding and recognition of community-based and indigenous adaptation strategies.

6. **Secure Land Tenure**: SPARC identifies land insecurity as both a driver of conflict and a barrier to adaptation. Strengthening land rights enables communities to invest in climate-smart practices and avoid land-based tensions.

7. **Expand Market Access**: By improving roads, digital services, and financial infrastructure, SPARC argues that pastoralists and farmers can better monetise their labour and invest in resilience strategies.

8. **Ensure Gender and Social Inclusion**: Climate programming must account for the specific vulnerabilities of women, youth, and marginalised groups. SPARC calls for tailored, inclusive approaches that remove structural barriers to adaptation.

9. **Plan for Uncertainty**: SPARC urges implementers to use climate scenarios in programme design and adopt flexible funding structures, enabling responses to adjust as risks evolve.

(i) FFLoCA

Programme Overview

The **Financing Locally Led Climate Action (FLLoCA)** programme is a pioneering initiative by the Government of Kenya, launched in 2021, and expected to end in 2026. It aims to strengthen climate resilience at the grassroots level by empowering county governments and local communities to plan, implement, and monitor climate actions. The programme is supported by multiple development

partners, including the World Bank, the governments of Denmark, the Netherlands, Sweden, and Germany (through KfW), with a total funding envelope of approximately **USD 295 million** over five years. Ninety percent of programme funding from FLLoCA is meant to be spent at county and community levels to ensure that support for climate resilience reaches those most at risk, including women, youth, persons with disabilities, elders, and other traditionally marginalized groups. Delivering 100% climate co-benefits, this programme supports partnerships between local governments and their citizens to assess climate risks and identify socially inclusive solutions tailored to local needs.[105]

FLLoCA represents the first national-scale model of devolved climate finance, integrating both **Investment Project Financing (IPF)** and **Program-for-Results (PforR)** modalities. This hybrid approach ensures that funds are directly channelled to county governments based on performance metrics, promoting accountability and effectiveness in climate action.[106]

Core Objectives

- **Deliver Locally Led Climate Resilience Actions**: Empower communities to identify and implement climate adaptation and mitigation projects that address their unique vulnerabilities.
- **Strengthen Institutional Capacities**: Enhance the ability of national and county governments to manage climate risks through improved planning, budgeting, and implementation frameworks.
- **Promote Inclusive Participation**: Ensure that marginalized groups, including women, youth, and persons with disabilities, are actively involved in climate decision-making processes.
- **Enhance Transparency and Accountability**: Establish robust monitoring, reporting, and verification systems to track climate finance flows and project outcomes.

Key Components

- **Policy, Legal, and Regulatory Frameworks**: Support the development and enforcement of policies that facilitate climate action at both national and county levels.
- **Capacity Building**: Provide training and resources to government officials and community members to effectively plan and execute climate initiatives.
- **Climate Finance**: Mobilize and manage funds for climate projects, ensuring efficient allocation and utilization at the local level.
- **Community-Led Actions**: Encourage grassroots initiatives by providing grants and technical support for locally identified climate solutions.
- **Technology and Innovation**: Promote the adoption of climate-smart technologies and innovative practices to enhance resilience.
- **Monitoring, Reporting, and Verification (MRV)**: Implement systems to track progress, measure impact, and ensure accountability in climate actions.

Geographic Scope

FLLoCA is operational across 45 counties in Kenya, with a focus on rural and peri-urban areas that are most vulnerable to climate change impacts. The programme emphasizes participatory planning at the ward level, ensuring that local communities have a direct say in climate action priorities.[107]

Target Communities

The FLLoCA programme is designed to strengthen climate resilience in Kenya by shifting resources, decision-making power, and technical capacity to local governments and communities. Its model focuses on **empowering institutions closest to affected populations** primarily county governments and ward-level committees to plan, budget, and implement climate actions that reflect local priorities.

FFLoCA's **direct beneficiaries** are **institutional actors** at the sub-national level, including:

- **County governments**, which receive conditional grants to integrate climate resilience into their development planning and budgets. Counties are supported to establish Climate Change Units and allocate at least 1.5% of their development budgets to climate-related actions.
- **Ward Climate Change Planning Committees** (WCCPCs) and **County Climate Change Planning Committees** (CCCPCs), which are multi-stakeholder platforms that include community representatives. These committees are responsible for identifying and prioritising locally relevant climate actions.
- **Local government staff and service providers**, who benefit from technical assistance and capacity-building under the programme's institutional strengthening component.

The **indirect beneficiaries** are **local populations** in climate-vulnerable areas, especially:

- **Women**, **youth**, **persons with disabilities**, and **marginalised groups**, who are explicitly included in participatory planning processes and targeted in community-level investments.
- **Households and communities in arid and semi-arid lands** (ASALs) and other regions facing climate risks, who benefit from investments in infrastructure, natural resource management, and livelihood support.

While FLLoCA funds are not transferred directly to households, the programme mandates socially inclusive planning and gender-responsive implementation to ensure that the benefits of resilience-building reach the most affected populations. This targeting structure reflects FFLoCA's broader aim: to institutionalise locally led climate action through Kenya's devolved governance system, ensuring that communities have both a voice in planning and that resources reach the local level where impacts are most felt.

Lessons Learned

- **Devolution Enhances Effectiveness**: Empowering local governments leads to more context-specific and responsive climate actions.
- **Inclusive Participation is Essential**: Engaging diverse community members ensures that climate solutions are equitable and sustainable.
- **Capacity Building is Fundamental**: Continuous training and support are essential for the successful implementation of climate projects.
- **Robust Monitoring, Reporting, and Verification (MRV) Systems Improve Accountability**: Transparent tracking of funds and outcomes builds trust among stakeholders and donors.

Challenges

- **Capacity Constraints at County and Community Levels**: Many counties face limitations in technical expertise and institutional frameworks necessary for effective climate action planning and implementation. This includes challenges in developing clear objectives, aligning budgets with interventions, and focusing on livelihood impacts. [108]

- **Weak Coordination Mechanisms**: There is often inadequate horizontal coordination among key institutions at both national and county levels, as well as weak vertical coordination between national, county, and sub-county levels. This fragmentation hampers cohesive climate action strategies.[109]

- **Financing Gaps and Limitations**: While FLLoCA aims to channel funds to county and community levels, there remains a significant financing gap that limits Kenya's ability to undertake locally led resilience actions. Subnational governments often allocate less than 2% of their budgets to climate-related activities, which is insufficient to address the scale of existing challenges.[110]

- **MRV Difficulties**: Establishing robust MRV systems is essential for tracking climate finance flows and project outcomes. However, many counties lack the necessary systems and capacities to effectively monitor and report on climate actions, leading to challenges in transparency and accountability.[111]

Recommendations

Based on the available documentation, the Financing Locally Led Climate Action (FLLoCA) programme does not explicitly state the following as formal recommendations. They were instead developed based on challenges and lessons learned.

1. **Scale Up Successful Models**: Replicate and adapt effective locally led climate action frameworks in other regions and countries.

2. **Strengthen Multi-Level Governance**: Foster collaboration between national, county, and community actors to harmonize climate strategies.

3. **Enhance Financial Mechanisms**: Develop innovative financing tools to sustain and expand climate initiatives at the local level.

4. **Promote Knowledge Sharing**: Facilitate the exchange of best practices and lessons learned to inform future climate actions.

5. **Performance-Based Financing Encourages Accountability**: FLLoCA employs a performance-based financing model, where counties receive funds based on meeting specific climate action milestones. This incentivizes accountability and ensures that resources are utilized effectively.

6. **Integration of Traditional and Scientific Knowledge**: The programme promotes the integration of indigenous knowledge with scientific data to inform adaptive management practices. This approach ensures that adaptation strategies are culturally appropriate and grounded in local realities.

(j) CLARE

Programme overview

The Climate Adaptation and Resilience (CLARE) programme is a flagship international research initiative jointly funded by FCDO and Canada's International Development Research Centre (IDRC). Announced at COP26 in 2021, CLARE is designed to bridge critical gaps between climate science and actionable adaptation strategies, with a strong emphasis on Southern leadership and inclusivity.

With a total budget of approximately £110 million, CLARE supports 24 research projects involving 136 organizations across 38 countries, primarily in Africa and Asia. The programme aims to enable socially inclusive and sustainable action to build resilience to climate change and natural hazards, particularly for the most vulnerable populations. Core objectives

Core objectives

- **Strengthening Resilience**: Enhancing the capacity of vulnerable communities to withstand climate risks and natural hazards.
- **Action-Oriented Research**: Generating practical, needs-driven research that informs effective adaptation solutions.
- **Equity and Inclusion**: Ensuring that adaptation efforts are socially inclusive, addressing the needs of women, youth, Indigenous peoples, and marginalized groups.
- **Evidence-Based Decision-Making**: Promoting the use of robust evidence to inform policies and practices at all levels.
- **Scaling Innovations**: Supporting the uptake and scaling of successful adaptation strategies through partnerships and capacity building.

Geographic scope

CLARE operates in 38 countries across Africa and the Asia-Pacific, focusing on regions most vulnerable to climate change impacts. The programme supports a diverse range of projects tailored to local contexts, ensuring that research and interventions are relevant and effective. In East Africa, it covers Kenya, Uganda, Tanzania, and Rwanda and in the Horn of Africa, it includes Ethiopia, Somalia, and South Sudan.

Target communities

CLARE's primary direct beneficiaries include:

- **Local research institutions and universities** in the Global South, which co-lead research consortia and drive context-specific, action-oriented climate research.
- **Sub-national and national government agencies**, especially those responsible for climate policy, planning, budgeting, and disaster risk management. These agencies receive support to integrate scientific and indigenous knowledge into decision-making processes.
- **Civil society organisations (CSOs) and community-based organisations (CBOs)** that facilitate engagement between research, policy, and local communities.

The indirect beneficiaries of CLARE are the local populations most vulnerable to climate change, such as women, youth, persons with disabilities, Indigenous peoples, and low-income households. These groups are not direct recipients of funds or services, but are the intended end-users of improved systems, policies, and adaptation strategies that CLARE research aims to inform and strengthen.

This systems-based approach reflects CLARE's broader goal: to enable inclusive, evidence-based, and sustainable adaptation by empowering the institutions that serve communities on the frontlines of climate risk.

Lessons learned

- **Co-creation Enhances Relevance and Livelihood Outcomes:** CLARE projects have shown that co-designing research with local stakeholders, including pastoralist communities leads to solutions that are better tailored to livelihood needs. In the *PASSAGE* project, this meant involving pastoralists in the co-production of drought impact data and anticipatory actions linked to access to water and pasture critical to sustaining livestock-based livelihoods.

- **Climate-Induced Livelihood Pressures Must Be Understood Contextually:** In South Asia, the *SUCCESS* project highlighted that rural outmigration in Nepal and Bhutan driven by climate and economic factors leads to the abandonment of farmland and the erosion of rural livelihoods. The programme recognised the importance of integrating social, political, and economic drivers into resilience research.

- **Risk Forecasting for Livelihoods Must Be Sector-Specific:** Projects like PASSAGE emphasised the need for anticipatory action systems that do more than provide general climate data; they must offer decision-support tools for specific livelihood activities such as livestock herding, including pasture forecasts, water access modelling, and mobility mapping.

Challenges

- **Livelihood-Specific Forecasting and Action Remain Underdeveloped:** While early warning systems are improving, many do not yet offer actionable insights at the livelihood level. For instance, few systems provide timely, accurate projections on pasture availability or water shortages essential for pastoralist planning.

- **Rural Livelihood Collapse Through Outmigration:** In Bhutan and Nepal, the SUCCESS project noted that youth migration from climate-affected rural areas is contributing to land abandonment, declining agricultural productivity, and structural loss of traditional livelihoods.

- **Lack of Integration Between Local Livelihood Systems and National Risk Planning:** PASSAGE highlighted that formal anticipatory action plans often exclude customary pastoralist mobility patterns and seasonal livelihood strategies, leading to reduced relevance for the communities they aim to protect.

Recommendations

The following recommendations are not explicitly stated by CLARE but have been inferred from the lessons learned and challenges highlighted across its projects.

1. **Integrate Livelihood Sectors into Climate Services:** Ensure that climate forecasts are made useful for specific livelihood groups such as pastoralists, farmers, and fisherfolk by co-developing services that meet their operational decision-making needs.

2. **Support Locally Embedded Strategies for Livelihood Resilience:** Support community-based institutions and traditional systems that govern natural resource use, especially those supporting climate-sensitive livelihoods like livestock herding or rainfed agriculture.

3. **Design Adaptation with Migration and Employment in Mind:** Programmes should anticipate labour shifts and land use changes by including rural employment, land tenure, and remittances in adaptation frameworks. This approach is especially relevant in areas affected by youth outmigration.

VI. Conclusion

Climate change is accelerating livelihood risks across East Africa, particularly in Kenya and Uganda, where refugee and host populations are disproportionately affected by increasingly severe floods, droughts, and heatwaves. These climate hazards are not only undermining agricultural and pastoralist livelihoods, the dominant sources of income in both countries but also placing additional stress on fragile infrastructure, ecosystems, and social systems. The climate risks outlined in this review are projected to intensify in the coming decades, further eroding the resilience of climate-sensitive livelihoods, especially in displacement-affected areas.

This review underscores that while adaptation is possible, the current pace and scope of climate adaptation remain inadequate. Refugees and host communities continue to rely on agriculture and informal labour in contexts of increasing climate volatility, limited access to land and markets, and weak financial and institutional support. Women, youth, and marginalised groups face additional barriers, as their access to resources, decision-making, and safe migration pathways remains constrained. Although mobility seasonal, cyclical, or cross-border has long been used as a coping mechanism, it is becoming less voluntary and more reactive in the face of climate stress, often compounding existing vulnerabilities.

Despite these challenges, emerging approaches such as anticipatory action, devolved climate finance, and co-designed adaptation planning with affected communities hold promise. Programmes like SPARC, FFLoCA, and CLARE have demonstrated the importance of locally led, inclusive, and flexible interventions that integrate both traditional and scientific knowledge, target livelihoods directly, and build the institutional foundations for sustained resilience. However, these programmes also highlight critical gaps in implementation, coordination, and data particularly in livelihood forecasting, outcome monitoring, and inclusion of informal systems in formal planning frameworks.

Looking ahead, there is a clear need for more robust integration of livelihood systems into climate adaptation programming. This includes developing early warning systems that are tailored to livelihood decision-making, expanding access to financial services and markets for vulnerable populations, and ensuring that policy frameworks explicitly recognise the adaptive role of migration. Field-based research and participatory diagnostics will also be key to designing targeted and scalable interventions. For adaptation to be meaningful in the region's displacement contexts, strategies must be both place-based and portable capable of addressing risks in the settlement as well as along migratory routes and areas of return. Strengthening the links between climate science, policy, and everyday livelihoods will be essential to building durable resilience for communities on the frontlines of climate change.

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