PEACE, PROSPERITY AND
REGIONAL INTEGRATION

Loss and Damage from Climate Change in the IGAD Region

Assessment Report

VULNERABLE POPULATIONS


Farmers


Pastoralists


Fishermen


Rural Communities


Urban Populations


Women

Slow-Onset


Drought


Sea level rise

Rapid-Onset


Floods


Storm surges

Economic Impacts


Supply chain interruption


Infrastructure Damage


Loss of Livelihood


Increase in Public Expenditure on Disaster Risk Management

NELD Impacts


Loss of cultural heritage


Displacement


Loss of Biodiversity


Loss of Human life

APPROACHES


Data Systems


Early Warning


Climate Finance


Local Adaptation

Building Resilience Together

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MEMBER STATES
Djibouti, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda.

EXECUTIVE SUMMARY

This assessment provides a regional synthesis of observed and projected losses and damages (L&D) resulting from climate change impacts across IGAD Member States. It examines both economic and non-economic losses and damages and situates its findings within global and regional policy frameworks under the UNFCCC and the Paris Agreement. The assessment responds to a critical international policy moment marked by the operationalisation of the Fund for Responding to Loss and Damage (FRLD) and increasing expectations for countries and regions to generate robust, credible L&D evidence to access emerging finance and influence future allocation frameworks.

The Intergovernmental Authority on Development (IGAD) region faces escalating climate-related L&D that are systemic, multidimensional, and increasingly transboundary. Country case studies from Djibouti, Ethiopia, Kenya, Somalia, South Sudan and Uganda demonstrate how intensifying slow-onset processes, such as rising temperatures, prolonged droughts, and ecosystem degradation, interact with recurrent rapid-onset hazards, including floods and extreme rainfall, to create compounding risks that exceed local and national adaptation capacities. Communities across the region face recurring drought cycles, catastrophic flooding, climate-induced displacement, and the degradation of ecosystems critical to livelihoods and food security. Documented economic losses include damage to agriculture, pastoral systems, infrastructure, fisheries, and water systems, while non-economic losses encompass displacement, loss of cultural heritage and identity, deterioration of mental health and social cohesion, and erosion of traditional knowledge systems.

These impacts are intensifying with global warming and are disproportionately concentrated among specific populations due to structural vulnerabilities, including high poverty levels, gender inequity, protracted conflict, fragile governance systems, and constrained institutional capacity. The assessment highlights the inherently regional nature of L&D in the IGAD region, with transboundary impacts observed across shared river basins, migratory pastoral corridors, ecosystems, and patterns of cross-border displacement and mobility. These dynamics complicate climate risk prediction, disaster response, and recovery efforts and underscore the limitations of fragmented, country-by-country approaches to addressing L&D.

While climate policies and adaptation strategies across IGAD Member States have improved, implementation remains uneven, and explicit L&D governance frameworks are limited or absent. Persistent data gaps, particularly on non-economic losses and residual risks beyond adaptation, constrain evidence-based planning and significantly hinder access to emerging international finance, including the FRLD. At the same time, climate-related losses are growing faster than available adaptation, humanitarian, and disaster response financing, exposing a widening gap between needs and resources and reinforcing the urgency of dedicated L&D finance. Addressing these challenges requires coordinated regional arrangements that embed climate risk governance within broader peacebuilding, development, and disaster risk management agendas.

IGAD's institutional architecture provides a strong foundation for collective action, leveraging the mandates and technical capacities of the IGAD Secretariat and specialised entities, including ICPAC, CEWARN, and ICPALD. A regional approach offers clear comparative advantages by enabling harmonised data systems, coordinated responses to transboundary risks, and stronger collective positioning in global climate finance and policy processes. However, realising this potential will require strengthened financing, interoperable data and information systems, enhanced institutional readiness, and coherent policy instruments that bridge climate adaptation, disaster risk management, and conflict-sensitive development.

Drawing on intergovernmental deliberation and regional priorities, this assessment identifies strategic action areas for IGAD, including:

- Developing a regional Loss and Damage framework aligned with global mechanisms under the UNFCCC and Paris Agreement;
- Scaling up climate services, early warning systems, and anticipatory action through ICPAC to reduce residual risks and unmet losses;
- Enhancing access to climate finance, including fiduciary and institutional readiness for the Fund for Responding to Loss and Damage and complementary financing windows;
- Integrating L&D considerations into conflict-sensitive development planning, peacebuilding, and disaster risk management frameworks;
- Investing in robust, interoperable data systems and methodologies, particularly for non-economic loss and damage assessment;
- Accelerating the integration of quantified L&D risks, including non-economic losses, into Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), and related national planning and budgeting processes to strengthen accountability, climate justice, and access to finance.

Meeting the scale and complexity of Loss and Damage in the IGAD region requires a shift from reactive, piecemeal responses toward proactive, coordinated, and justice-centred action. IGAD has a critical role to play in supporting Member States in operationalising regional strategies, strengthening institutional capacity, and elevating the region's collective voice in global climate negotiations. By doing so, IGAD can help ensure that Member States are equipped to access emerging L&D finance, respond effectively to escalating climate impacts, and safeguard lives, livelihoods, and regional stability in a rapidly changing climate.

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ABBREVIATIONS AND ACRONYMS

AF	-	Adaptation Fund (AF)
COP	-	Conference of the Parties
FRLD	-	Funds for Responding to Loss and Damage
GCF	-	Green Climate Fund
IPCC	-	Intergovernmental Panel on Climate Change
L&D	-	Loss and Damage
LDCF	-	Least Developed Countries Fund
NAP	-	National Adaptation Plan
NCQG	-	New Collective Quantified Goal
NDC	-	Nationally Determined Contributions
NDMA	-	National Drought Management Authority
NDRMC	-	National Disaster Risk Management Commission
NELD	-	Non-Economic Loss and Damage
NWP	-	Nairobi Work Programme
PDNA	-	Post Disaster Needs Assessment
SNLD	-	Santiago Network for Loss and Damage
SoDMA	-	Somali Disaster Management Agency
UNFCCC	-	United Nations Framework Convention on Climate Change
WIM	-	Warsaw International Mechanism

1 INTRODUCTION

1.1 OVERVIEW OF LOSS AND DAMAGE IN THE IGAD REGION

Climate change can have negative impacts on income, physical assets, individuals, communities, and the environment and disproportionately affects the least developed and developing countries and marginalised communities such as small-scale farmers and pastoralists. Loss and Damage (L&D) under the UN Framework Convention on Climate Change (UNFCCC) and Paris Agreement seeks to address the economic and non-economic losses and damages associated with climate change impacts due to the slow-onset events and extreme weather events (Wenger & Firm, 2022). Loss and Damage refer to the impacts of climate change on human and natural systems, encompassing both slow-onset and extreme weather events.

Climate change impacts are increasing across the globe, with the Horn of Africa, or IGAD (Intergovernmental Authority on Development) region, among the most affected. The IGAD member states include Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan, and Uganda. The countries are highly susceptible to climate-related hazards such as droughts, floods, desertification, locust invasion and more. The IGAD region faced a multi-year drought that transitioned into flooding, exemplifying compound climate extremes that are driving losses and damages (UNEP, 2022). More broadly, the IPCC 6th Assessment Report points to the widespread and severe L&D to humans, including livelihoods and natural systems, driven by human-induced climate changes, increasing the frequency and/or intensity and/or duration of extreme weather events, including droughts, wildfires, terrestrial and marine heatwaves, cyclones and floods. Climate extremes already surpass the resilience of many ecological and human systems and challenge the adaptation capacities of others, including impacts with irreversible consequences, which lead to losses and damages (IPCC, Calvin et al., 2023).

This assessment report also highlights the impacts of L&D in agri-food systems in the context of state fragility in the IGAD region. At the regional level, political instability and protracted crises are a new norm for humanitarian actors, with new challenges emerging (FAO, 2023). By 2022, close to 1.02 billion people lived in fragile and conflict-affected situations (World Bank, 2022), with the Horn of Africa among the regions affected by both catastrophic climate extremes and fragility. By 2030, fragile countries are projected to host close to 60% of the global poor (Corral et al, 2020) who are mainly dependent on agriculture-based livelihoods for employment, income and food, and are facing stronger multiplier impacts of climate change, which is likely to cascade and compound negative impacts on livelihoods, food security and nutrition (FAO, 2023).

In the Horn of Africa, L&D in the agrifood sector is deeply intertwined with persistent food insecurity, poverty, conflict, and governance challenges. The occurrence of five consecutive failed rainy seasons prior to 2023 stands as a stark illustration of both economic and non-economic losses suffered by pastoral and agro-pastoral communities due to prolonged drought (Global Report on Food Crises, 2023).

Agro-pastoral crop production was severely impacted, and drought caused the death of around 13.2 million livestock across the region, losses that will take years for pastoralist households to recover from. Similarly, 2.7 million people were displaced from their homes due to drought and faced major difficulties re-establishing their livelihoods. In June 2023, the region had 23.5 million people who were experiencing acute food insecurity (IGAD, FAO, and the Regional Food Security and Nutrition Working Group). A steep rise in acute malnutrition was also noticed, culminating in an estimated 43,000 excess deaths in Somalia alone in 2022 (FAO, 2023). Since 2024 and January 2026, many countries in the IGAD region have continued to face the negative impacts of prolonged droughts, affecting the livelihoods of millions of pastoralists and farmers and creating a humanitarian crisis. In Somalia, failed rainfalls in most of 2024 and most recently in October-December 2025 resulted in over 4.4 million people facing acute food insecurity, increasing displacements and conflict. As of January 2026, 23 out of 47 Counties in Kenya have been classified as facing an acute food crisis due to extreme droughts that have worsened livestock and crop production losses, according to Kenya's National Drought Management Authority (NDMA). In Ethiopia, over 10 million people are facing food insecurity, especially among pastoral communities, with women and children mostly impacted. In South Sudan, over 57% of the population continues to face acute food insecurity, with conflicts and limited adaptive capacities exacerbating the crisis, leading to displacements and creating a humanitarian crisis, according to the IGAD Regional Focus of the 2025 Global Report on Food Crises.

Climate projections for Africa indicate that if temperatures increase by 1.5°C (approximately), warming will result in around 25% of the continent's land area being vulnerable to extreme heat (Schaeffer et al., 2014; Lloyd & Shepherd, 2021). The heatwaves will likely amplify water stress and enlarge desert and dryland swaths by an estimated 4%. Further, warming conditions may accelerate ocean acidification, endangering coral reefs in the ocean and marine ecosystems. That will heavily impact smallholder farmers, pastoralists and artisanal fisherfolk whose agricultural productivity is expected to decline (Schaeffer et al., 2014; Lloyd & Shepherd, 2021), producing a ripple effect on food and nutritional security. This report considers the context of the L&D for the IGAD region, which comes from the baseline that:

- The IGAD region is characterised by arid and semi-arid lands and faces slow-onset and rapid-onset events. It experiences frequent extreme weather events that directly impact agriculture, water resources and biodiversity as the region faces constant food insecurity with severe drought affecting millions in the region. The fragile ecosystem with unpredictable rainfall magnifies the slow onset and extreme climate events in the region. Moreover, the livelihoods of most communities in the region are rainfed agriculture (crop farming) and the pastoral system, which are highly sensitive to climate vulnerability.
- The economic and non-economic costs of L&D in the IGAD region are yet to be established. However, climate change affects and impacts agriculture (crops and livestock), water resources, biodiversity, human population (displacement, mobility, migration, and health), heritage, tourism and the urban informal settlements. There is a need to further develop an understanding of projected climate variability and change, and what it would mean for mixed agricultural systems, as the rangelands may continue to witness invasive woody lots that are not suitable for pastoral livelihood, as farmers face land degradation. Additionally, many

of the member states may suffer non-economic L&D due to climate extremes, including loss of human lives, psychological damage, species extinction, and loss of cultural heritage and Indigenous knowledge, which cannot be directly compensated with money.

- The report is critical to operationalising the IGAD Regional Strategy for Disaster Risk Management (2019-2030) and the IGAD Climate Adaptation Strategy (2023-2030), which have prioritised disaster risk management and climate change adaptation, respectively. This assessment enables the region to make data-driven policy decisions at both the regional and national levels. Moreover, accurate L&D data is vital in mapping vulnerabilities and allowing governments to create policies that improve community resilience, water management, agricultural practices, and infrastructure to withstand future climate impacts, especially related to loss and damage.
- This assessment underscores the region's social and humanitarian concerns. Extreme climate events, both rapid and slow onset, regularly and repeatedly lead to displacement, food crises and loss of livelihood, affecting the marginalised in the IGAD region, with women, girls and children facing the most challenges. The IGAD region also faces climate-driven conflict fragility. The direct dependence of the domestic and livestock sectors on natural resources, rangelands, and critical water sources has fueled conflicts over these vital resources in IGAD countries.
- L&D assessment is critical for international advocacy and climate justice. IGAD recognises climate change as a justice issue, with L&D impacts on communities that contributed the least to it. Currently, the Member States are in debt distress. Climate finance, debt relief, and other forms of international support are feasible and practicable ways of reducing macroeconomic stress in climate-responsive ways.

1.2 Objective and Scope of the Regional Assessment

Overall, the IGAD Regional L&D Assessment contributes to advocacy efforts, strengthens policies aimed at reducing climate-induced L&D in the IGAD region, and formulates a long-term regional implementation plan to provide technical support to member states to address residual impacts of climate-related stressors that cannot be avoided or have not been avoided.

The scope of the research study included:

- A thorough desk review of L&D assessments associated with climate extremes in the IGAD region, including droughts, floods, cyclones, and other climate-induced natural disasters. This includes assessment of both economic and non-economic impacts, as well as climate-related security risks
- Evaluated the current state of institutional capacity of the Member State in addressing climate-induced L&D and identified specific requirements for strengthening this capacity at the institutional and systems levels. Major gaps and barriers that currently exist are highlighted
- Reviewed relevant methodologies and data requirements for assessing L&D associated with the adverse effects of climate change, including those related to climate-induced security risks, as well as lessons learnt and gaps identified at different levels
- Assessment conducted in consultation with relevant key partner regions to gather information on L&D
- Provided policy recommendations for addressing L&D due to climate-related stressors in the IGAD region

2 METHODOLOGY

2.1 CONTEXT

This assessment positions the review in light of the long-term trends and prospective trajectories of climate change in the IGAD region by utilising over 30 years of historical meteorological data, concentrating on factors such as yearly rainfall and temperature patterns. This historical data provides the empirical basis for determining the baseline for climatic variability and extreme weather occurrences in the region. The long-term meteorological data make evident a changing climate in the IGAD region, a pointer that the L&D experience in the region is attributed to climate change. The IPCC 6th Assessment Report (2023) and the Adaptation Gap report (UN Environment Programme, 2022) confirm the exceedance of adaptation limits leading to L&D in the region due to a changing climate in the Horn of Africa with both rapid and slow onset extreme climate events. Temperature increases in Africa exceeded the global average increase over land and ocean combined (UNEP, 2022).

Both mean temperatures and extreme heat events are projected to continue to rise in the region (IPCC, 2021). The inter-annual variability in temperatures throughout the IGAD region points to a sustained increase in mean surface temperatures (Figure 1). Significantly, the mean surface temperatures were higher between 2010 and 2020, with the record highest mean temperature recorded in 2020 (IGAD, 2022). Future projections of precipitation are uncertain (Ayugi et al., 2020), pointing to greater sensitivity to seasonal and regional variation than temperature projections. Furthermore, climate predictions extending to 2080 or the century's conclusion are employed to forecast future changes using models like CMIP5 and downscaled regional climate models.

2.2 Method

This assessment provides a comprehensive review of IGAD member states' Post Disaster Needs Assessment Reports (PDNAs), World Bank country climate risk profiles, African Development Bank (AfDB) climate and economic profiles, peer-reviewed literature, and academic studies, among others. It also considers L&D-relevant information in disaster management strategies, Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), national climate change strategies and sectoral policy documents. Synthetic assessment of L&D across these different sources enables an in-depth, multi-dimensional view of reported climate-related losses and damages, existing institutional frameworks, and the identification of synergies and disjunctures between climate change and disaster policy commitments and reported L&D realities.

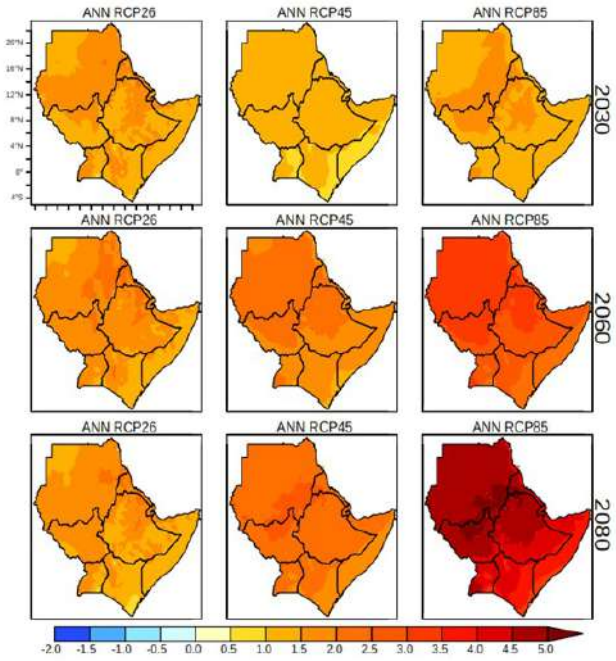

Figure 1: Spatial distribution of projected annual near-surface air temperature change (anomalies) over the IGAD region under RCP2.6, RCP4.5, and RCP8.5 for the 2030s, 2060s, and 2080s. Climate Reports. Source: IGAD-ICPAC, 2022.

Stakeholder consultations with member states' disaster management agencies, including SODMA and NDMA; partner institutions involved in climate change and disaster risk management development partners; and CSOs. The engagement enabled the identification of existing mechanisms, capacities, M&E systems, and challenges in responding to climate change impacts.

The study uniquely incorporates case studies and human-interest stories from communities in IGAD Member States that have been affected by climate-related shocks, including droughts, floods, and displacement, to complement the data-driven analysis. A case study template was provided to partner organisations working with vulnerable communities at the grassroots level to capture the lived realities of climate-related L&D. The outline of the case studies covered existing contexts in the geographical location, including climate hazard impacts such as slow-onset events (droughts, extreme temperatures, water stress, and sea level rise) and rapid-onset events (including floods, wildfires, and cyclones), compounding risks/impacts, and created vulnerabilities/impacts; initiatives to avert, minimise, and address L&D; positive outcomes; support required in the future; and lessons learnt.

Numerical data alone cannot adequately encapsulate the lived human experience of climate change. Human-interest stories provide first-hand accounts of individuals that have suffered climate change-related loss of livestock, crop failures, displacements, destruction of homes, increased gender-based violence, loss of education opportunities for children, and family disintegration, among others. Incorporating personal anecdotes and qualitative narratives, the assessment draws on human experiences and grounded realities to amplify the policy relevance of the findings.

2.3 Methodological Limitations in Assessing L&D

Although climate change-related L&D assessments are becoming increasingly important, especially in climate-vulnerable regions such as the IGAD Member States, significant methodological and operational deficiencies continue to impair their robustness and comprehensiveness. These challenges are discussed below, considering emerging scholarly evidence and regional and national experiences.

2.3.1 Attribution Challenges and Data Gaps Across Sectors

A significant challenge in executing L&D assessments is the difficulty in acquiring sector-specific, directly identifiable data, especially for non-economic losses and damages (NELD). Although meteorological and catastrophic event data are available in diverse formats, establishing a direct correlation between specific

losses (e.g., infrastructure degradation, agricultural decline, health consequences) and climate change remains a methodologically intricate task given the challenge of distinguishing climate change impacts from other socio-economic or environmental stressors.

For example, Kenya's Second National Communication (NC2) and Somalia's NDC 3.0 both highlight the lack of disaggregated, high-resolution data needed to perform a comprehensive L&D assessment. These national reports acknowledge that while climate hazards are intensifying, the attribution of sectoral impacts to climate change is hindered by fragmented monitoring systems and weak institutional data-sharing mechanisms.

Although probabilistic event attribution science has progressed (e.g., James et al., 2019; Mechler et al., 2020; Rüttinger et al., 2024; Engdaw et al., 2024), its implementation in real-time L&D contexts remains constrained, especially in low-income nations that lack reliable climate modelling capabilities and ground-level verification data. Methods to detect and then attribute extreme climate events to human-caused climate change have evolved significantly in the past 15 years. There is now a growing spectrum of attribution approaches emerging from global climate model simulations to machine learning-assisted literature mapping, as well as end-to-end statistical attribution of health and economic impacts.

Most recent advances within the last 5 years have helped move beyond attribution of physical climate hazards to a variety of approaches that identify what portion of the impacts of climate change can be attributed. The foundational work on attribution compared simulations of greenhouse gas (GHG) emissions and other climate forcings with human influences dominating the climate system to show warming since the 1970s. 80% of multidecadal global mean temperature changes were attributable to human activities (Stott et al. 2016; Stott and Christidis 2023). This approach has allowed for subsequent work to geolocate impact studies within grid-cell level attribution of temperature and precipitation trends derived from CMIP6 simulations to identify areas with robust evidence of anthropogenic impacts (Callaghan et al. 2021). Increasingly sophisticated impact attribution approaches have applied statistical models to epidemiological data from 732 cities across 43 countries and used simulations to construct factual and counterfactual climate scenarios to estimate heat-related mortality attributable to human-induced warming (Vicedo-Cabrera et al. 2021).

Some studies have relied on global datasets of damage and loss, such as those recorded in the EMDAT database, where estimates of loss of life, damage costs, and number of lives affected can be plausibly situated in time and space to relate impact to the occurrence and intensity of a specific climate change hazard such as a major drought or flood (Newman and Noy 2023; Panwar 2020). By combining values from attribution studies with disaster loss data, estimates have shown that US$143 billion per year in damages could be attributable to climate change between 2000 and 2019 (Newman and Noy 2023) while others have established annual losses of heat-related mortality exceeding US$100 billion (Carlson et al. 2025). Impact attribution is also important to global discussions on responsibility and potential liability for L&D, as the fraction of attributable impact can now potentially be traced back to companies and countries that have been the fossil fuel majors over the past century and is therefore important to discussions on climate finance and L&D finance specifically.

The current assessment is unable to use these quantitative approaches due to incomplete and inconsistent detection, attribution and impact data on critical loss and damage sectors, including metrics that would cover both economic and non-economic L&D. For example, while CMIP6-based trend attribution indicates detectable anthropogenic warming in parts of East Africa, few impact studies have been conducted in the region (Kimutai et al. 2023; King et al. 2023; Thalheimer 2023; Thalheimer, Otto, and Abele 2021; Thalheimer, Schwarz, and Pretis 2023). Africa is chronically underrepresented in both climate change attribution studies and climate

impact studies (Jézéquel et al. 2024; Kimutai et al. 2023; King et al. 2023; Otto 2023; Otto et al. 2020). However, research and data for L&D assessment in the IGAD region are lacking; thus, extensive investment is necessary to support future L&D assessments and overcome these challenges.

2.3.2 Absence of a Standardized Framework for Non-Economic Loss and Damage (NELD)

Non-economic losses and damages (NELD) are critical climate change-related losses that require concerted efforts to address. These include losses and damages to ecosystems and biodiversity, mental health, indigenous knowledge loss, and displacement. However, there is currently no universally accepted metric or framework to quantify NELD.

This absence substantially impedes the comparability and policy significance of evaluations across sectors and regions. According to several studies (including Serdeczny, 2019; van Schie et al., 2023; and Chautard et al., 2024), as well as corroborated by the UNFCCC Warsaw International Mechanism reports, the methodological invisibility of NELD results in underreporting and inadequate representation in national adaptation and disaster risk frameworks. In the absence of a precise and consistent methodology to define and quantify these losses, they remain anecdotal, despite their profound emotional impact and social significance.

The disparity is most pronounced in IGAD nations, where social and cultural frameworks are intricately connected to livelihoods, identity, and ecological integrity that are affected by climate change, particularly concerning migration and displacement; nonetheless, these elements frequently remain excluded from accounting methodologies.

3 INTERNATIONAL AND REGIONAL ENABLING POLICIES AND FRAMEWORKS

To avoid confusion between the assessment of losses and damages from the impacts of climate change and the geopolitical process of negotiation on the global response to loss and damages, the IPCC separated the two ideas. This has not been the approach of this report, and international and regional enabling policies and frameworks for L&D that are focused on this section are integrated with the impact concept.

The L&D legal and institutional framework is emergent. The L&D institutional ecosystem is also a complex and evolving concept at the intersection of legal, political, scientific and ethical debates. Though not formally defined under the UNFCCC or the Paris Agreement, due in part to challenges in attributing specific impacts to climate change and the politically sensitive issue of liability and compensation, L&D is a topical issue that requires both legal and institutional responses from local to global scales. This assessment is also cognisant of the many countries that remain cautious about the legal interpretations which may carry responsibility for historical emissions (Wenger & Firm, 2022).

The L&D legal and institutional framework extends beyond the UNFCCC to also encompass the institutional space of international organisations and frameworks addressing L&D components such as adaptation, disaster risk reduction, sustainable development, migration and displacement, and climate risk financing (Wenger, 2022; Appadoo, 2021). Climate change effects intensify longer and more extreme periods of drought, storms, and floods that disproportionately affect climate-vulnerable and socially excluded regions in Africa, Asia, Small Island Developing States (SIDS), and Least Developed Countries (LDCs), undermining economies, livelihoods, human rights, and cultural heritage. L&D are emerging as a pillar in climate action, reflecting the residual impact of climate change despite mitigation and adaptation efforts because of extreme events and slow onset processes (Appadoo, 2021).

The historical and institutional evolution of L&D has a long history that stretches back to 1991 with the proposal by the Alliance of Small Island States (AOSIS) to the international insurance pool to support vulnerable coastal nations. Even those initial efforts were not widely recognised. The 2007 (CoP13) in Bali formally referenced L&D in the Bali Action Plan, rooting for strategies to address climate-related L&D in vulnerable countries. This was followed by the 2010 (CoP16) Subsidiary Body for Implementation (SBI) work programme to assess L&D approaches and enhance international cooperation.

Additionally, CoP19 (2013) created the Warsaw International Mechanism for L&D (WIM) to enhance knowledge,

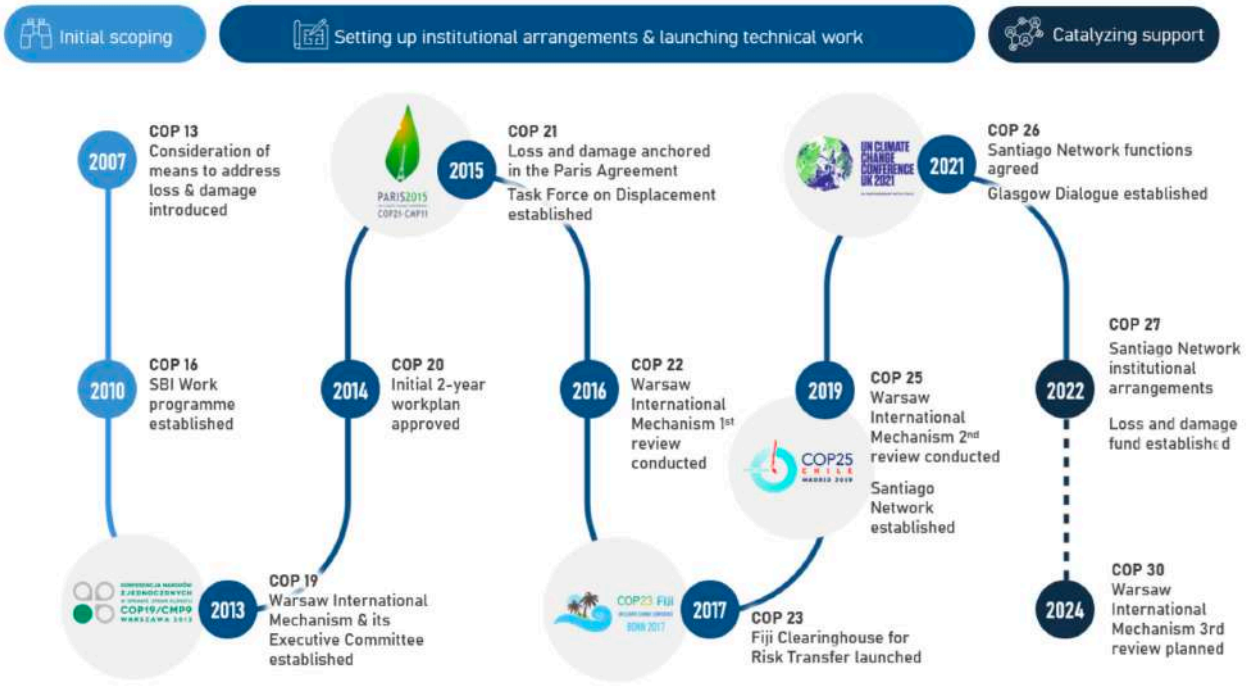

Figure 2: The journey of L&D institutional framework. Source: UNFCCC, 2024

coordination, and support (Appadoo, 2021). The IPCC 5th Assessment Report (2014) raised the profile of L&D on the UNFCCC agenda, raising concerns as irreversible climate impacts were increasingly likely. The technical work of UNFCCC increasingly probes methodologies to analyse L&D in the wider climate governance framework. The diagram above illustrates a path of the development of the L&D institutional framework. To date, L&D is anchored within the international frameworks through policy direction, financing mechanisms and the definition of technical support, as shown below.

3.1 Warsaw International Mechanism for Loss and Damage (WIM)

The Conference of Parties (CoP19) (UNFCCC, 2015) in Warsaw, Poland, in 2013, established the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (Loss and Damage Mechanism), to address L&D associated with impacts of climate change, including extreme events and slow onset events, in developing countries vulnerable to the adverse effects of climate change. This was the first dedicated international mechanism for the UNFCCC to address L&D with the main tasks to:

- Enhance knowledge and understanding of comprehensive risk management approaches to address L&D associated with the adverse effects of climate change, including slow-onset impacts
- Strengthen dialogue, coordination, and synergies among relevant stakeholders.
- Enhancing action and support, including finance, technology, and capacity building, to address L&D
- To achieve these goals, WIM engages in activities including facilitating support of actions addressing L&D, coordinating L&D, convening meetings, synthesis and review of information, technical guidance and policy support.

The Warsaw International Mechanism Executive Committee (ExCom) is tasked to guide the implementation of

the functions of the WIM, and during CoP21 the ExCom established the following:

- The Fiji Clearing House for Risk Transfer is a platform/repository on insurance and risk transfer, facilitating efforts of parties to develop and implement comprehensive risk management strategies.
- A task force on displacement tasked with recommending integrated approaches to avert, minimise and address human displacement. A recent mandate was to partner with the Adaptation Committee (AC) and Least Developed Countries Expert Groups (LEG).

Also, working to deliver its mandate, the ExCom established the following expert groups to make recommendations on WIM:

- Expert group on slow-onset events
- Expert group on non-economic losses
- Expert group on comprehensive risk management
- Task Force on human mobility/displacement
- Expert group on action and support.

The ExCom also invited interested parties to establish National L&D Contact Points/Focal Points for L&D to enhance the implementation of approaches to address L&D at the national level. On this end, IGAD CAEP (hosted under ICPAC) collaborates with the member states and focal points to build technical capacity on L&D.

3.2 The Paris Agreement (2015)

Article 8 of the Paris Agreement and Decision 1/CP.21 (UNFCCC, 2015) formally recognises the importance of averting, minimising, and addressing L&D associated with the adverse effects of climate change and the role of sustainable development in reducing the risk of L&D. Article 7.5 of the Paris Agreement emphasises that adaptation should be integrated into socio-economic and environmental policies, reinforcing its relevance to L&D planning and response. Moreover, the Paris Agreement decided to continue the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts. The Paris Agreement identified the following actions and support for L&D: early warning systems; emergency preparedness; slow onset events; events that may involve irreversible and permanent L&D; comprehensive risk assessment and management; risk insurance facilities, climate risk pooling and other insurance solutions; non-economic losses; resilience of communities, livelihoods and ecosystems. Along this line, IGAD CAEP (hosted under ICPAC), collaborates with member states to undertake a comprehensive understanding and assessment of the L&D. Member States generate the post-disaster needs assessment (PDNA) that is critical in informing the L&D assessment.

3.3 Santiago Network for Loss and Damage (SNLD)

The Santiago Network was established at COP25 in 2019 to operationalise WIM and improve technical support to countries affected by L&D. With the goal of catalytic technical assistance for the implementation of relevant approaches for averting, minimising and addressing L&D in developing countries, SNLD is tasked to deliver on the following functions: contribute to the implementation of WIM; identify and catalyse demand-driven technical assistance; enhance collaboration, coordination and coherence by actors, including networks and experts, on technical assistance to developing countries; enhance the development and access of knowledge and information; and enhance access and support for L&D, including finance, technology and capacity building in and outside UNFCCC.

In addition, the SNLD technical assistance on L&D also covers measures including risk assessment and analysis, early warning system risk insurance and adaptation and DRR. These goals align with the IGAD mandate to provide technical assistance to member states in addressing L&D.

The Glasgow Dialogue, established at COP26 and scheduled to run through 2024, aims to engage relevant organisations and stakeholders in exploring funding arrangements to avert, minimise, and address L&D, efforts that closely align with the mandate of the Santiago Network on Loss and Damage (SNDL) to catalyse technical assistance for developing countries.

3.4 Other Institutional Frameworks Relevant to L&D

Efforts to address L&D intersect with disaster risk reduction, humanitarian assistance, migration and displacement, and sustainable development. These include:

3.4.1 Sendai Framework for Disaster Risk Reduction (2015–2030)

Adopted in 2015, the Sendai Framework provides an international strategy for disaster risk reduction (DRR) (UNISDR, 2015) and is closely related to L&D in terms of managing climate risks. The Sendai framework aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries over the next 15 years. Although the Sendai Framework is not a climate-specific framework, it supports measures aiming to mitigate L&D impact by reducing disaster risk and improving readiness.

The Sendai Framework includes a set of targets and thirty-eight quantitative indicators to measure progress in the reduction of disaster risk and losses, both nationwide and locally. The indicators aim to measure the reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries.

3.4.2 UN Office for Disaster Risk Reduction (UNDRR)

This is the UN system's lead agency on disaster risk reduction (DRR), responsible for coordinating implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030. It supports countries in strengthening institutional capacity for preparedness and resilience. The key coordination mechanisms under UNDRR are the Senior Leadership Group on DRR and Resilience and the UNDRR focal point.

3.4.3 Sustainable Development Goals and L&D

The 2030 Agenda for Sustainable Development offers a non-binding policy framework to eliminate poverty, reduce inequality, and safeguard the planet. It was adopted in 2015 along with the Paris Agreement. It is a soft law tool, not a legally binding obligation. Even though the two domains of climate and development have important connections, the SDGs in L&D have been under-investigated. Under the UN Department of Economic and Social Affairs (UNDESA) Division for Sustainable Development Goals (DSDG), for instance, it is facilitating SDG implementation, including SDG 13: Climate Action, which specifically references the UNFCCC and the Sendai Framework on Disaster Risk Reduction. Migration and displacement are increasingly fuelled by climate change, leading to global frameworks as well as institutional responses. Both migration and displacement are clearly listed under the L&D through the assessment of the NELD and the economic L&D. Some of the international platforms for combating migration and displacement may be:

- The UN High Commissioner for Refugees (UNHCR), in their Global Compact on Refugees (2018), advocates for collective responsibility and robust approaches to displacement, one also incorporating climate-related factors.
- International Organization for Migration (IOM) – via the IOM, the Global Compact for Safe, Orderly and Regular Migration (2018) was co-developed. The Compact includes a special address to displacement associated with natural disasters and climate change, with a focus on better data and analysis.
- Platform on Disaster Displacement (PDD), which evolved from the Nansen Initiative, this state-led platform advances protection for cross-border displacement linked to climate and disasters, filling policy gaps not addressed by the Refugee Convention.

Other Key Institutions Supporting L&D Response include the Food and Agriculture Organization (FAO) through its support for L&D in agriculture; the UN Environment Programme (UNEP) which supports vulnerability assessments, early warning systems, and risk monitoring; World Food Programme (WFP) that utilizes early warning systems to trigger anticipatory action and insurance payouts, supporting climate-resilient food systems for vulnerable communities; the UN Office for the Coordination of Humanitarian Affairs (OCHA) tackling humanitarian needs related to crises; the Convention on Biological Diversity (CBD) that addressed restoration and compensation for biodiversity loss through the Kunming-Montreal Global Biodiversity Framework; and the UN Convention on the Law of the Sea (UNCLOS) for addressing L&D due to the climate impacts on marine ecosystems, ocean boundaries, and sea-level rise.

3.5 L&D and its Linkages with Adaptation

The limits of adaptation are points at which climate impact overcomes adaptation actions. These impacts that result in, for example, changes in mortality and morbidity due to the impacts of climate change cause L&D. There are many factors that can initiate or worsen adaptation limits: environmental tipping points, technological constraints, financial limitations, and institutional weaknesses, as well as socio-economic conditions such as cultural norms and low levels of social preparedness, which may impede adaptive efforts (Wenger, 2020). Due to the confluence of adaptation and L&D, the following institutional arrangements under UNFCCC are pertinent to L&D:

- Adaptation Committee (AC): Created at COP17, the AC promotes enhanced adaptation action and serves as a central coordination body. It synthesises and disseminates knowledge, best practices, and technical guidance through its expert groups.
- Least Developed Countries Expert Group (LEG): Formed in 2001, the LEG supports LDCs in formulating and implementing National Adaptation Programmes of Action (NAPAs) and National Adaptation Plans (NAPs). It also assists in accessing climate finance through the Green Climate Fund (GCF).
- Nairobi Work Programme (NWP): Functions as a knowledge hub on adaptation, providing resources through the Adaptation Knowledge Portal.
- NAP Process: Supports countries in identifying, integrating, and implementing both short- and long-term adaptation needs into national development planning.

In addition, adaptation-related reporting serves as a critical source of information for L&D assessment and action. This reporting occurs through the National Adaptation Plans (NAPs); the long-term strategies under

Article 4.9 of the Paris Agreement; the adaptation communications; the National Communications under Article 12 of the UNFCCC; and the Nationally Determined Contributions (NDCs) under Article 4.2 of the Paris Agreement.

3.6 International Financing Instruments for L&D

Climate-vulnerable developing countries need consistent and reliable financial support to deal with L&D related to climate change. The International Financing Instruments for Loss and Damage are a promise from countries around the world to provide more funds and resources to help countries that are already experiencing climate effects that can't be avoided through mitigation or adaptation. Additionally, there are other related international financing mechanisms under the UNFCCC and outside that contribute to financing actions on L&D discussed in this section.

3.6.1 COP27 Loss and Damage Fund and Subsequent Progress

Decision -/CP.27 Sharm el-Sheikh Implementation Plan noted with concern, the burden, gravity, scope and frequency of L&D, resulting in devastating economic and non-economic losses, including forced displacement and impacts on cultural heritage, human mobility and the lives and livelihoods of local communities, and emphasised the importance of an adequate and effective response to L&D. Furthermore, CoP27 established a funding arrangement responding to L&D associated with the adverse effects of climate change.

After COP27 established the Loss and Damage Fund, succeeding COPs have made some progress in moving the needle on L&D financing architecture, shifting from political consensus to early operational delivery, albeit financing remains well below the needs of climate-vulnerable countries. At COP28 (Dubai, 2023), Parties established the Fund for Responding to Loss and Damage (FRLD) as a World Bank-hosted Financial Intermediary Fund under the UNFCCC financial system following the adoption of its Governing Instrument. COP28 and subsequent pledges totalled USD 700–730 million, with major contributions from the UAE and Germany (USD 100 million each), the EU and its Member States (over USD 200 million collectively), and the US (USD 17.5 million) and Japan (USD 10 million). While symbolic, this level of capitalisation represents less than 1% of the anticipated annual L&D needs of developing countries, estimated at USD 100–400 billion. The Fund's mandate specifically addresses economic and non-economic losses from severe events and slow-onset processes, focusing on post-impact response, recovery, and reconstruction, while supporting adaptation and risk-reduction finance.

COP29 (Baku, 2024) and COP30 (Belém, 2025) completed the design-to-early-implementation phase. COP29 established the New Collective Quantified Goal (NCQG) for climate finance, aiming to mobilise USD 1.3 trillion annually from public and private sources. However, without a dedicated quantitative sub-target for L&D finance, it competes with mitigation and adaptation within the finance architecture. At COP30, the FRLD was considered operationally ready, and its first funding call under Barbados Implementation Modalities was approved, providing approximately USD 250 million in grant-based resources for 2025-2026. COP30 finished the third review of the Warsaw International Mechanism (WIM), emphasising delivery, non-economic losses, compound hazards, and coordination with the Santiago Network and FRLD. Despite these advancements, Fund pledges remained at barely around USD 730 million by COP30, highlighting a disparity in scale between resources and impacts.

According to the UNFCCC secretariat's 2019 report (Wenger & Firm, 2022), other financing options that are important for L&D are:

- Adaptation Fund (AF) – gives grants to help in adaptation and L&D activities.
- Least Developed Countries Fund (LDCF) – gives grants to Least Developed Countries for projects that help them to adapt to climate change. For L&D, it funds initiatives including climate information service networks, L&D-related components of National Adaptation Programmes of Action (NAPAs) and National Adaptation Plans (NAPs), early warning systems, risk transfer mechanisms, and comprehensive risk management. However, non-economic losses are outside the Fund's mandate.
- The Special Climate Change Fund (SCCF) was set up in 2001 to help developing countries adapt to climate change in specific ways. Some of these are grants, concessional loans, equity investments, and insurance products like weather risk insurance and reinsurance.
- Green Climate Fund (GCF) helps low-emission, climate-resilient development by giving money in the form of grants, loans, guarantees, equity, and results-based payments. GCF also supports L&D projects that involve risk assessments, risk prevention and reduction, early warning systems, and ecosystem-based approaches to adaptation. It has also backed projects like flood mapping, weather index-based insurance, and other tools that help people become less vulnerable and lose less. At COP25, the Parties asked the GCF to keep giving money to activities related to L&D, following its current investment plans and the Executive Committee's (ExCom) five-year workplan.

In addition, the IGAD member states can finance the L&D activities through other bodies and mechanisms outside the UNFCCC through multilateral climate funds relevant for L&D finance, including the International Fund for Agricultural Development's Adaptation for Smallholder Agriculture Programme (IFAD); the Global Climate Change Alliance; and the Pilot Programme for Climate Resilience (PPCR) under the World Bank's Climate Investment Funds (CIFs).

3.7 Regional Frameworks

To address climate-related L&D, both Africa and the IGAD region have developed frameworks and initiatives aimed at addressing L&D. Here are the main regional frameworks and programs that support L&D in Africa and the IGAD region.

3.7.1 African Union's Climate Change and Resilient Development Strategy and Action Plan (2022–2032)

The African Union (AU) started this plan in 2022 to help the continent deal with loss and damage (L&D), build resilience, and adapt to climate change. It gives African Union member states a way to work together to keep their promises about climate change and help communities that are at risk. The third objective of the AU strategy explicitly targets the reduction of L&D caused by climate extremes through capacity building for recovery and supporting risk management of the members. The strategy also targets increased financial flows for L&D through existing international instruments such as GCF. Additionally, the AU calls for the integration of the strategy into national policies and support for the insurance-based risk management programme in Africa.

3.7.2 Africa Risk Capacity

Africa Risk Capacity (ARC) is a specialised African Union agency established in 2012 to provide insurance solutions and risk financing for African governments, enabling them to better manage climate-related disasters. The ARC is like a mutual insurance company for extreme weather events like droughts, floods, and cyclones. The facility in addressing the climate-induced L&D is significant in helping local communities and countries' resilience capacity. Notably, IGAD member states, including Kenya, Ethiopia, and Sudan, are part of the ARC's insurance programmes.

3.7.3 IGAD Regional Strategy for Disaster Risk Management (2019-2030)

The IGAD Regional Strategy for Disaster Risk Management is at the heart of addressing L&D. The strategy is cognisant of the progress by IGAD in disaster risk management, yet the region continues to experience significant social and economic losses due to both natural and human-induced hazards. Also, the strategy concerns the compounded climate variability and change, with the region being exposed to seismic hazards (IGAD, 2021).

As per the strategy, drought alone is estimated to cost the IGAD region approximately 3% of its GDP, while the broader costs of hunger and malnutrition associated with disasters in Africa exceed 10% of GDP. Disasters result from a combination of exposure to hazards and the vulnerability of populations and assets. In addition, hydrometeorological hazards have become more frequent and intense in recent years, making it increasingly difficult for vulnerable communities to prepare for, respond to, and recover from extreme events. IGAD adopted a Regional DRM Strategy in 2004, developed through a consultative process and aligned with the Sendai Framework for Disaster Risk Reduction and the African Union's Programme of Action for DRR. The strategy was technically validated in February 2019 and aims to achieve the Sendai Framework's global outcome of a substantial reduction in disaster risk and losses in lives, livelihoods, health, and the economic, physical, social, cultural, and environmental assets of people, businesses, communities, and countries by 2030.

Through the strategy, the IGAD and its Member States are committed to supporting targeted DRM research, focusing on risk assessment, decision support tools, including L&D assessment methodologies, DRR models and geospatial data analysis, integration of climate change adaptation within the DRM and documentation and dissemination of good practices (IGAD, 2021).

3.7.4 IGAD Climate Adaptation Strategy (2023-2030)

The IGAD Climate Adaptation Strategy is explicit that the region is already experiencing the impacts of climate change-related L&D, which are projected to worsen with rising global temperatures. The strategy reveals that climate-induced impacts are leading to both economic and non-economic effects, including food insecurity, malnutrition, displacement, and the loss of livelihoods due to declining agricultural, livestock, and fisheries productivity. In addition, the strategy perceives climate change-induced L&D as an opportunity to leverage climate finance and for innovative financing. Moreover, the strategy calls for an inclusive and consultative approach involving a wide range of stakeholders, including governments, project developers, local communities, indigenous peoples, refugees, migrants, financial institutions, carbon market actors, and buyers, to collaboratively identify and implement effective solutions (IGAD, 2023).

In line with the need to address L&D, IGAD, together with the African Union, calls for the operationalisation of the Global Goal on Adaptation, early and adequate contributions to FRLD, and the doubling of adaptation

finance by 2026 and beyond. Also, L&D presents an opportunity to channel revenues from the carbon market to support curative and preventive measures. The strategy also recognises the efforts on debt-for-nature and debt-for-climate swaps. As per the strategy, failure to act or adopting fragmented, weak intervention risks increasing exposure, which consequently leads to escalating losses (IGAD Regional Climate Change Strategy and Action Plan (2023-2030), n.d.-b).

3.7.5 IGAD Transhumance Protocol

The IGAD transhumance protocol (IGAD, 2020) supports climate change adaptation through IGAD Member States' free, safe, and orderly cross-border movement of transhumant livestock and herders in search of pasture and water. The protocol is in line with other regional frameworks that are related to L&D, including the Nairobi Declaration on Ending Drought Emergencies (2011); the IGAD Conflict Early Warning and Response Mechanism (2002); the regional climate prediction efforts by ICPAC through GHACOF; the Nairobi Protocol on Small Arms and Light Weapons (2004); and the Protocol on Eradication of Cattle Rustling (2008).

3.7.6 Coordinating Mechanism within the IGAD Member States

IGAD member states have assigned the L&D coordination role to various agencies in line with the Sendai Framework and the Santiago Network's structure under WIM on L&D. Parties assign the role of L&D contact points and other relevant stakeholders at the subnational, national and regional level for the implementation of relevant approaches for averting, minimising and addressing L&D at the local, national and regional level in developing countries that are particularly vulnerable to the adverse effects of climate change (Decision 2/CMA.2, para 43) (UNFCCC, 2020). Under the Santiago Network, the Drought Management organs have the mandate to coordinate to address L&D as illustrated below.

Kenya: National Drought Management Authority (NDMA)

The National Drought Management Authority (NDMA) is a public body established by the National Drought Management Authority (NDMA) Act, 2016. The Act requires coordination of issues related to drought risk and efforts to end drought emergencies in Kenya. It also requires conducting disaster assessments related to climate extremes and slow-onset events.

Ethiopia: National Disaster Risk Management Commission (NDRMC)

The National Disaster Risk Management Commission of Ethiopia is the main federal agency responsible for preventing disasters and coordinating responses to them. The Ministry of Peace runs the NDRMC, which is the main group in charge of reducing disaster risk and managing drought. The NDRMC coordinates the drought response and resilience efforts. NDRMC also coordinates the Sendai Framework Voluntary Commitments (SFVC) online platform that allows stakeholders to inform the public about their work on DRR, which addresses L&D.

Somalia: Somali Disaster Management Agency

Somalia's Disaster Management Agency (SoDMA) is responsible for coordinating disaster response and risk management across the country, which is frequently affected by severe droughts and famine due to limited resources and prolonged conflict. SoDMA provides guidelines in disaster management, environmental conservation, and climate change mitigation and adaptation efforts addressing L&D.

Uganda: Office of the Prime Minister (OPM), Department of Disaster Preparedness and Management

In Uganda, the Department of Disaster Preparedness and Management within the Office of the Prime Minister (OPM) is responsible for managing drought and other climate-related disasters. The department focuses on DRR to strengthen climate resilience in drought-prone regions, livelihood improvement through climate-resilient agriculture to avert and minimise L&D that are climate induced, and providing early warning and climate information to enhance the country's preparedness.

South Sudan: The Ministry of Humanitarian Affairs and Disaster Management (MHADM)

The MHADM is South Sudan's lead agency for humanitarian coordination and disaster management. It makes rules that follow national laws and humanitarian principles to keep internally displaced people (IDPs) and refugees safe. The ministry is in charge of overseeing, coordinating, and keeping an eye on humanitarian operations, disaster risk reduction, early warning systems, and emergency preparedness. It represents South Sudan in humanitarian meetings at the regional and international levels. The strategic plan for 2018–2020 puts policy development, stakeholder coordination, and resource mobilisation at the forefront in order to improve humanitarian response. The ministry works with other groups to strengthen national disaster risk management systems.

Djibouti: Ministry of Environment and Sustainable Development (MESD)

The Ministry of Environment and Sustainable Development (MESD) in Djibouti is in charge of protecting the environment. This includes responding to droughts and addressing L&D from rapid-onset and slow-onset events. The ministry works with partners from other countries to adapt and reduce L&Ds.

4 LOSS AND DAMAGE ACROSS IGAD MEMBER STATES

This section provides a description of observed and projected L&D that is documented in the corpora assessed, including both economic and non-economic L&D. It highlights the scale, drivers, and implications of climate-related impacts, as well as institutional responses in each member state.

4.1 Djibouti

Djibouti is a lower-middle-income developing country that is increasingly vulnerable to the impacts of climate change. Djibouti is situated in the Horn of Africa, a region with a dry to semi-arid climate. It faces extreme heat, droughts, and flash floods. Agriculture and livestock contribute to less than 3% of GDP; however, they are important for food security and livelihoods in rural areas (Djibouti NDC, 2025). Djibouti's economy is largely based on services. Because it is an important international shipping route, port logistics, transportation, and trade make up more than 75% of GDP (AfDB, 2024). But these areas are also vulnerable to climate change, especially from rising sea levels and coastal erosion that damage port infrastructure. Djibouti's population is expected to be just over 1.2 million by 2025, with more than 70% of the population living in cities, especially in the capital, Djibouti City (Djibouti Country Climate and Development Report, 2025). About 17.1% of the people lived below the national poverty line (World Bank, 2023). The 2021 Notre Dame Global Adaptation Initiative (ND-GAIN) index ranks it 171st out of 185 countries, pointing to a low ability to adapt and high exposure to climate change (Gómez Álvaro and Caro Carretero 2024).

4.1.1 Climate trends, impacts and projections

Djibouti has a very hot climate, erratic rainfall, and long dry seasons. It has inland plateaus, low-lying coastal plains, and volcanic highlands. In the summer, the average daily high temperature in coastal areas like Djibouti City is usually over 41°C (Djibouti Country Profile, 2023). In the meantime, the inland and northern parts of Tadjourah and Obock are much drier and hotter during the day (World Bank, 2023). Djibouti has two rainy seasons, from March to May and from September to November. This is because of subtropical anticyclones and monsoonal winds. But the rain is very unpredictable, not evenly spread out, and usually low, with an average of less than 150–200 mm per year. There is always insufficient water, with the amount of available renewable freshwater resources being one of the lowest in the world, at 185 m^3 per person per year (World Bank, 2023).

The average temperature in Djibouti has gone up by about 1.24°C since the 1960s. There are more long-lasting heat waves. Days of extreme heat (≥45°C) have more than trebled in number and are now 15 times more common than in the late 20th century. The average annual air temperature could also go up by 2.2 to 4.0°C by 2100, depending on how much greenhouse gas is released around the world (Djibouti Country Climate and Development Report, 2024). Changes in rainfall patterns have extended dry spells and caused sudden heavy rains. Pastoralists in rural Djibouti have lost their livelihoods to droughts. In 2019 and 2020, flash floods hurt more than 200,000 people in Djibouti City and the area around it (Germanwatch, 2021).

The Djibouti Climate Risk Profile (2023) reports that the temperature in Djibouti will rise by 1°C every twenty years. By 2100, the average temperature will be 32°C. Seasonal variability is likely to get worse because El Niño and La Niña cycles are getting stronger. Months with a lot of rain will get more, and months with little rain will get less. This makes dry places drier and wet places wetter (Dabar et al., 2022).

88% of the population live along the coast, implying that half of all economic activities and a third of all capital assets are at risk of being underwater. Getting salt from Lake Assal is a critical industry that is also in danger. A 1°C rise in temperature could lower GDP per person by 1.5%, making the economy even more vulnerable (Kireyev, 2017). Extreme heat is detrimental to health, especially in rural areas, where it can cause heatstroke and lower productivity at work.

4.1.2 Economic L&D

Droughts are the most common and harmful weather events in Djibouti. They have only gotten worse in recent decades. The drought in 2005–2006 affected more than 28,000 people and resulted in emergency assistance in the northwest, southeast, and central lowlands. The period of intense drought, 2008–2011, killed between 50–70% of livestock, impacted more than 100,000 people and decreased the GDP to around 4% (UNDP Djibouti, 2024). Droughts from 2015 to 2017, followed by El Niño rains led to a lot of water trucking, which caused a scary rise in malnutrition, especially in children (Nicholson et al., 2025). Food prices hiked during the 2019 drought, making it harder for families to afford basic meals (Country Climate and Development Report Djibouti, 2025). The 2022 drought in Djibouti made 122,000 people more food insecure due to high food prices and lost income (Relief Web, 2022). Djibouti experienced devastating food insecurity between 2023 and 2024 as a result of drought, price volatility, and geopolitical conflicts (UNDP Djibouti, 2024).

Both extreme drought and frequent flash floods, the typical conditions of most of the region, are becoming increasingly common and devastating. One such occurrence is a huge flash flood in November 2019 that affected Djibouti City and its nearby land, as three straight days of heavy rain (the equivalent of two years of rain) fell on Djibouti City and surrounding areas. Damages and losses ranging up to US$47 million were incurred, and the floods affected more than 250,000 people (almost 25 % of the national population) and took 11 lives (IFRC Djibouti, 2022). Heavy flooding in 2020 led to massive flash flooding in Djibouti, and its neighbourhood of Balbala, among others, which resulted in the deaths of eight people and the displacement of some 110,000 persons (World Bank, 2024).

The coast of Djibouti and in particular in the vicinity of the city of Djibouti and the Gulf of Tadjourah are threatened more by inundation and erosion (Razack, Jalludin, and Houmed-Gaba, 2019). There are estimates that sea levels could rise by up to 0.69 meters by 2100, a severe danger for the country's biggest economic structure (Razack, Jalludin, and Houmed-Gaba 2019). More than 70% of Djibouti's national revenue is derived from its ports and free trade zones. These regions are particularly vulnerable to storm surges and saltwater

intrusion, leading to costs that could rack up tens of millions of dollars annually for the country. Now boreholes are unusable due to rapidly increasing salinity levels of coastal aquifers. That has increased the price of desalination and water distribution by over 20%. Coral reefs are disintegrating, which is damaging fisheries, and coastal erosion is ruining roads and villages. Razack et al. (2019) estimates suggest that damages from coastal flooding will probably cost more than US$12 million annually in damages without good coastal protection measures by the year 2030.

4.1.3 Non-Economic L&D

4.1.3.1 Loss of human lives

Djibouti has suffered climate-induced droughts, causing massive loss of human life, often unrecorded (Moghalu 2015). The 2005–2006 and 2008–2011 droughts saw the collapse of pastoralist livelihoods, with up to 70% livestock loss and rising death rates among children and pregnant women due to dehydration, malnutrition, and untreated infections (Aden, 2014). The drought from 2015 to 2017, which was caused by El Niño, made the problems of child mortality and maternal health even worse (Othering & Belonging Institute, 2025). The drought from 2020 to 2023 affected more than 200,000 people, and many of them died from hunger and disease, especially in remote areas. The dry spell also left more than 80,000 people in dire need of humanitarian aid (Bayu & Sunjo, 2023).

Flash floods are getting more deadly because of bad drainage and lots of people living in low-lying areas. Cyclone Sagar killed two people and forced more than 3,150 people to leave their homes in May 2018 (Das 2022). Floods killed 10 people in April 2019, most of them in informal settlements (Kassegn and Endris, 2021). The floods in November 2019 killed 13 people, and the floods in April 2020 killed 8 people and caused disease outbreaks (Kassegn and Endris 2021). Even though there have been no official reports of deaths caused by rising sea levels, they are becoming more dangerous to people in Djibouti City and along the coast because of storm surges, erosion, and saltwater entering freshwater sources.

4.1.3.2 Migration and displacement

Long-lasting droughts in Djibouti have led to internal migration within the country, especially in nomadic pastoral communities (Kalipeni and Oppong 1998). Droughts from 2005 to 2006 and from 2008 to 2011 led to pasture failures and livestock deaths that uprooted whole communities and led to long-term settlement in peri-urban areas (Dabar et al. 2022). The 2015–2017 drought, which was made worse by El Niño, forced people to leave their homes in the central and northern regions (Green et al., 2019). The Horn of Africa's drought from 2020 to 2023 affected more than 200,000 people and caused a mass exodus from Obock and Dikhil (Barton 2022). Al Sharjabi et al. (2024) report that in 2023–2024, lack of food and water forced another 80,000 people to leave their homes.

Urban flash floods have repeatedly displaced vulnerable populations. Cyclone Sagar (2018) displaced 3,150 people and damaged some important infrastructure (Das 2022). Floods in April and November 2019 displaced thousands of people, particularly those in low-income communities, and killed at least 13 individuals. Floods in 2020 resulted in additional evictions and forced many households to seek temporary refuges (Kassegn and Endris 2021). Flood-related displacement is typically long-term since houses are destroyed and safe places to resettle cannot be identified. The sluggish beginning of displacement in low-lying territories is being exacerbated by sea level rise and coastal erosion as destabilising pressures in locations with visible sea level

rise, such as Tadjourah, Obock, and the coastal Djibouti City (Razack et al. 2019). Families are being forced inward due to the salinisation of freshwater supplies, tidal floods, and the loss of fishing habitat.

4.1.3.3 Loss of biodiversity and ecosystem services

Djibouti's frequent droughts have led to rangelands, forests, and wetland degradation and established long-term biodiversity loss (Aden, 2014). The 2005-2006 and 2008-2011 droughts accelerated soil erosion, removal of native shrubs, mortality of 70% of livestock, and overgrazing and decline of species. In 2015-2017 there was drying of wetlands and the groundwater recharge areas, whilst the 2020-2023 drought, being the worst in decades, devastated plant regeneration, disrupted pollination services, and turned biodiversity hotspots into a shadow of their former glory in Obock and Dikhil (Pandit, Shimada, and Dube 2024). Ecosystem collapse was further exacerbated during the 2023-2024 drought, exhausting seed banks and damaging traditional land-use systems.

Flash floods following drought spells have come with sudden ecological damage. Cyclone Sagar in 2018 uprooted vegetation and removed topsoil, damaging wadis and mangroves in the process. The 2019 floods (April and November) eroded riparian zones and polluted wetlands, killing aquatic species and disrupting water filtration functions (Pandit et al. 2024). The 2020 floods followed with similar devastation, washing waste into the drainage systems of the semiarid region and causing additional destruction to vegetation. As a result, these events have harmed important ecosystem services, such as natural flood buffering, soil fertility, and water regulation, while also cutting off more habitat for plants and animals.

Rising sea levels and warmer waters are hurting Djibouti's coastal ecosystems. Mangroves are at risk of being submerged and salinised, which could make them less useful for fishing and protecting the coast (Razack et al. 2019). The coral reefs near Tadjourah and Maskali are affected by bleaching and acidification, which is detrimental for marine biodiversity and fish stocks. Flooding and urban runoff are damaging seagrass beds and salt marshes, which are otherwise keeping sandstone control and maintaining habitat stability. These changes put the most important ecosystem services at risk, and so far, there is no record of them getting better.

4.1.3.4 Heritage L&D

Long-lasting droughts have made traditional ways of making a living, oral knowledge systems, and social ties much weaker, especially in pastoralist communities. Between 1980 and 1984 and 1998 and 2001, droughts forced thousands of nomadic herders to move. This made it harder for them to pass on their cultural and ecological knowledge from one generation to the next. Droughts that happened after that (2005–2011) killed up to 70% of livestock. This hurt traditional income and animal-raising cultures. In 2015, sacred places like ancestral wells and grazing lands were abandoned. The recent droughts (2020–2024) made clan networks weaker, interrupted rites of passage, and made language-based ecological knowledge less useful.

Urban and peri-urban flash floods have also damaged cultural heritage. Cyclone Sagar (2018) and the floods of April and November 2019 destroyed mosques, burial grounds, and historic community structures in Djibouti City and surrounding areas, threatening both tangible and intangible cultural assets (Cherel et al. 2020). The November 2019 floodwaters destroyed gathering places and forced families to leave their neighbourhoods. This made the informal support networks weaker (Barboni et al. 2022). The floods in 2020 made things even worse for people who had to leave their homes, especially those who were already poor. This caused communities to be less united and broke down traditional support systems (Barboni et al. 2022). In every case,

owning a home and an ancestral object is the least of a cure. Losing them directly hurts the ability of affected communities to keep their cultural identity and to recover from shock as a group.

According to the Djibouti Climate Risk Country Profile (2023), rising sea levels and coastal erosion are damaging the sacred sites, burial grounds, and fishing traditions along Djibouti's coast. Flooding and salinisation are hurting Djibouti City, Tadjourah, and Obock, and traditional fishing and salt harvesting are on the verge of going out of business. This is forcing people to leave coastlines that are important to their culture. Mangrove ecosystems are dying slowly, which hurts biodiversity and cuts off connections to the spiritual and medicinal uses of plants. As coastal areas slowly disappear, songs, stories, and practices related to the sea are lost, which hurts the identity and culture of future generations.

4.1.4 Institutional Arrangements

The Djibouti National Disaster Preparedness Baseline Assessment (2023) reports that Djibouti's institutional frameworks for climate L&D include many important changes and improvements (Djibouti NDPA, 2023). The Djibouti National Disaster Preparedness Baseline Assessment (2023) outlines that Djibouti's institutional frameworks for climate L&D have made a lot of important changes and improvements (Djibouti NDPA, 2023). The Government of Djibouti (GoDJ) has worked with important international groups to deal with climate risks like floods, droughts, and food shortages. Some of these are the SDGs, the SFDRR, and the Paris Agreement. It has formed official national groups to work together on climate action and disaster risk management. These groups include the National Committee for Sustainable Development (CNDD), the Executive Secretariat for Disaster Risk Management (SEGRC), and the National Steering Committee for Climate Change (CNDCC).

Djibouti is also a member of IGAD and the Regional Disaster Management Centre (RDMC). These groups help the region to work better together on issues such as droughts, giving early warnings, and building up skills. Even with these changes, there are still big problems, especially when it comes to getting civil society and NGOs involved in disaster planning and risk management, which they haven't been very good at.

Table 1: Institutions responsible for handling climate change-related L&D

Institution	Functions
Executive Secretariat of Disaster Risk Management (SEGRC)	Leads technical coordination on disaster risk management (DRM), climate change adaptation, and emergency response. Responsible for advising the national committee
National Committee for Sustainable Development (CNDD)	Coordinates sustainable development efforts, including climate change and environmental management policies
National Steering Committee for Climate Change (CNDCC)	Oversees national climate change policies, strategies, and programs. Provides guidance on climate adaptation and mitigation efforts
Intergovernmental Authority on Development (IGAD)	Supports drought monitoring and disaster response in the Horn of Africa, providing early warning systems and regional cooperation on climate risks
Regional Disaster Management Center (RDMC)	Facilitates capacity building and coordination among countries in the region for disaster risk management.
Civil Society Organizations (CSOs) and NGOs	Engage in community-level disaster risk reduction (DRR) and climate adaptation projects, although their roles in formal DRM processes are still developing
Private Sector	Plays an emerging role in supporting disaster preparedness and climate adaptation, but its participation in pre-disaster planning is still under development

4.1.5 Current state of institutional capacity

Djibouti's climate governance is centralised within the Ministry of Environment and Sustainable Development (MESD). It was previously hosted under a broader ministry named the Ministry of Urban Planning, Environment, and Tourism (MUHET), serving as the national focal point for the UNFCCC and the Green Climate Fund until MESD was established as a stand-alone to lead on national climate policy, international reporting, and adaptation and mitigation initiatives. The National Adaptation Program of Action (2006), the revised Nationally Determined Contribution (2021), and the National Environmental Policy are all important strategic documents. They focus on areas like water, agriculture, coastal protection, and energy that are most important.

The National Environment Council encourages coordination between ministries, but the capacity of institutions is still limited because of a lack of technical knowledge, funding, and data systems. There isn't much decentralisation, so regional and local governments don't have enough resources or freedom to adapt to local situations or respond to disasters. UNEP, UNDP, and the AfDB provides monetary and technological support to Djibouti for ecosystem restoration. The coordination between donors and national systems is still lacking.

4.1.6 Gender intersectionality and L&D

Climate-related loss and damage in Djibouti is more likely to affect women and girls because of patriarchal norms and societal limits that make it difficult for females to access resources, move around, and make decisions. Other vulnerabilities, including ethnicity, socioeconomic position, and homelessness, worsen these gendered consequences. Women fetch water, cook, care for children, and look after the elderly in rural Djibouti. Climate change affects their work more seriously and worryingly (Djibouti Climate Risk Country Profile, 2023). When there are shortfalls of water or ongoing droughts, women and girls can travel long distances for water collection. Not only does it affect their health, but the long excursions into areas where water can be found further compromise education, time for self-employment or income generation, and/or recreational leisure.

Increased invisible and gendered labour limits women's ability to engage in productive economic activities, deepening their economic vulnerability, especially in agriculture-dependent areas affected by unpredictable rainfall. Climate change also heightens health risks for women and girls; during droughts, water scarcity compromises hygiene and access to clean water, raising rates of waterborne diseases and malnutrition (Anjum and Aziz 2025). Pregnant women are at risk of maternal mortality due to the extreme climate events, as their ability to care for themselves and seek improved healthcare is limited. In addition, women in Djibouti face limited access to essential health care and reproductive health services owing to the escalating climate change impacts on health.

Climate change-related relocation is seen as gender-based violence (GBV) (UNFPA, 2023). Climate change causes floods and droughts in Djibouti, forcing people to move. This makes camps and temporary shelters full of displaced people. These places have higher rates of gender-based violence, exploitation, and harassment against women and girls. Lack of secure spaces and protection puts them at risk. Women and girls who migrate to cities feel more alone, have fewer work opportunities, and are excluded from social activities. Women cannot control land use and adaptation methods due to restrictive land ownership norms, making climate-related loss and damage harder to resolve (Ones, 2025).

Cross-country box on L&D and gender

Due to social norms, unequal resource access, and exclusion from decision-making, women and girls are more vulnerable to climate shocks than men. These differences affect daily struggles for water, food, and safety under climate impacts. As a consequence, across all IGAD Member States, climate-induced economic and non-economic L&D is not gender-neutral. It is delineated and most acutely experienced along gender and intersectional lines.

In communities affected by drought, women and girls must walk further to get water which exposes them to exhaustion, health risks, and gender-based violence along insecure routes. Such trips cost hours that can be spent on education or income-generating activities, perpetuating poverty and marginalisation. Women bear the costs of children, the elderly, and the sick; unpaid care work is disproportionately performed among their ranks even as they struggle with food and water shortages that undermine their own health and well-being. Pregnant women face heightened risks of maternal mortality when health facilities are damaged or inaccessible. This is particularly documented in South Sudan and Somalia, where maternal mortality rates are among the highest globally. Under conditions of displacement womens vulnerabilities are compounded by overcrowded shelters that lack privacy and protection, increasing risks of sexual exploitation and early marriage.

Economic losses also intersect for women with cultural and social erosion. In pastoralist communities, livestock is sign of identity and social status. Women are often left behind to manage households under severe drought and this breakdown of traditional roles destabilizes social cohesion and increases domestic violence, as documented in Kenya's ASAL counties and Ethiopia's Borena zone. The gendered dimensions of non-economic loss also extend to women who are caretakers of seed selection, food preservation, and herbal medicine. At a time of ecosystem collapse and displacement, when communities are torn apart, these knowledge systems vanish, eroding the resilience for future generations.

4.2 Ethiopia

Ethiopia is a least developed country, the most populous in the IGAD region, as well as the second largest country on the continent (World Bank, 2025), with a population of 126.5 million. Most of these populations live below the international poverty line with a per capita income of $1,020. The Ethiopian economy is heavily reliant on its agricultural sector. In recent years, the sector has generated approximately 75% of the country's foreign currency from exports, employed approximately 65% of the working population, and contributed approximately 35% of the country's GDP. Due to its over-dependence on rain-fed agriculture, Ethiopia is highly vulnerable to climate change-related hazards, such as droughts and floods (Federal Democratic Republic of Ethiopia 2021). After several shocks, the economy is regaining normalcy as of 2025 and heading towards macroeconomic stabilization following the pandemic and the war in Northern Ethiopia. Every primary macroeconomic indicator is trending upward. Real GDP growth was 8.1% in 2024 and is expected to be 6.4% in 2025. Industry grew 9.2%, followed by services (7.7%) and agriculture (7%).

4.2.1 Climate trends, impacts and projections

Ethiopia`s climate is described by variable temperature and rainfall, with rising temperatures and fluctuating rainfall trends. Due to altitudinal differences, climate varies significantly between highlands and lowlands, with cooler temperatures ranging from 16 to 22°C experienced in the western, eastern and rift valley highlands. The

western and eastern lowlands experience hot and humid climates, with average temperatures of 27°C (Elzopy et al., 2021). The highlands, including central and western parts of Ethiopia receives average annual rainfall ranging between 1000 to 2,200 mm, while lowlands, including eastern, southern and northeastern receives average annual rainfall ranging between 200 to 800 mm (Mohammed et al., 2018). Ethiopia`s rainfall pattern is greatly influenced by the Inter-Tropical Convergence Zone (ITCZ) besides other minor factors including Indian Ocean Dipole (IOD), ENSO (El Niño–Southern Oscillation), Tropical Cyclones in the Indian Ocean and the Highland Topography which increases rainfall through topographic lifting (Degefu, Rowell, and Bewket 2017).

Globally, Ethiopia is ranked 22nd among countries vulnerable to climate change and least ready to build resilience. Thirteen out of the 30 droughts that occurred during the past six decades in Ethiopia were experienced throughout the country (Mulualem et al. 2024). The most severe drought, spanning 2020 to 2023, was described by five failed rainy seasons in southern and south-eastern Ethiopia (UN OCHA, 2024). These droughts are often experienced in the eastern and southern parts of Ethiopia, such as Afar, Somali and Oromia, while flooding frequently affects the Gambella region. UNFCCC projections indicate a potential temperature rise of 1.5 to 5.1°C across the country by 2090 (UNFCCC, 2024). Currently, the frequency of drought occurrence has increased to once every 2 to 3 years compared to the past, when drought occurred once every 10 years.

Projections points towards a warming future with highly variable rainfall across Ethiopia (Table 2).

Table 2: Summary of Ethiopian changing climate

Year	Temperature	Rainfall	Extreme events
1960-2006	An increase of 1.3°C in temperature, with increased hot days and nights and reduced cold days and nights	High variability was recorded across seasons, years and decades.	Severe floods and droughts occurred regularly with no evidence of change in the frequency and severity of extreme events.
2020s	Temperature increased by 0.7 to 2.3 °C	Rainfall increased by 0.4%	South and South-east experience higher rainfall from October to December.
2050s	Temperature is projected to increase by 1.4 to 2.9°C	Rainfall is expected to increase by 1.1%	There are huge uncertainties due to heavy rainfall and uncertain El Niño behaviours.
2090s	Predictions indicate temperature will rise by 1.5 to 5.1°C	Wetter conditions are expected	Heavy floods and severe drought events are predicted to occur due to increased heat waves and high evaporative demand.

Source: (Ethiopia Climate Risk Assessment Report, 2023; Nega, 2025)

Ethiopia is experiencing high temperatures and erratic rainfall, both of which, according to experts in climate systems, exacerbate the effect of extreme weather events, both today and in the future. This warming will remain significant under multiple climate scenarios; the projected temperatures will rise to 25.5°C (SSP2-4.5), 27°C (SSP3-7.0), and 28.5°C (SSP5-8.5) by 2100 as mentioned in future projections. Higher heatwaves and droughts will lead to crop failure, lower yields, food insecurity, displacement, resource-based conflict, and biodiversity loss. Precipitation figures remain extremely uncertain and tend to be more and more erratic. Small increases are projected by low emission scenarios (SSP1-2.6 and SSP2-4.5), while high-emission scenarios (SSP3-7.0 and SSP5-8.5) may see up to 1300 mm/year by 2100. It's projected that different regions

will receive more rain in the southwest and southeast while the north will see decreasing precipitation. But higher temperatures can offset rainfall gains through increased evapotranspiration, making water scarcity, ecosystem degradation, and agricultural stress worse. Flooding-rich areas where extreme rains occur can seriously damage wetlands and ecosystem services.

4.2.2 Economic L&D

Ethiopia's economy is heavily dependent on agriculture, a sector highly vulnerable to climate-related risks such as floods and droughts. These hazards reduce crop and livestock productivity by intensifying land degradation, disrupting rainfall patterns, increasing pests and diseases, and fuelling climate-induced conflicts. Other sectors frequently affected by droughts and floods include water resources, energy (particularly hydropower), transport and infrastructure, forestry and ecosystems, education, health, and tourism.

Floods, despite often being overshadowed by droughts, have occurred with increased frequency and intensity due to climate variability, causing serious economic losses and reversing significant developmental gains in Ethiopia. Agriculture, health, education, transport and infrastructure, and public health sectors have had severe economic losses from frequent and intense floods that occurred over the last few decades (Edossa, Babel and Das Gupta 2010). Over the past several years, flooding hit the Afar region, destroying crop fields, housing and roads and disrupting transport and service delivery. Contaminated water sources also meant serious public health issues and livestock losses that cost tens of millions of USD. And in 2006, flash floods in Dire Dawa, caused by heavy rains in the highlands, resulted in over USD 14.9 million in damages, which included USD 10.23 million to housing and USD 2.6 million in recovery costs for agriculture, trade and industry (Tadesse & Jayawardena, 2014).

The heavy Belg and Kiremt rains received in 2016 led to flooding in Oromia, SNNP and Tigray regions, causing the death of over 1,000 livestock and the destruction of hundreds of hectares of crop lands (Mamo, Berhanu, and Melesse 2019). Overall economic losses and damages incurred, including damages to infrastructure such as roads, water systems and irrigation canals, was estimated at tens of millions of dollars. Likewise, the flood-ridden Ethiopian lowlands had the worst impacts of the 2018 East African floods for some areas (Afar, Somali and SNNP) (Legese and Gumi 2020). Flooding impacted 165,000 people, obliterating farmland, homes and essential infrastructure. The irrigation system, bridges and roads were torn as a result of destruction, disrupting transport and basic services, including the closure of schools.

It is estimated that agriculture, accommodation, and public services have resulted in losses of between USD 50–100 million. More than 1 million people were displaced by floods in 2020 brought on by heavy rains in the Somali, Afar, SNNP and Amhara regions. Some 33,000 hectares of cropland were destroyed, thousands of livestock were slaughtered or killed, and vital infrastructure (such as health, roads and electricity) was shattered. Schools and hospitals were submerged or converted into shelters. Recovery costs reported by the UN as high as USD 48 million (UN OCHA, 2020). Ethiopia has been periodically hit by major droughts that have resulted in large economic losses while undermining the country's development. The 2002–2003 drought, which was characterised by the failure of Belg and Meher rains, affected 13 million people, contributing to the need for food assistance that exceeds USD 400 million (Dercon 2005).

The El Niño-driven drought of 2015–2016, one of Ethiopia's worst, affected 10.2 million people and claimed an estimated USD 2 billion when livestock were lost. GDP growth contracted by 2.5%, due to the drought. The global recovery effort received USD 100 million from the World Bank's PSNP and USD 700 million from

the Ethiopian government. During period 2020–2022, Ethiopia suffered from a drought that impacted over 22 million Ethiopians, 4 million livestock and contributed to a 70% decrease in crop production. Ethiopia had the highest proportion (estimated USD 1.5 billion) in livestock losses in the region. The crisis worsened food insecurity, loss of income, interfered with services, and led some areas, such as Somali and Afar, to the brink of economic ruin (Kassa, 2022).

According to the World Bank, climate change is projected to result in greater frequency and intensity of floods and droughts in Ethiopia. Heavy rainfall results in deterioration of ecosystems, loss of biodiversity, loss of water, and resource-focused conflict during extended periods of drought. The increasing temperatures exert additional pressures on agricultural productivity. Ethiopia's heavy dependence on climate-sensitive sectors, along with poverty and conflict, increases susceptibility to climate-related losses. Such rising threats underscore the pressing need for early warning systems and resilience investments in climate-ready infrastructure to protect economic development in Ethiopia (Ethiopia Climate Risk Country Profile, 2021).

4.2.3 Non-Economic L&D

Unlike the economic impacts, non-economic climate-related losses and damages, including loss of human lives, migration and displacement, destruction of cultural heritage and social cohesion and loss of ecosystem services and biodiversity, are often unaccounted for or underreported.

4.2.3.1 Loss of human lives

Flood events have continuously resulted in loss of human lives across Ethiopia. Despite the weak disaster tracking system not capturing exact numbers, the 1994 and 1996 Awash Basin floods caused several human deaths among farmers and herders in rural lowlands of eastern Ethiopia. In 2006, torrential rains resulted in bursting banks and overflowing of various rivers, including Awash, Omo and Baro-Akobo, resulting to the loss of over 600 people nationally and 200 lives in Dire Dawa where floods engulfed settled areas overnight. The heavy rains received in Oromia and SNNP regions in 2018 caused 72 human deaths, while the 2020 floods killed over 64 people. In the case of the 2023 El Niño-induced floods, 40 deaths had occurred from floods in the Somali and Afar regions (World Bank, 2023).

Droughts in Ethiopia have already claimed many lives with many of the losses being caused by malnutrition, starvation, and diseases. In the 2015–2016 El Niño drought, for example, 1.7 million children were acutely malnourished, and 435,000 severely affected. The 2020–2023 drought, compounded by conflict, led to an estimated 540,000 deaths in northern Ethiopia, particularly Tigray and Amhara.

4.2.3.2 Migration and displacement

Floods continue to cause significant displacement and migration, worsening the humanitarian situation in Ethiopia (AfDB, 2007). For example, the 2018 floods forced mass evacuation of over 150,000 people from low-lying farming areas to the highlands. Furthermore, the 2020 floods affected 1,017,854 people and resulted in forced displacement of over 292,863 people in severely affected regions, including Oromia, Somali, Afar and Amhara (UN OCHA, 2020). A worse situation was recorded during the 2023 floods, where over 600,000 were displaced from their homes into temporary shelters.

Droughts have resulted in the migration of people all over the country (FAO, 2000). During the drought of 2011, more people moved from rural areas to cities, which led to the growth of informal settlements in cities like Dire Dawa, Addis Ababa, and Awash (UNHCR, 2011). More than 280,000 people were forced to leave their homes, and women and girls were more likely to be victims of gender-based violence in the camps and on the way to the camps (USAID, 2016). The 2020–2023 drought forced 613,000 people into IDP camps, mostly in Oromia, Somali, and Tigray (Ethiopia Humanitarian Needs Overview, 2024).

4.2.3.3 Heritage L&D

Frequent and intense floods have eroded social and cultural institutions, crumbling social cohesion among communities in Ethiopia. Various historic buildings, such as harari and the social meeting sites, such as iddirs and ekubs were submerged by the 2006 Dire Dawa floods. The 2006 and the 2018 floods destroyed farming systems important for cultural practices such as Dassenech and Hamer in South Omo (Addaney and Gbomagba 2025). Similarly, the 2020 floods destroyed the clan-based ceremonial systems for traditional storage of harvests. The 2023 floods recently submerged traditional places for ceremonies, circumcision, and storytelling in Oromia and Somali, making it harder for people to pass on traditional knowledge to younger generations.

Drought events have historically exerted traditional and cultural influences in Ethiopia (Addaney and Gbomagba 2025). The deaths of livestock during the 1999-2000 droughts weakened the cultural identity of pastoral communities in the Borana and Afar regions that was tied to their wealth. During the 2011 drought, people couldn't get to sacred grazing and ritual spaces very often. This made it harder for communities to share resources and clans to settle disputes. The 2015-2016 drought worsened the already disintegrated traditional systems such as iddirs and ekubs in drought-affected areas. Traditional migratory routes, particularly in Oromia and Somali regions, were disrupted by climate-related conflicts during the 2020-2023 drought. The breakdown of established cultural and social groups undermines resilience to the impacts of climate change.

Both Ethiopia's cultural heritage and traditional knowledge systems are particularly impacted by climate change, particularly among the people of rural and pastoralist communities. In the longer term, with the recent droughts causing pastoralism to break down in areas including Oromia and Somali, traditional lifeways are failing (Assen et al. 2024a). Climate change has disrupted the staple livelihoods of traditional migratory livestock due to climate change, with resource shortages, forced migration, and loss of cultural identity as a result. The failure of these systems has weakened transmission through generations and oral traditions, eroded generational knowledge, and reduced the power of oral traditions, and oral culture. Displacement brought about by climate change disrupts families, social cohesion, and community resilience. Women, important to household stability and cultural continuity, bear their burdens disproportionately—60% of rural women report greater responsibilities and limited role in cultural and economic activities.

For instance, the Konso cultural landscape, covering 2337.81 km2 in Konso zone is a UNESCO World Heritage Site described by distinctive dry-terrace intensive agriculture, the walled towns and the unique socio-cultural institutions. Its complex terrain, comprising large lowlands in the north and northeast and Rocky Mountains at the centre makes it vulnerable to destruction by climate change hazards such as drought and floods (Assen et al. 2024b). At the Konso cultural site, droughts, rising temperatures, and unpredictable rainfall have impacted the environment, crop productivity, and water availability. People have stopped conducting Tuta (annual thanks to God) and Kara (passing on knowledge) due to the lack of ecosystem services. Climate-induced migration has split up walled town communities, further damaging cultural heritage and identity (Gashure and Wana

2023). Less grass for traditional dwellings means fewer paftas and mora cultural areas. Fewer juniper trees make memorial wakaa and ulahitas harder to create.

4.2.3.4 Loss of biodiversity and ecosystem services

Ethiopia's biodiversity and ecosystem services are under increasing threat from climate change, impacting the national economy. The Awash valley overflooded the common waterways in 1996, submerging the adjacent wetlands. Also, most of the Gambella National Park was submerged by the 2006 Gambella floods, causing displacement of dominant species, including the white-eared kob and the Nile lechwe. Severe erosion caused by the 2018 floods in the SNNP and Oromia region resulted in vegetation degradation and destruction of pollination habitat. Over 21,000 hectares of agricultural fields were waterlogged by the 2020 floods, contaminating freshwater ecosystems and killing fish (Desta et al. 2024). In 2023, floods in Somali and Afar destroyed many wetlands and grazing paths. This led to the cutting down of trees or the building of emergency shelters, thus reducing carbon sequestration capacity (Mabumbo et al. 2024).

The drought period between 1983 and 1985 led to significant deforestation, drying of wetlands, and serious soil erosion. Reports indicate that 97% of wetlands were lost, 76% of grasslands degraded, and 50% of forests destroyed (Ango, Hylander, and Börjeson 2020). The drought that occurred between 1999 and 2000 devastated traditional grazing areas, resulting in overgrazing and desertification, which increased climate vulnerability. The 2011 drought led to the death of many plants and the drying up of water sources such as Lake Haramaya, exacerbating conflicts between people and animals over limited resources. The drought that occurred between 2015 and 2016 led to habitat loss, resulting in reduced effectiveness of pollination, soil fertility, and watershed services, ultimately diminishing the resilience of ecosystems. The extended drought in Borana Zone between 2020 and 2023 severely impacted rangelands, led to a decline in biodiversity, and resulted in the drying of rivers, leaving communities heavily reliant on humanitarian assistance.

4.2.4 Institutional Arrangements

Ethiopia is still working on creating an organisation to deal with climate-related L&D that will focus on improving data management, creating early warning systems, and involving more stakeholders. However, a multi-faceted institution has been established for the implementation of climate change mitigation and adaptation strategies. Climate response efforts in Ethiopia are led by the Environment, Forest, and Climate Change Commission (EFCCC), a National Focal Point to the UNFCCC. The commission is mandated with the coordination of the country's reporting to UNFCCC, the formulation of environmental laws and standards, and the development, coordination and implementation of the sector programmes and plans, such as the CREG strategy. Both the EFCC and the CRGE Facility, comprising the Ministry of Finance and responsible for resource mobilisation and monitoring and evaluation, synergistically implement climate change interventions.

The existing cross-sectoral multidisciplinary institutional arrangement is organised through line ministries with CRGE departments and directorates focusing on climate change policy implementation at the sector level. The activities of the CRGE sectoral directorates are coordinated by the Planning and Development Commission (PDC). The autonomous National Meteorological Agency (NMA), formed in 1980 and domiciled under the Ministry of Water and Energy, is responsible for collection, management and dissemination of meteorological data and provides weather- and climate-related advisories to the government and the general public.

Table 3: Climate change mitigation and adaptation initiatives in Ethiopia

Initiative	Objective	Relevance to climate change related L&D
Key Institutions		
Environment, Forest, and Climate Change Commission (EFCCC)	Established in April 2022 to ensure sustainability in management of the environment and forests and address climate change issues.	Lead agency that oversees climate change mitigation and adaptation. Coordinates implantation of the CRGE.
CRGE Facility	Formed in 2011 to ensure climate financing of actions towards implementation of CRGE.	Responsible for resource mobilization and monitoring and evaluation of climate change mitigation and adaptation strategies, particularly CRGE.
Ministry of Finance (MoF)	MoF ensures financing for climate change strategies and actions.	Mobilizes and manages resource for financing climate change mitigation and adaptation strategies.
National Meteorology Agency	Established in 1980 to collect, coordinate and disseminate meteorological information.	Provides advisory on weather and climate events predictions.
Key policies		
Climate-Resilient Green Economy (CRGE) Strategy 2011	To ensure Ethiopia builds a green economy and achieve middle income status by 2025 and forms basis for Ethiopia`s target of 64% reduction in emissions by 2030.	The policy targets mobilization and coordination of climate financing both locally and internationally including through Green Climate Fund.
Second Growth and Transformation Plan (GTP-II) 2015-2020	Aimed at steering Ethiopia towards attaining it`s 2025 target of becoming middle-income country.	Ensures integration of climate resilience into sectoral development agenda and promote the CRGE.
Perspective Development Plan 2021-2030	Developed to ensure climate mainstreaming into development in various climate change sensitive sectors such as agriculture, water and energy.	Ensures prioritization of sustainable urban development, climate resilient infrastructure and disaster risk reduction through low-carbon emission and enhanced early warning systems.
Ethiopia Nationally Determined Contributions (NDC 3.0)	Build on previous NDCs to address climate vulnerability and set ambitious GHG reduction of 70.3% by 2035	Recognizes that Ethiopia faces irreversible climate impacts beyond adaptation and there is need for support including finance and capacity
National Forest Sector Development Program 2018-2028	Designed to guide coordination of strategic forestry policy interventions and investments for the period 2018-2028.	Supports the efforts of CRGE by promoting sustainable forest management and carbon sequestration.

Source: Author

4.2.5 Current state of institutional capacity

Despite significant evolution in Ethiopia`s institutional framework for handling climate change related L&D, significant gaps persist in cooperation and coordination of efforts, financial and technical capacity. These gaps limit the effectiveness of efforts towards mitigating and adapting to climate change related hazards such as droughts and floods. Although the climate resilience is integrated into climate related strategies such as CRGE and NAP, the lack of a dedicated national L&D framework and coordination mechanism constitutes a significant policy gap. Often, these strategies overlook the NELD, including the loss of human lives, biodiversity, and ecosystem services, as well as the disintegration of the social fabric (UNFCCC, 2024). The weak integration of climate risk governance is evidenced by the scattered responsibilities across ministries of water, urban

development, and energy, where each operates in isolation, leading to duplication or neglect of cross-cutting issues, including climate-related losses and damages. Since most humanitarian efforts focus on the provision of food and shelter, the lack of a national climate fund dedicated to compensation, rehabilitation for IDPS and restoration of ecosystem services further limits the capacity to handle climate-related shocks. The National Meteorological Services (NMS) are underdeveloped and lack the capacity to provide timely, actionable warnings and forecasts, undermining preparedness and the community and government's ability to respond to climate shocks. Ethiopia's NDC 3.0 does not recognise the risks posed by climate change-related losses and damages in isolation but integrates overall adaptation-related aspects of disaster risk reduction and early warning. It further emphasises the need for enhanced climate finance and capacity support.

4.2.6 Gender intersectionality and L&D

Increasingly, research is showing effects of climate change-related hazards on the human population in Ethiopia by limiting agricultural productivity, increasing food insecurity and increasing water scarcity, causing loss of lives and livelihoods. Despite the effects being felt across different socio-economic classes, socio-cultural groups and poverty levels, evidence is emerging indicating that the effects are not gender neutral, with women and children at higher risk than men (Devonald et al. 2024). This is associated with gender-based differences such as time use, limited access to assets and credit, strained access to policy discussions and a lack of gender-sensitive policy change. During drought and flood periods, compared to men, women and girls are at more risk of death and injury, sexual and gender-based violence, as well as increased food insecurity. Water scarcity resulting from drought forces women and girls to spend more time walking long distances to fetch water. On the other hand, men are forced to migrate with livestock to areas with better pasture and close to water sources, potentially destroying family ties. The scramble for the limited grazing fields and scarce water heightens tension among different clans, tribes or communities, often leading to full-blown inter-community conflicts. For example, out of a total of 256 deaths caused by the 2006 floods in Dire Dawa, women suffered the most, with 134 women, 83 men and 39 children deaths recorded (Tadesse & Jayawardena, 2014).

4.3 Kenya

Kenya is a lower-middle-income developing country that is highly vulnerable to the impacts of climate change. The agriculture and livestock sector's direct contribution to GDP was estimated at 21.2% in 2022 (Republic of Kenya, 2025). It employs more than 40% of the total population, with the majority residing in rural areas of the country. The agriculture and livestock sector's direct contribution to GDP was estimated at 21.2% in 2022. The tourism sector is the third most significant contributor to Kenya's GDP, injecting over US$7.7 billion (KSh 1 trillion) in 2023, equivalent to between 8.8% and 10.4% of the country's GDP. Both sectors are vulnerable to climate-related extreme variations in rainfall and temperature. As a result, Kenya ranks 150th out of 185 countries on the 2021 Notre Dame Global Adaptation Initiative (ND-GAIN) index (GAIN 2021). According to the Kenya National Bureau of Statistics (2019), the total population stood at approximately 47 million, with the current 2025 population estimated to exceed 54 million. Over 31.7% of the population lived below the poverty line in 2022 (Kenya National Bureau of Statistics 2022).

4.3.1 Climate trends, impacts and projections

Kenya has a highly variable climate with huge regional temperature and precipitation differences. In most regions, the hot and humid conditions are typical for coastal parts and the more temperate climate of the

interior, especially the highland zones. The northern and northeastern parts of Kenya are predominantly arid and extremely hot (29°C), the central highlands have cooler temperatures (Republic of Kenya, 2013) but slowly dry and arid inland. Much of the country's rainfall is determined by the Inter-Tropical Convergence Zone (ITCZ), which plays a major role in the precipitation structure.

Kenya's temperatures have been increasing since the 1960s, and the minimum and maximum temperatures in the inland communities are increasing. The average yearly mean increase has been 1.0°C, or 0.21°C every 10 years. Rainfall patterns have been highly variable since the 1960s. Drought occurrence used to be an event every decade, but the frequency of droughts has significantly increased since 2000 (Asokan et al. 2025) . Overall temperatures are expected to rise 1.7°C by 2050 and 3.5°C by 2100. The rise in maximum temperatures is projected to result in an increased number of hot days and nights, with the worst implications in a business-as-usual scenario by the end of the century (World Bank 2021).

A rise in temperature has the potential to wreck Kenya's economy, devastating key sectors that are dependent on a stable climate. Heatwaves and droughts caused by climate change are hurting the economy by making agriculture, tourism, and services less productive. If nothing changes Kenya's GDP could drop by 1.25 to 2.4% by 2030 and by 3.61 to 7.25% by 2050 compared to the baseline (World Bank 2023a). Extreme temperatures will stress livestock and lower their quality, reducing meat and milk production in dry and semi-dry areas. This will have an impact on the well-being of citizens.

4.3.2 Economic L&D

Over 3.75 million Kenyans were affected by the 2011 drought, which ruined crop yields (Laibuni 2021). The drought from 2008 to 2011 is thought to have caused Ksh 968.6 billion (about US$12.1 billion) in damage to the economy. This includes KSh. 64.4 billion (US$805.6 million) in damage to physical and durable assets and KSh. 904.1 billion (US$11.3 billion) in lost economic activity across all sectors. The recovery and reconstruction needs stood at KSh. 156.2 billion (approximately US$1.7 billion) and an additional KSh. 184.8 billion (approximately US$2.1 billion) for disaster risk reduction (DRR) requirements (Republic of Kenya, 2012).

The 2008–2011 drought had devastating, multi-sectoral impacts in Kenya, with the livestock sector most affected—suffering KSh. 56.1 billion in damages and KSh. 643.2 billion in losses, severely affecting pastoral livelihoods. The agriculture sector experienced a loss exceeding KSh. 121 billion due to widespread crop failures and a market downturn. More than 500,000 mothers and children required immediate assistance, placing significant pressure on the healthcare system, particularly in arid regions. The overall losses were estimated at KSh. 4.7 billion. In the energy sector, a decrease in hydropower generation led to increased costs associated with thermal power reliance. Water shortages intensified disease outbreaks and conflicts over water resources. The WASH sector experienced losses of KSh. 7.7 billion and KSh. 80.4 billion, respectively. The education sector experienced infrastructure damage and high dropout rates due to food and water insecurity. Environmental deterioration, too, intensified, as ecosystem destruction, loss of wildlife and increasing human-wildlife conflict took hold.

The 2017 drought caused a loss of up to KSh. 20 billion (about USD 200 million) in the agricultural sector. Floods produced serious losses and damage from 2018 across different industries – agricultural, livelihood and infrastructure related – affecting different sectors. The floods filled at least 8,450 acres of agricultural fields, obliterating crops. And 21,000 acres of crops were inundated, yielding losses in billions of shillings. Significant losses to livestock occurred, with more than 6,000 animals dead across the country. Floods hit highways and

many other essential bridges hard. It has been estimated by Kenya Rural Roads Authority (KeRRA) that Sh18 billion was needed for road repairs. A further US$120 million was given for roadwork maintenance.

From 2020 to 2023, Kenya had the most severe drought in four decades, with five consecutive failed rainy seasons—producing the loss of over 13 million livestock and crop failure—along with extreme malnourishment, especially in the region's arid and semi-arid regions, impacting more than 20 million Kenyans with acute food insecurity (Odongo et al. 2025). The drought has brought economic losses of nearly KES 70 billion (USD 650 million), sending GDP growth from 5.8% in 2021 to 4.9%. This recession threw more 300,000 people into poverty (Republic of Kenya, 2025). March-May 2024 floods followed, causing heavy losses and damage in 38 out of the 47 Counties in Kenya. According to the Kenya Floods Recovery Needs Assessment Report 2024, the total estimated damage was KSh 10,102.28 million (approximately US$783.3 million), while total losses were KSh 86,719.29 million (approximately US$679.9 million) (Republic of Kenya 2024).

The effects of higher temperatures on water and food availability bring greater internal migration, particularly from rural to urban areas. Kenya's water shortage index is expected to worsen, potentially decreasing to 293 cubic metres (m^3) per capita by 2050, compared with the internationally recognised threshold of 1,000 m^3 per capita (World Bank 2021). This adds to pressures on urban centres such as Nairobi, Mombasa, and Kisumu, generating extra slums, strains, and a worsening of divisions and disintegration. Higher temperatures are also threatening biodiversity and the natural world with the accelerating extinction of species such as the hirola antelope in Garissa County and the Kenya-Somalia border, and indigenous traditional knowledge of local communities, reliance on traditional calendars for climate prediction, and sacred places such as Ogiek, Maasai, and Kamba (through the drying-up of wetlands, rivers, and changing land use as a result of climate change). Floods, on the other hand, result in damage and destruction of critical infrastructure and increase the cost of disaster recovery. Unchecked climate change has the potential to reduce Kenya's GDP by 7.25% by 2050 (World Bank 2023a).

Table 4: Summary of National Level Damage and Loss Estimates per Sector

	Million KSh		**Million USD**	
Sector	Damage	Loss	Damage	Loss
Housing	5,488.83	693.46	42.53	5.37
Health	709.73	254.85	5.50	1.97
Education	6,308.07	29.84	48.88	0.23
Social Total	12,506.63	978.15	96.91	7.58
Agriculture	34,926.33	84,820.59	270.62	657.22
Productive Total	34,926.33	84,820.59	270.62	657.22
WASH	2,540.85	902.36	19.69	6.99
Transport	22,305.11	-	172.83	-
Infrastructure Total	24,845.96	902.36	192.51	6.99
Environment	28,480.46	-	220.68	-
DRR	342.90	18.19	2.66	0.14
Cross-cutting Total	28,823.36	18.19	223.33	0.14
Grand Total	**10,102.28**	**86,719.29**	**783.37**	**671.93**

Source: (Republic of Kenya 2024)

The productive sector, which includes agriculture, livestock production, and equipment, accounted for 35% of the climate-related damages, followed by the cross-cutting sectors (environment and DRR) with 28% and the infrastructure sector (transport and WASH) with 25% of the total damage.

4.3.3 Non-Economic L&D

Beyond economic L&D, Kenya has experienced climate-related non-economic losses and damages, including loss of human lives, displacement, loss of ecosystem services and biodiversity, destruction and loss of cultural heritage and loss of traditional indigenous knowledge.

4.3.3.1 Loss of human lives

Climate change-related loss of human life often receives less attention than the economic impacts on GDP or infrastructure following severe droughts or floods. However, Kenya's vast arid and semi-arid lands (ASALs) significantly increase the vulnerability of its population to such climate shocks. It is critical to recognise that the human toll is equally, if not more, devastating. Prolonged low rainfall leads to acute water and food shortages, placing already vulnerable communities at extreme risk. Drought disproportionately affects pregnant women, children, and the elderly, resulting in increased mortality. Already under-resourced healthcare services are further strained by malnutrition and waterborne diseases, and many children are experiencing acute starvation, stunted growth, and in severe cases, death.

Kenya is currently experiencing climate-related NELD because of droughts and floods (Ayugi et al. 2020). The 2011 drought impacted more than 3.75 million people in Kenya, inducing displacement, food insecurity, conflict over resources, and a 0.7 to 1.0% GDP reduction. Drought hit 23 counties from 2014 to 2018, leaving 3.4 million people without enough food and 500,000 people without water. Floods in 2018 forced more than 230,000 people to leave their homes, half of them being children. The disaster destroyed 700 schools and ruined 8,500 hectares of farmland. This illustrates the impact of climate-related events on individuals and communities (Republic of Kenya 2025). The prolonged drought from 2020 to 2023 impacted over 20 million people, especially in the ASAL counties, leading to the demise of more than 13 million livestock (Odongo et al. 2025). The floods from March to May 2024 affected 43 of Kenya's 47 counties, killing 315 people and leaving 83 missing. WASH, schools, and transport systems were severely affected by the rise in waterborne disease outbreaks, school dropouts, and loss of access to markets and mobility, especially in rural areas without paved roads (Republic of Kenya 2024).

4.3.3.2 Migration and displacement

Climate change resulted in migration and displacement of people (Ebi and McLeman, 2022; Mishra et al., 2024). In the last few decades, people have been displaced in Kenya because of extreme weather events (Republic of Kenya 2025). The droughts from 2020 to 2023 caused a lot of damage and loss in the Horn of Africa, including Kenya. It was the worst drought in 60 years, and it forced more than 300,000 people to leave their homes. The floods from March to May 2024 affected 412,763 people, including more than 9,300 pregnant women in 42 counties. The Republic of Kenya (2024) reported that the floods forced about 306,000 people out of their homes, which caused a major humanitarian crisis. Displacements and forced migration caused by climate-related problems make tensions and conflicts over important resources like water, pasture, and fuel worse. This puts social unity and peaceful living at risk in both the host community and the surrounding areas. The refugees from Somalia who were hosted at the Dadaab refugee camp in Garissa County, Kenya, often

have tensions with the local host community over massive deforestation of the fragile ecosystem. The refugees use the trees for building semi-permanent shelters and firewood (Kumssa et al. 2014).

4.3.3.3 Heritage L&D

Cultural heritage sites around the world play a vital role in preserving culture and history and boosting the economies of the host countries. However, in the last few decades, climate change has emerged as a significant threat to these critical sites. Climate-related extreme temperatures and sea level rises contribute to damage and loss of both tangible and intangible cultural assets (Sesana et al. 2021).

In Kenya, climate change poses a threat to key historical sites, such as Lamu Old Town, a UNESCO World Heritage Site, through increased coastal flooding and sea level rise (Hoseah 2019). The old town buildings, made of mangrove poles and coral rag, remain threatened by increased storms, saltwater intrusion, and erosion. This significantly impacts the livelihoods of coastal communities and tourism revenues in Kenya through reduced tourist visits. Climate threatens other immovable sites such as Fort Jesus in Mombasa, the Mnarani ruins, a Swahili settlement located on the south bank of Kilifi Creek on Kenya's north coast, the Gede ruins, a twelfth-century Swahili village located deep within the Arabuko Sokoke forest, 16 km south of Malindi, and the Vasco da Gama Pillar in Malindi (Chemeli, Njoroge, and Agufana 2021).

Climate change continues to threaten the sacred sites of local communities, such as the Ogiek, Maasai, and Borana. Extended drought periods result in the drying of key sacred streams and springs in the Mau Forest, affecting the Ogiek communities' ritual practice tied to water sources and ecological stability. The shifting of rainfall patterns and droughts has also rendered the availability of critical medicinal and ritual plants difficult to obtain (Kobei et al. 2025). The Maasai community, which extends to the Tanzania border, has also experienced displacement by the government, exacerbated by climate change, which has pushed communities out of their ancestral spiritual grazing grounds, such as in Loliondo/Ngorongoro, located between the Kenya and Tanzania borders (Millanga 2010).

Climate change has contributed to the erosion of indigenous knowledge that has been practised for centuries by pastoralist communities, such as the Maasai, Samburu, Borana, and Rendille, in weather forecasting (Millanga 2010). Fifty years ago, the elders would observe animal behaviours (e.g., cattle, birds), insects (e.g., ants, butterflies), and plants to gauge rainfall patterns and read stars to forecast precipitation patterns. As rainfall patterns shifted significantly due to climate change, the traditional knowledge has become less accurate.

For those in Kenya's pastoral communities, livestock loss and the waning potential of pastoralist lifestyles become interlinked with economic, social and cultural implications. Drought reduces livestock health and market value, often forcing herders into distress sales. The meaning and nature of cattle as they are far more than resources, their association with spirituality and society is deeply rooted. Pastoralists sometimes hold onto their herds for too long and lose all or a significant number of cattle in the long run instead of selling before long droughts to support their families (Cuni-Sanchez et al. 2019). With livelihoods collapsed for communities, many live sedentary lives close to urban areas, the loss of cultural heritage, ecological knowledge, and added stress on local resources lead to tension due to battles over access to and control of remaining water points or pasturelands.

4.3.3.4 Loss of biodiversity and ecosystem services

As a key factor in providing ecosystem stability and order, biodiversity is critical for ecosystems which, in turn, support strong resilience or adaptability to environmental change. Growing threat from climate change affects ecosystems and biodiversity (Weiskopf et al. 2020) that have ramifications for food security, health, water resources, and overall well-being.

In Kenya for example, adverse climate events namely droughts, floods, sea level rise, and storms damage ecosystems and biodiversity and the communities dependent on these services (Jenkins, Warren, and Price 2021). For the past few decades, Kenya has undergone sustained droughts that have degraded important ecosystems, including the Tana River Basin and the Ewaso Niro Basin, and have impacted pastoral, agro-pastoral, and farming communities and the animals that rely on them. Droughts also continue to threaten Lake Turkana, which borders Kenya and Ethiopia, with a significant risk of drying up, thereby undermining fishing and biodiversity. Droughts also result in forest and rangeland degradation through drying up of rivers and wetlands and reduced healthy biodiversity (including pollinators), leading to a shortage of water, pasture, and carbon sinks (Jenkins et al. 2021).

Sea level rise has exacerbated the salinisation of coastal wetlands and aquifers in Kenya through the inundation of beaches, mangroves, and turtle nesting areas, resulting in the loss of marine and coastal biodiversity. Climate change has led to an increased incidence of erosion, saltwater intrusion into mangroves, and undermined restoration efforts. The combined effects reduce carbon sinks from mangroves and hinder the achievement of Kenya's NDC GHG emission reduction target through mangrove restoration (Kairo et al. 2021).

Climate-related flash Floods result in wetland and riparian damage and loss through increased pollution of freshwater ecosystems, siltation, and soil erosion. The destruction of the ecosystem's stability results in habitat loss and species fragmentation. Upstream flow reduction, land-use changes, and flood management infrastructure have contributed to a decline in biodiversity in Lake Victoria. Climate change risks exacerbating these patterns, undermining Africa's largest freshwater lake (Mamboleo et al. 2025)

4.3.4 Institutional arrangements

Kenya does not have a L&D-specific institutional arrangement, as the concept is new and can currently utilise existing DRR and climate change-related frameworks. Also, the legislative and institutional frameworks on DRR are fragmented with role duplication. The National Disaster Risk Management Policy 2017 is the main Disaster policy for Kenya with the overall objective of substantially reducing natural and human-induced disaster risk and associated losses in social, economic and environmental assets at the National and County levels through the establishment of an integrated multi-hazard DRM approach. The National Disaster Response Plan also exists to guide disaster preparedness and response efforts in Kenya. The DRM policy is aligned with the Sendai Framework for Disaster Risk Reduction (2015-2030) and the Paris Agreement.

In addition to the Kenya DRM policy, several national-level disaster management initiatives are in place. At the County level, there are also devolved disaster management policies.

Kenya's primary institutional basis for combating L&D is based around the Climate Change Act 2016 (revised 2023). Climate Change is mainstreamed in national priorities and monitored as described in the National Climate Change Action Plan (NCCAP) and the National Adaptation Plan (NAP) by the National Climate Change Council (NCCC), chaired by the President. The Ministry of Environment and Climate Change is the

Table 5: National-level disaster management initiatives in Kenya

National Initiative	Objective	Relevance to Climate Change-Related L&D
National Disaster Operations Centre (NDOC)	Established in 1998 to monitor emergencies and disasters, coordinate response efforts, and support disaster risk reduction	Coordinates immediate response to climate-induced disasters such as floods and storms; mobilizes resources and support systems in emergencies
National Disaster Management Unit (NDMU)	Inter-agency unit responsible for leading disaster and emergency management across Kenya	Leads national coordination during climate-triggered emergencies (e.g., landslides, flash floods), improving preparedness and reducing response time
National Drought Management Authority (NDMA)	Established by the NDMA Act of 2016 to coordinate drought risk management and build resilience in arid and semi-arid lands (ASALs)	Directly tackles climate change L&D by implementing drought early warning systems, response coordination, and resilience-building among vulnerable pastoralist communities
National Platform for Disaster Risk Management (NPDRM)	A multi-stakeholder informal platform for inclusive decision-making in disaster risk management	Enables integration of climate change adaptation and loss & damage considerations into national and local disaster risk governance, including community-level participation

Source: Authors

national focal point, while the Climate Change Directorate is the lead agency and Council Secretariat. NEMA also supervises and enforces environmental laws, acts as the National Implementing Entity for the Adaptation Fund, and is accredited to the GCF. The Council of Governors (COG) is responsible for coordinating climate action at the county level and promoting intergovernmental actions.

4.3.5 Current state of institutional capacity

Kenya's Second Nationally Determined Contribution (2031–2035) recognises climate-related L&D as a major threat, particularly to vulnerable groups. Inadequate data, especially on non-economic loss and damage, and limited resources prevent effective disaster risk reduction (DRR) measures from taking place. Comprehensive L&D assessments, monitoring, reporting and verification (MRV), capacity building and enhanced coordination were highlighted by the NDC as components critical to ensuring that climate impacts do not get in the way of Vision 2030 and the Sustainable Development Goals (Republic of Kenya 2025).

4.3.6 Gender intersectionality and L&D

Gender considerably impacts how pastoralists, farmers, and fisherfolk in Kenya experience both economic and non-economic losses related to climate change. The IPCC AR6 WGII report has stated that vulnerable populations (such as women, children, Indigenous Peoples, and the elderly) are most negatively impacted by systemic inequities. In patriarchal rural areas of Northern, Eastern, and Rift Valley Kenya, women and girls bear the brunt of the burden during droughts – carrying water, caregiving, and household work – resulting in household losses in income, education, and rest. Limited access to credit, land, decision-making, and other resources hinders women's ability to recover from climate shocks. Climate change also heightens the health risks faced by girls and pregnant women and exposure to gender-based violence, especially among displaced populations. A transformational approach to L&D needs to be more than gender-sensitive; structural inequality should be confronted head-on and women empowered to play a leading role in the future through equity- and justice-orientated strategies which create long-term resilience.

4.4 Somalia

Somalia continues to experience climate change-related losses and damages resulting from extended droughts and floods. The agriculture, livestock, and infrastructure sectors bear the brunt mainly, with increasing costs in the last few years. Livestock and crop production contribute 75% of Somalia's GDP and are a source of livelihood for more than 65% of the population, especially those living in rural areas (Government of Somalia 2025). It is a least developed country, with 19.6 million people. More than 69% of the population lives below the international poverty line. Somalia has been in a long-running war since 1991. In the last few decades, things have been relatively stable, which has allowed important government institutions to grow. It still relies heavily on agriculture for its economy, especially livestock exports and remittance by Somalis living abroad.

The Heavily Indebted Poor Countries (HIPC) initiative helped it a lot by reducing its debt. In December 2023, Somalia reached the HIPC Completion Point, which meant that its debts were forgiven. The HIPC Initiative's strict economic and governance reforms have helped Somalia's external debt go down from $5.2 billion to $600 million. This shows that the country is committed to long-term economic policies and reducing poverty (Nor 2024).

4.4.1 Climate trends, impacts and projections

Somalia has a dry and semi-arid climate marked by profound seasonal changes. This is because of monsoons, tropical cyclones, and the Indian Ocean and Red Sea's effects at the coast. Somalia's rainfall is low and unpredictable, with significant regional and temporal variation. Precipitation is concentrated in two distinct rainy seasons: "Gu" (April-June) and "Deyr" (October-November). Precipitation significantly differs throughout the country, with the northeast and north experiencing markedly lower amounts than the south and southwest. The annual mean temperature in most parts is around 30°C, while the entire country experiences warm spells between April and June (World Bank, 2025).

4.4.2 Projections of climate-related extreme and, losses and Damages implications

The average annual temperature in Somalia has risen at a rate of around 0.1–0.3°C every decade since the 1950s. The mean annual temperature in the 2010s was 1.1˚C elevated compared to the 1950s. The prevalence and severity of hot extremes have risen, while cold extremes have diminished. Without significant acceleration in global climate action, average temperatures in Somalia are projected to rise by at least 3°C by the century's end (World Bank 2024).

Somalia is projected to incur economic and non-economic losses and damages in the future under the business-as-usual scenario with low investment in adaptation. Climate change may increase direct and indirect economic losses and damage in Somalia. Floods might cause $24–$27 million in direct economic L&D by the 2050s, or up to $1.2 billion if statistical loss of life (SLOL) is included. Drought caused $5.0–$5.4 billion in L&D, or $91.2–$98.8 billion with SLOL during the same period, with non-economic losses not factored in (SPARC 2024). Sectors including agriculture and fisheries will experience reducing yields (maize and sorghum), livestock losses, and increasing food insecurity (Osman et al. 2025).

Increasing temperatures could lead to a decline in fish populations, alter the distribution of species, and elevate the operational expenses for the fishing community. Fishing infrastructure and livelihoods will be increasingly disrupted by droughts and floods (El-Shahat et al. 2021). Sea levels are anticipated to increase by 20-21 cm by 2050, potentially affecting coastal fisheries, aquaculture, and coastal ecosystems, including mangrove forests

and seagrass beds, which serve as vital nursery grounds for fish (World Bank 2023b). The anticipated rise in sea levels endangers the lives of coastal residents, especially in southern Somalia, including Mogadishu, through saltwater intrusion making groundwater unfit for use (El-Shahat et al. 2021).

Climate change is expected to diminish Somalia's water resources and increase the risk of floods and droughts. As a result, flooding could affect over 400,000 people by 2050, and drought could affect 3 million (Ali, Gökçekuş, and Youssef 2023). Pregnant women, the elderly, people with disabilities, and children in Somalia will be more susceptible to water-related diseases such as cholera, malaria, and diarrhoea due to climate-related water insecurity. Malaria and dengue fever spread more due to water scarcity.

Extreme droughts, floods, and heatwaves are expected to be ever more frequent and intense, driving individuals to migrate in search of safe havens. This is expected to prompt internal displacement within Somalia and even cross-border migration (Sax et al. 2024). Higher exposure to heat waves is likely to increase heat-related mortality, especially among already vulnerable populations such as lactating mothers and infants.

Somalia's infrastructure, including transport, energy, water, and education, among others, faces significant risks of losses and damages if the government fails to invest substantially in climate-proofing the infrastructure. Severe heat can soar to 38°C, while flooding has the potential to devastate crucial road networks, interrupt transport systems, and damage water infrastructure. They exacerbate water shortages and power outages, resulting in power cuts, particularly in urban areas (Adelphi 2022).

Severe weather linked to climate change and the looming risk of increased desertification will impact Somalia's cultural heritage (Sesana et al. 2021). The rising temperatures of the coastal waters of Somalia continue to pose a risk to the nation's cultural heritage. This leads to coral bleaching and increased ocean acidification, impacting the livelihoods of local communities (SPARC 2024). Climate-related droughts and disasters threaten traditional knowledge and social cohesion through climate-induced migration and displacements, which disintegrate families, with communities losing ancestral (Abebe, Hassan, and Nunow 2023). Hundreds of thousands of Somali refugees relocated to Kenya and Ethiopia during the 2011 drought in pursuit of essential resources, with some having repatriated to Somalia while a substantial majority continue to reside in foreign nations (Ahmed Dirie, Maamor, and Alam 2024).

4.4.3 Economic L&D

Somalia is one of the top 10 countries in the world that are most vulnerable to climate change (Notre Dame Global Adaptation Initiative, 2022). The country has already suffered losses and damages because of climate change. The vulnerability comes from relying too much on sectors that are vulnerable to climate change, such as livestock and farming, along with political instability, extreme poverty, environmental degradation, and lack of resources to keep vulnerable communities safe from floods and droughts. Climate change is a threat multiplier for Somalia. It makes already bad political and economic conditions worse and makes it harder for the national transformation plan and the sustainable development goals to be realised (Ahmed Dirie et al. 2024).

Six failed rainfall seasons from 2020 to 2023 resulted in livestock losses and crop failures, devastating the livelihoods of millions of people. Extended food insecurity, water shortages, and malnutrition led to displacements. The extended drought impacted more than eight (8) million people, resulting in a humanitarian crisis (Government of Somalia 2025). In 2023, Somalia saw severe flash floods from October to December due to above-average rainfall caused by a strong El Niño and positive Indian Ocean Dipole weather patterns.

The floods affected more than 2.4 million people in 36 districts, killed 188 people, and forced more than 1.2 million people to leave their homes, making the situation even worse.

Table 6: Summary of Climate-related Damages, Losses and Recovery Needs, by Sector (US$)

Sector	Damages (US$)	Losses (US$)	Needs (US$)
Social Sectors			
Housing	7,917,169.00	1,443,695.00	27,048,181.17
Education	18,913,700.00	2,100,000.00	23,057,783.00
Social Sectors Total	26,830,869.00	3,543,695.00	50,105,964.17
Productive Sectors			
Farming and Livestock	38,966,108.61	17,995,472.07	60,018,390.30
Productive Sectors Total	38,966,108.61	17,995,472.07	60,018,390.30
Infrastructure Sectors			
Water and Sanitation	16,366,262.00	16,307,278.00	24,662,057.52
Energy	9,327,571.00	1,953,842.00	14,056,707.00
Transport	29,709,363.45	-	37,399,016.00
Infrastructure Sectors Total	55,403,196.45	18,261,120.00	76,117,780.52
Cross-Cutting Sectors			
Disaster Risk Reduction and Resilience	234,865.00	2,300,180.83	8,572,503.75
Social Protection and Employment/ Livelihoods	-	-	17,102,255.00
Environment and Climate Change	5,151,800.37	7,372,349.57	18,693,675.64
Cross-Cutting Sectors Total	5,386,665.37	9,672,530.40	44,368,434.39
GRAND TOTAL	**126,586,839.43**	**49,472,817.47**	**230,610,569.38**

The productive sector's damages were estimated at US$38.9 million, with losses of over US$17.9 million. The infrastructure sector, comprising transport, water and sanitation and energy, suffered damages of up to US$55.4 million, with losses of over US$18.2 million. Other sectors including disaster response, social protection and employment/livelihoods suffered damage estimated at over US$ 5.3 million and losses of over US$ 9.6 million. Direct damage to the key sectors totalled over US$126.6 million, with losses reaching US$49.5 million. The recovery costs that the Government of Somalia needed to deal with the devastating floods' impact are estimated at US$230 million (Federal Government of Somalia 2023).

Somalia's GDP growth decreased to 2.4% in 2022, down from 3.3% in the prior year. Droughts and floods in Somalia resulted in significant economic losses, with damages to the agriculture and livestock sectors estimated at US$2.84 billion, accounting for 4.5% of these sectors' GDP. By the 2050s, without a substantial enhancement in climate-resilient socioeconomic development initiatives, the total direct economic L&D from floods and droughts may reach between $5 billion and $100 billion (SPARC 2024).

4.4.4 Non-Economic L&D

Somalia has also been experiencing non-economic losses and damage. These are challenging to quantify because they have no established market value. They have lasting value, yet valuing them is difficult because they are intangible. Culture affects community trust and cohesion, making NELD implementation difficult in Somalia. These social capital characteristics are useful during climate change-related floods and droughts. Losing livestock is significant in Somali culture. When a herder loses several camels due to bad weather, it affects their finances, reputation, security, and mental health. NELD in Somalia destroys life, mental and emotional health, ecosystem services and biodiversity, cultural heritage and indigenous knowledge, the social fabric and results to displacement and migration.

4.4.4.1 Loss of human lives

The 2011 drought and famine resulted in a devastating loss of over 260,000 people, of these being children under five years old. In 2019, flash floods and heavy rains affected 570,000 people, most of whom were in Beletweyne town in Central Somalia. The floods killed more than 20 people. The 2020-2023 drought impacted 8 million people across Somalia and led to the death of over 43,000 people, with nearly half of them being children, according to UNICEF.

4.4.4.2 Migration and displacement

Climate change-related forced migration and displacement are considered non-economic loss and damage (Chandra et al. 2023). Displacement is a huge non-economic loss since it compels people to leave their homes, communities, and environments, potentially increasing socioeconomic and environmental vulnerabilities. The 2011 drought displaced over 1.3 million people internally and forced close to 300,000 to migrate to neighbouring countries, Ethiopia and Kenya, in search of food and shelter. Additionally, over 1 million people were displaced by the 2023 extended drought, which impacted nearly half the Somali population. Migration and displacement exacerbate resource-based over access and control of land, water and pasture between the host and migrant communities, undermining social cohesion.

4.4.4.3 Heritage L&D

Indigenous knowledge systems and cultural practices are closely linked to the natural environment. Floods, droughts, storms and heatwaves caused by climate change adversely affect the natural environment that is the main vehicle for the preservation of community culture, identity and sense of belonging (Daiyan 2023). Displacement of communities due to climate impacts, damage to cultural sites as a result of extreme weather, and the disruption of traditional practices seriously undermine communities' social cohesion and cultural identity. Furthermore, the reliability of traditional knowledge systems like weather prediction is reduced in the context of a changing climate. The disintegration of the social fabric through recurring losses or forced migration exacerbates future vulnerabilities, deteriorates development gains, and redirects available community resources and capacities.

Somalia's culture includes oral traditions, social practices, performing arts, movable and immovable property, and traditional knowledge. Movable heritage includes antiques, crafts, and antiquities. But immovable heritage consists of ancient towns and religious buildings, which are typical of the architecture and a historical feature of the region. There are orally handed-down Somali stories and poetry identities. Social behaviour is affected

by custom and tradition. A lot of the cultural vibrancy in the country comes to life in music and dance. Sufi traditions are also practised, especially in rural areas. Skills of traditional methods, from craftsmanship up to ability, illustrate Somali inventiveness.

Specific cultural sites are Laas Geel Cave Paintings, Qalat Ruins, Ruins of Gondershe, and the like. All these sites throw light on Somali culture and history. Intangible cultural heritage includes Somali poetry, Dhaanto dance, camel raising, music, culinary traditions including Somali Bariis (rice), textile production, marine expertise, and Sufi religious activities. The table below assesses tangible and intangible heritages and possible loss and harm based on global climate change implications.

Table 7: World Heritage sites in Somalia

Category	Heritage	Description	Potential Loss/Damage due to Climate Change
Tangible Cultural Heritage	Laas Geel Cave Paintings (Laas Geel, 2025)	Among the oldest and best-preserved rock art in Africa, depicting ancient pastoralist life	Increased risk of erosion and weathering from changing weather patterns and potential for damage due to increased rainfall or extreme weather events
	The Ruins of Gondershe (General Information Including Landmarks, Government and for Koyama, 2014.)	Known for its strategic importance and architecture from the medieval Ajuran period	Susceptibility to coastal erosion and sea-level rise, threatening the integrity of these coastal ruins
	The Forts of Merca (Merca I Archiqoo, 2025)	Representing the colonial era and local resistance in the southern Lower Shebelle province of Somalia. During the Middle Ages, the area was one of several prominent administrative centres of the Ajuran Sultanate	Risk of deterioration due to increased humidity, salinity, and potential flooding
	The Berbera Coast (United Nations Human Settlements Programme 2007)	Known for its historical buildings and rich maritime history	Coastal erosion, sea-level rise, and increased salinity potentially affect structural integrity
Intangible Cultural Heritage	Somali Poetry and Oral Literature (William Johnson 2006) and Dhaanto Dance	Includes poetry, storytelling, and proverbs integral to Somali culture. A traditional Somali dance performed at social gatherings	Loss of cultural continuity and displacement of communities might lead to the erosion of these oral traditions. Cultural practices may diminish as communities face climate-induced challenges and potential displacement
	Camel Raising and Nomadic Pastoralism	Reflects the deep connection with the land and animals	Altered weather patterns and reduced water availability could severely impact pastoralist lifestyles and livelihoods
	Traditional Somali Maritime Skills (Geshekter, 1993)	Involving boat building and navigation techniques	Changes in sea conditions and fish populations could impact traditional maritime practices
	Sufi Religious Practices and Ceremonies (Nyamwaya 2014)	Associated with various Sufi orders in Somalia	Environmental stresses and community displacement could affect the practice and transmission of these religious ceremonies

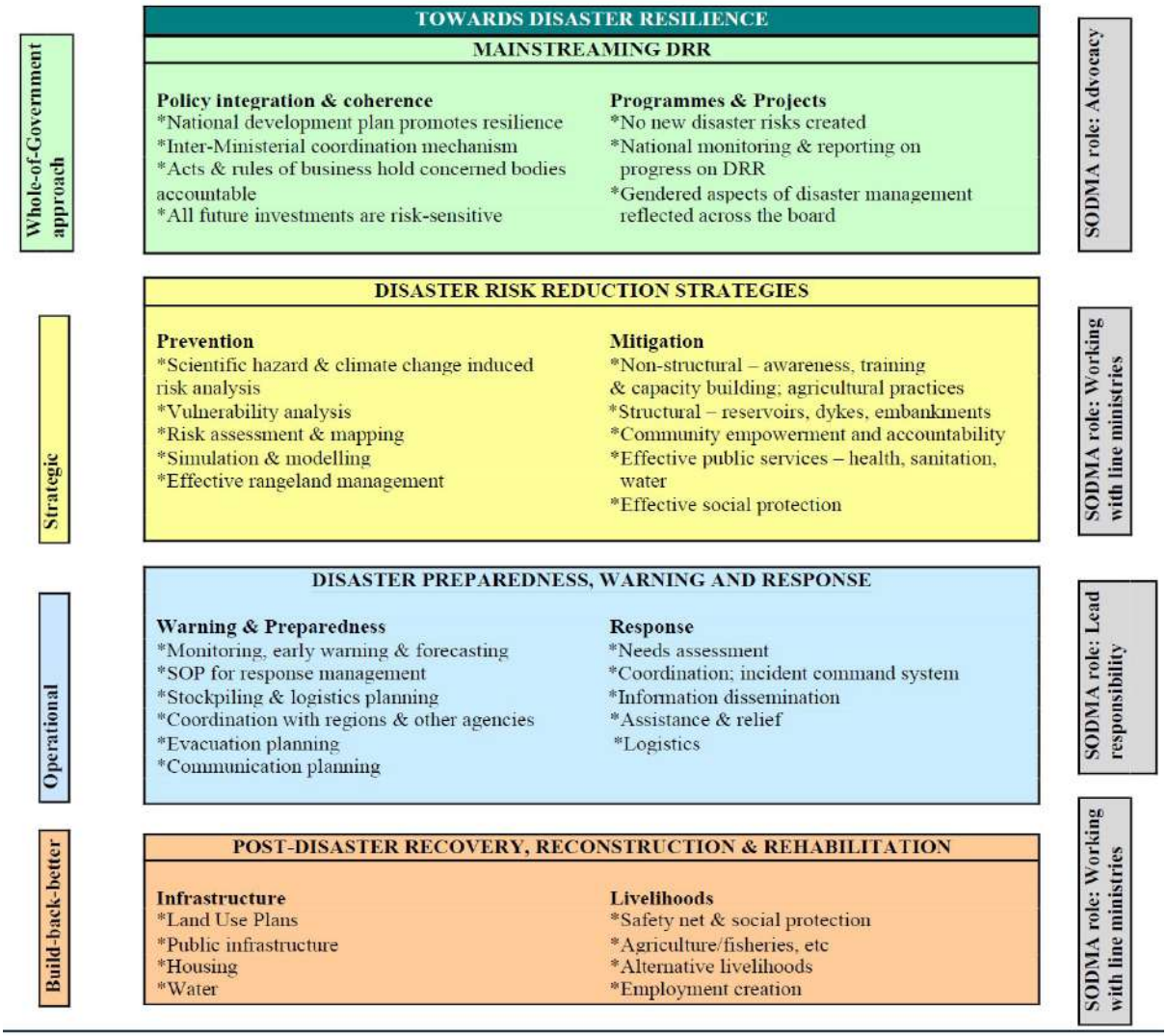

Figure 3: Schematic Diagram of Disaster Management Framework for Somalia.
Source: Somalia National Disaster Risk Management Policy 2018

4.4.5 Institutional arrangements

Institutional arrangements are critical for addressing climate-related losses and damages. Like in many African countries, Somalia's existing national-level mechanisms have been developed in the context of disaster risk management programming (ClimateDev-Africa 2014) to build ex-ante resilience through risk reduction and risk avoidance measures.

The Federal Government of Somalia developed the Somalia National Disaster Risk Management Policy 2018 under the Ministry of Humanitarian Affairs and Disaster Management (MOHADM). In 2022, the Somalia Disaster Management Agency (SODMA) was set to lead in the policy implementation. SODMA oversees and coordinates the National DRM function, including early warning, disaster planning, disaster response (including displacement), and durable displacement solutions. SODMA houses the National Multi-Hazard Early Warning Centre (NMHEWC) and the National Emergency Operations Centre (NEOC) and coordinates with all relevant MDAs at the Federal and disaster management entities at the state levels.

Key national-level policies aimed at building resilience against climate-related losses and damage are shown

Table 8: Somalia policies relevant for reducing climate-related L&D

Key National Policy Document	Objective	Relevance to L&D
Somalia National Disaster Risk Management Policy (2018)	To provide a legislative framework for embedding DRM and DRR within government structures and strengthen national capacities for effective disaster preparedness, response, mitigation, prevention, recovery, and resilience.	Aims to reduce catastrophe deaths, damage, and economic loss by enhancing capacity at all levels of government, directly addressing key aspects of L&D.
Somalia's Third Generation Nationally Determined Contribution (NDC 3.0)	Recognizes the need to strengthen institutional frameworks, financing, and community resilience. Calls for integration of L&D assessments into MRV (Monitoring, Reporting, and Verification) systems.	Explicitly mentions L&D and highlights the need for integrated approaches and financial support to address it.
Somalia National Transformation Plan (NTP) 2025–2029	To increase resilience to environmental and climate shocks by climate-proofing key sectors such as agriculture, livestock, water, health, and infrastructure, leveraging the DRM Policy (2018).	Recognizes the role of DRR in reducing vulnerabilities and supports the implementation of the DRM Policy, which is highly relevant to managing L&D.
Somalia Recovery and Resilience Framework (RRF)	To set the strategic vision guiding drought recovery and building resilience against climate-related shocks.	Focuses on recovery from climate-related shocks and long-term resilience building, aligning with L&D priorities, especially regarding post-disaster recovery.

in table 8. The framework for managing climate change in Somalia includes people from the Federal, State, and District levels, as well as other groups. The Ministry of Environment is in charge of issues related to climate change, such as L&D. The NCCC is a high-level policy coordination committee that includes all the ministries and other groups that are responsible for climate change activities in Somalia. There are committees at both the State and cross-sectoral levels to make sure that all climate-related priorities, including those related to disaster risk management, are taken into account.

4.4.6 Current state of institutional capacity

L&D is a new phenomenon, and most countries, including Somalia, lack the institutional and technical capacities for assessing economic and non-economic loss and damage and effective reporting (Abebe et al. 2023). Neither the Federal Ministry of Environment nor SODMA has a dedicated L&D unit or personnel to lead the L&D agenda on behalf of the countries. Limited finance hinders the implementation of the Somalia National Disaster Risk Management Policy (2018) and the undertaking of comprehensive L&D assessments. Somalia's NDC 3.0 has set a milestone recognising the need to address sudden and slow climate-related impacts, build capacities and integrate L&D assessments into MRV (Measurement, Reporting and Verification) systems to allow tracking and validation of climate change impacts, including economic and NELD (Government of Somalia 2025).

4.4.7 Gender intersectionality and L&D

Gender, race, caste, ethnicity, (dis)ability, and socioeconomic status, among other factors, converge to produce diverse levels of vulnerability and susceptibility to the effects of climate change. These overlapping inequalities can make social injustices worse and have a bigger impact on groups that are already on the outside (Kaijser and Kronsell 2014).

Due to gender inequality and social norms, climate change affects men and women differently. Women are especially vulnerable to climate change-related health issues, such as food insecurity, migration, displacement, unpaid care and gender-based abuse and exploitation during catastrophes (Tewari et al. 2023). Due to social expectations and risk-taking, men may be more prone to accidents related to extreme weather conditions.

Climate change disproportionately impacts women and girls in Somalia, leading to limited resources to cushion themselves and face discrimination and gender-based violence due to weak governance systems and protracted instability (OHirsi 2024). Somalia has the third-highest maternal mortality rate in the world, with 732 deaths per 100,000 live births, due to women's restricted access to healthcare. Climate change exacerbates water shortages and food insecurity, forcing vulnerable households to migrate, increasing health risks, especially to pregnant women and children. Non-economic losses and damages for women and girls include increased labour in household chores, agriculture, and livestock production, which negatively impact their health and well-being. Women and young girls are forced to trek long distances in rural areas in search of water and firewood due to extreme climate impacts, leading to a loss of time and energy that could be utilised for productive family income, education, and leisure.

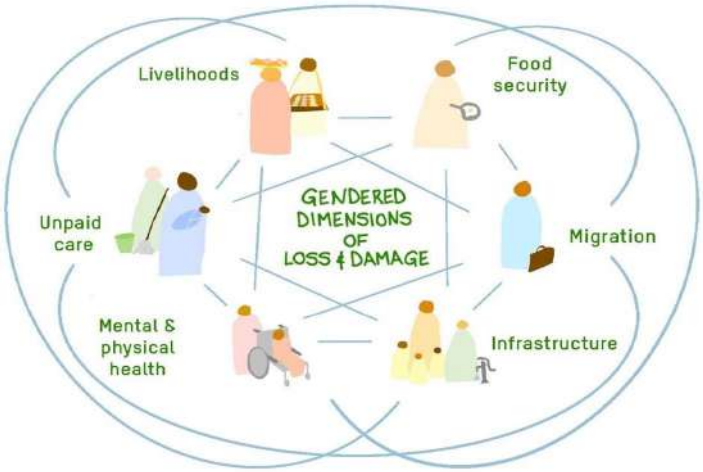

Figure 4: Intersecting gendered dimensions of L&D

According to (Fanning 2018), Somalia has a patriarchal cultural setting, and gender relations have been further strained by the impact of drought and conflict, with women being particularly vulnerable. One of the women respondents in his study opined, "Before the drought, girls were safe in their rural area, but now, after the drought, they are displaced and facing difficulties, including physical abuse and sexual abuse," indicating that climate change-related shocks increase the burden on women.

4.5 South Sudan

South Sudan continues to lose and suffer damages due to climate change from recurrent floods, droughts, and heat waves. The agriculture sector, which employs about 80% of the population and contributes about 33% to the national GDP, is highly affected (Food Systems Profile - South Sudan 2025). Flooding displaced more than one million people and destroyed more than 37,000 hectares of farmland for food production and grazing between 2021 and 2022 alone (Al-Said et l., 2024). With a population of roughly 11.5 million, more than 76% of South Sudanese fall below the international poverty line of US\$2.15 per day (Hanmer et al. 2024). Ranking 173rd out of 182 countries on the 2023 Notre Dame Global Adaptation Initiative (ND-GAIN) index for extreme

vulnerability and low adaptive readiness, South Sudan remains highly fragile due to decades of protracted armed conflict and weak institutional capacity, as it is one of the least developed and the youngest countries in the world (University of Notre Dame, 204). Climate projections predict an increase in the frequency and intensity of extreme weather events over the next 20 years, hence threatening food security, displacement, and the reversal of development gains. The total population of South Sudan was estimated at approximately 12.4 million in 2025, up from 11 million in 2020 (South Sudan NBS, 2024).

4.5.1 Climate trends, impacts and projections

The climate in South Sudan is tropical, but different climate regimes exist across the three dominant ecological zones: semi-arid, tropical savanna and equatorial, where temperature and rainfall patterns in each zone differ greatly (Mohammed and Laki 2024). The semi-arid northern and eastern regions receive seasonal rains of below 450 mm and have high interannual variability characterised by a long dry season from November to March. The equatorial southern zone has year-round precipitation, with a maximum of rainfall around March-May and October-November and up to 1230 mm annually (AfDB, 2018). Daily average temperature is 22°C in highlands and 28°C in lowland semi-arid areas, with seasonal temperature variations generally being between 2–7°C.

South Sudan benefits from good alluvial soils and extensive woodland ecologies and savannas, but the nation's natural resources are in danger from deforestation, land degradation, and the effects of changing weather. The high dependency on rain-fed agriculture and pastoralism, the low level of infrastructure development and weak institutions place the country at high risk to climatic shocks such as droughts, floods, and rainfall regime variations. From 1996 to 2016, an estimated 7.9 million people were affected by droughts, while 1.14 million were affected by floods (AfDB, 2018) that caused loss of livestock, crop failure, water shortage, and people displacement.

Long-term climate data reveal major trends of warming across the globe. Between 1979 and 2015, average annual temperatures increased between +0.37°C and +0.46°C per decade, with the equatorial zone warming the most rapidly (Mohammed and Laki 2024). Mean annual rainfall had no statistically significant trend, although more frequent extreme rainfall events were observed, most often in semi-arid and equatorial areas. These have further destabilised the agricultural calendar, impacting the predictability of more traditional planting seasons.

Models have also implied that South Sudan will see widespread temperature rise over the coming decades. With only moderate emission scenarios (RCP4.5), mean annual temperature is projected to increase by 1.5 to 2.5°C by 2050 and may also increase by as much as 3.5°C under high-emission scenarios (RCP8.5). This rise in temperature will most severely damage the dry season (December to March), leading to increased heatwaves, evapotranspiration and water shortage (AfDB, 2018). Without adaptation, the trend towards increasing temperatures may seriously damage development, worsen poverty, and may further intensify displacement and conflict over shrinking natural resources (Food Systems Profile - South Sudan, 2025).

Rainfall in South Sudan is projected to increase primarily through more high-intensity rainfall events rather than more frequent rainy days. CMIP5 model forecasts indicate significant increases, especially in the Tropical Savanna region, where rainfall could rise by up to 600 mm/year by 2100 (or 150% of baseline levels) (AfDB, 2018). These changes, of more variability, heavier rains and longer dry spells, pose serious risks to agriculture, infrastructure and national stability. Unpredictable precipitation disrupts farming cycles, raises post-harvest losses and worsens drought-flood cycles. Intense flooding wrecks homes, schools, roads and water systems,

displacing thousands and undermining disaster response. Flooded farmland and contaminated water sources endanger food security, health, and livelihoods. Changing rainfall patterns also aggravate conflict over land and water, which in turn undermines development and social cohesion (UNICEF, 2023).

4.5.2 Economic L&D

Climate-sensitive sectors like agriculture, livestock, forestry, and fisheries are very important to South Sudan's economy. These sectors employ more than 80% of the population. L&D attributed to climate change are slowly affecting other important areas, such as health, education, infrastructure, and water and sanitation. This makes the country's already weak state even worse, which is exacerbated by ongoing conflict and a lack of development in critical areas.

A series of droughts have plagued South Sudan since 1998, resulting in food insecurity, the collapse of agricultural systems, and economic erosion (Human Rights Watch, 1999). Between 2008 and 2012, devastating cycles of droughts in South Sudan severely disrupted rain-fed agriculture, on which 90% of the population depends, accompanied by steep reductions in cereal yields, a 30% national cereal deficit by 2011, and the reversal of prior progress in agricultural productivity and food security (FAO, 2024). In 2015 and 2016, South Sudan experienced a very severe drought that was worsened by an El Niño weather pattern. This led to poor harvests, less water, and more food insecurity (World Bank Group, 2023). The 2017 crisis is thought to be the worst, with both drought and war putting more than 6 million people in famine conditions (World Bank Group, 2023). In 2023, a mix of drought and flooding altered farming schedules, leaving more than 7.1 million people in South Sudan without enough food. This is the highest number ever recorded in the country's history (South Sudan | World Food Programme 2023). These droughts have led to the deaths of thousands of livestock, widespread crop failures, forced displacements, and an expensive reliance on humanitarian aid, with estimated losses amounting to billions of dollars.

In 2010 floods affected 100,000 people in South Sudan, destroying their homes and infrastructure and creating the need for emergency distributions of food, shelter and medical supplies (South Sudan, 2015). In 2011, heavy flooding amid the transition to independence overwhelmed emergency systems, disrupting the lives of many people. In 2014, floods affected over 835,000 people in South Sudan, causing major destruction to homes, crops, and infrastructure, prompting over $33 million in emergency aid (OCHA South Sudan, 2021). Between 2019 and 2022, South Sudan experienced catastrophic flooding for four consecutive years. The 2019 floods affected 90,000 people, displacing 420,000 and causing damage to homes, crops, and infrastructure, prompting a government-declared state of emergency (ACAPS, 2019). In 2020, the deluge impacted at least a million people, resulting in the death of 800,000 animals, and crucial road access was severely affected. The worst floods in 60 years in 2021 displaced around 835,000 people, causing substantial economic losses. The floods of 2022 again affected 800,000 people, triggering a public health emergency due to waterborne diseases and disrupting school activities (UNCT, 2022). Between 2023 and 2025, South Sudan faced over $236 million in losses and damages from floods and displacement (South Sudan Crisis Response Plan 2023 - 2025, 2025). These flood events have cumulatively cost the country billions in economic damages, severely weakened agriculture and transport systems, and increased reliance on international aid and disaster risk response.

4.5.3 Non-Economic L&D

4.5.3.1 Loss of human lives

Climate change-related droughts, floods, and poor government services have led to the deaths of many South Sudanese (Garang 2017). Extended droughts in 2009 and 2012 destroyed crops in Eastern Equatoria and Northern Bahr el Ghazal, increasing malnutrition fatalities among children and pregnant women (Mohamed et al. 2024). The 2015 drought hindered crop planting and worsened food shortages for almost 3 million people. The 2017 Unity State famine, exacerbated by drought and violence, increased deaths from hunger and diseases, especially in areas with restricted humanitarian access. Throughout these periods, climate-related mortality often went unrecorded, especially in remote and conflict-affected areas where health systems were inaccessible or non-functional.

Hundreds of lives have also been lost due to floods, directly by drowning and indirectly by the disruption of health care and the spread of disease. The 2001, 2010, and 2011 floods in Jonglei, Upper Nile, and Unity displaced more than 750,000 people, leaving them without access to health facilities and clean water, which resulted in cholera, malaria, and other killer diseases (Figura, 2022). In 2014, floods displaced 150,000 people, and overcrowded camps were lacking sanitation, which sped up the spread of diseases. South Sudan has gone through four years of intensive flooding, between 2019 and 2023. The floods in 2019 and 2020 affected nearly 2 million people, leading to outbreaks of diseases and increased drowning rates (World Bank, 2023). The 2021 deluge, which was the worst in the last 60 years, ruined more than 100,000 domestic environments, and the populations that had lost houses were found dead due to infections they had not treated, the lack of food during childbirth, and starvation. In 2022 and 2023, lack of properly functioning health infrastructure and stagnant floods resulted in additional mortality that is not accounted for but is certainly high, especially in Unity, Jonglei, and Northern Bahr el Ghazal (Food Systems Profile - South Sudan 2025). The loss of human life in South Sudan is among the most dramatic and irreversible outcomes of the climate change, as the extreme climatic events become more common and intense.

4.5.3.2 Migration and displacement

Climate-induced migration and displacement have grown common in South Sudan, primarily owing to long droughts and intensified floods (Garang 2017). A 2009 drought in Eastern Equatoria and Lakes gave rise to conflict as pastoralist groups moved into contested areas over scarce resources. A drought in 2012 precipitated food insecurity in Northern Bahr el Ghazal, creating conditions whereby households gave up on failing farms to seek support in urban areas or displacement sites. In 2015, crop failures brought on by climate conditions forced families from Central and Eastern Equatoria to seek refuge in humanitarian camps, as the usual routes for seasonal livestock migration were no longer reliable. The 2017 famine displaced over 6 million people internally on a mass scale. Especially in Unity and Jonglei, a confluence of insecurities with climate shocks forced entire communities into settlements dependent on aid.

Floods have become the most significant drivers of internal climate displacement in recent years. The floods of 2001 and 2010 sent away a population of about half a million from their homes, after sheltering capacity could hardly cope, thus disrupting typical settlement patterns (Figura, 2022). The 2014 floods in Upper Nile uprooted families already displaced by the conflict, leaving many stranded in flood-prone areas with minimal access to aid. South Sudan has been facing extreme flood-induced displacements from 2019 onwards, with a yearly displacement surpassing 700,000. The floods of 2019 forced people from their homes in Jonglei, Unity,

and Lakes, some of whom were recent returnees to the very same camps from which they had fled in previous years. Towns were cut off by floods in 2020, while the one in 2021, being the worst in decades, saw villages submerged for months, making Bentiu and Fangak permanent sites for displacement (South Sudan, 2025). By 2022 and 2023, displaced populations were still in very precarious conditions on raised dykes and makeshift embankments and were unable to return home due to waterlogging.

4.5.3.3 Heritage L&D

Climate change has significantly eroded South Sudan's cultural heritage and traditional knowledge systems, which are deeply tied to land, seasons, rituals, and ancestral settlement patterns (Kemp and Rasbridge 2004). The droughts of 2009 and 2012 caused the mass migration of pastoralists from Eastern Equatoria and Northern Bahr el Ghazal; thus, intergenerational transmission of indigenous understanding on grazing patterns, weather interpretation, and livestock management was disrupted (Mohamed et al. 2024). Prolonged droughts in 2015 led to confusion concerning agricultural and herding practices transmitted orally for generations, disrupting seasonal calendars. During the 2017 famine, competition over resources split social cohesion, and displaced families were separated from elders, spiritual leaders, and cultural institutions that would otherwise provide support and identity in times of distress.

Increased flooding from 2001 to 2023 has progressively disintegrated traditional social structures and disrupted cultural continuity in South Sudan (Chrostowsky 2013). Repetitive floods (particularly from 2019 onwards) have led to large, widespread displacement in Upper Nile, Unity, Warrap, Jonglei, and Lakes, disrupting cultural practices, community governance, and spiritual life. Submerged ancestral sites and sacred spaces obliterated material traces of heritage, and settlement in overcrowded camps inhibited important social functions like storytelling, rites of passage, and conflict resolution. By 2023, many young people were growing up separated from their traditions, culture was lost — the children had lost touch with their heritage, and identity. These irrevocable non-financial losses indicate the profound cultural implications of climate change that are beyond quantifiable economic losses.

4.5.3.4 Loss of biodiversity and ecosystem services

Wetlands, grasslands, forests, and rivers are vital to livelihoods in South Sudan. Prolonged droughts have accelerated ecosystem degradation. In Eastern and Northern Bahr el Ghazal, seasonal rivers and grazing lands were further dried during dry spells in 2009 and 2012, leading to intensified resource competition between pastoralists and wildlife (Omay et al. 2023). Grazing corridors, which were already inadequately disrupted by nature, became further degraded due to the droughts in 2015 and 2017, thereby causing a reduction in biodiversity and a shrinkage of resilience that amplify climate shocks. Repeated droughts weakened ecosystems, causing overgrazing, bush encroachment, and the loss of native plant species used for traditional healing and livelihoods.

Flooding has disrupted South Sudan's fragile ecosystems since 2001. These incidents have worsened since 2010. In 2001, 2010, and 2011, floods in Jonglei, Upper Nile, and Unity flooded wetlands and rivers, forcing people and animals to depart and accelerating soil erosion and deforestation on fragile floodplains (Omay et al. 2023). Floods in 2014 in the Upper Nile and Jonglei lowlands and grazing regions damaged native vegetation and likely reduced biodiversity. Extreme floods ravaged substantial parts of the Ramsar-listed Sudd Wetlands from 2019 to 2021. Long periods of waterlogging, overfishing by displaced people, and pollution from human

Table 9: Summary of projected climate changes across regions of South Sudan for key climate variables by 2050

Region	Average Temperature [°C]	Total Annual Rainfall [mm/year]	Number of Heavy Rainfall [days/year]	Rainy Days [days/year]
Semi-arid	Increasing +1.5°C to +2.5°C by 2050s but changes evident in next decades	Normal to increasing, ranging from no change to an increase of up to 40%. Change could become evident after 2050s	Increasing, ranging from no change to an increase of up to 100%. Change could become evident in the 2050s	Normal to increasing, could become evident in the 2060s
Tropical Savannah	Increasing +1.5°C to +2.5°C by 2050s but changes evident in next decades	Normal to increasing, ranging from no change to an increase of up to 30%. Change could become evident after 2080s	Normal to increasing, ranging from no change to an increase of up to 100%. Change could become evident in the 2050s	No consistent sign in projections
Equatorial	Increasing +1.5°C to +2.5°C by 2050s but changes evident in next decades	Normal to increasing, ranging from no change to an increase of up to 50%. Change could become evident after 2070s	Normal to increasing, ranging from no change to an increase of up to 100%. Change could become evident in the 2050s	No consistent sign in projections

Source: AfDB, 2018

and animal waste exacerbated environmental stress. In Unity and Jonglei, native fish populations plummeted as invasive aquatic plants spread quickly in calm water.

The floods of 2022-23 continued to damage the floodplains, forest edges, and riparian zones, which hurt migratory birds, aquatic animals, and grazing animals like antelopes (World Bank, 2023). Vegetation loss due to floods has compromised natural flood management, soil fertility, and water filtration, affecting ecosystem services that contribute to rural livelihoods. The repeated breakdown of vital systems like pest control, pollination, and clean water poses a persistent threat to biodiversity, food security, health, and climate resilience. Such cumulative and frequently irreversible non-economic losses undermine the ecological basis for sustainable development and recovery in South Sudan.

4.5.4 Institutional arrangements

South Sudan does not have a standalone institutional architecture for climate-related L&D, though there are other relevant functions embedded within broader disaster risk reduction, environmental management, and climate adaptation systems. Institutional frameworks are immature and scattered, with multiple government agencies and development partners collaborating to manage climate-generated adversities like flooding, drought, and food insecurity.

The head national ministry on climate change, the Ministry of Environment and Forestry (MoEF), is responsible for developing the NDCs, the Climate Change Policy Framework, and the forthcoming National Adaptation Plan and ensuring mainstreaming of climate resilience across the various sectors. South Sudan's Meteorological Department (SSMD) under the Ministry of Transport and Roads is responsible for climate monitoring and early warning, albeit with significant capacity constraints and the shortfalls that have affected its ability to make timely and accurate predictions. The Relief and Rehabilitation Commission (RRC) and the Ministry of Humanitarian Affairs and Disaster Management (MHADM) are the main organisations responsible for disaster response; however, a consolidated National Disaster Risk Management Policy is not yet in place and limited attention to climate-induced displacement remains a key gap.

At the subnational level, local authorities are intended to facilitate responses to climate resilience, but they encounter significant resource challenges and capacity shortages. Positive initiatives are happening through donor-supported initiatives, including the World Bank's ECRP-II, which aims to support climate-resilient infrastructure and early warning systems under the UN Multi-Partner Plan Framework. Also, the development partners (e.g., UNDP, UNEP, FAO, World Bank) have played a crucial role in institutional development and capacity building. However, the continuity of climate shocks emphasises the need for a specific and organised national approach to L&D in a long-term climate-resilient manner.

4.5.5 Current state of institutional capacity

L&D from climate change in South Sudan has significant challenges due to the country's fragile institutions with weak governance and limited resources (Sugga et al. 2024). South Sudan's post-conflict context also severely constrains institutional capacity, legal frameworks and technical know-how to deal with climate change. Funding constraints make mitigation and adaptation even more difficult. Already, the country faces growing floods and droughts, disrupting livelihoods, threatening food security and fuelling conflict and displacement (NUPI 2025). Climate change is continuing to deepen poverty and unemployment, particularly in rural areas. Going forward, South Sudan's emphasis will be on strengthening institutional capacity through governance reforms, technical training and policy processes. There will be need for climate-specific legislation, development of domestic and international funding, and investments in community-based adaptation strategies. Through the Africa Review mechanisms and technical cooperation through regional bodies like IGAD, South Sudan's can build robust capability to address L&D. Also, addressing the legislative gaps could enable South Sudan access climate financing.

4.5.6 Gender intersectionality and L&D

Climate-induced L&D in South Sudan significantly affects women and girls disproportionately, worsening existing inequalities related to gender, poverty and displacement. The frequent and intense occurrence of extreme climate events such as floods, droughts and heatwaves intersecting with the existing vulnerabilities places women and girls at alarming risk of harm, deprivation and exclusion. According to UNFPA (2025) , 98% and 92% of people living in Malakal and Rubkona, respectively, were severely affected by flood, while 68% in Kapoeta South faced severe drought (WHO, 2025). These calamities cause displacement, food insecurity and loss of livelihoods, factors that specifically endanger women and girls. For instance, displaced women reported increased cases of sexual assault, rape, and child marriage, especially while collecting firewood or water. Nearly 50% of respondents reported a rise in gender-based violence due to climate-related events.

In addition, maternal health is at risk. South Sudan's maternal mortality rate is one of the highest in the world (1,223 deaths per 100,000 live births) and is exacerbated by health services disrupted by climate change (WHO, 2025). Overall, access to contraception remains very low, at less than 5%. Floods or heatwaves that disrupt schools increase the likelihood of girls marrying at a young age because they can't attend school. Gender intersects with displacement, poverty and conflict to create complex, nuanced vulnerabilities. If adaptation has not taken the needs of women and girls into account, they will continue to be the most affected by climate change. To make sure that no one is left behind, it is necessary to prioritise women's voices in climate planning, invest in strong health and education systems, and improve protection services.

4.6 Uganda

Uganda is among the poorest and least developed countries worldwide. It comprises 45.9 million people, which increases at a rate of 3.7% annually (National-Population-and-Housing-Census, 2024). The GDP per capita is $957 (World Bank, 2025), and the services, agriculture, and industry sectors play an enormous part in this. The service sector is the major economic sector, contributing 47.6% to the GDP, followed by the agricultural sector with 24.2% and the industrial sector with 19.9% (Uganda Loss & Damage Forum, 2022). The main staple foods are maize, plantains, beans, cassava, groundnuts, sorghum and millet. Uganda exports mostly coffee, gold, pulses, fish and maize, the bulk of its maize sales to Kenya, which is located nearby. Even though the service sector is ahead of the agriculture sector, 72% of the population relies on some sort of small-scale farming as a source of livelihoods (Vos and Cattaneo 2021). Uganda primarily depends on rainfed agriculture and subsistence farming (Sridharan et al. 2019). Currently, irrigation schemes can accommodate less than 1% of the national crop. As a result, farmers, especially the smallholder farmers, are affected by climate change disrupting their food supply and exposing them to the risks of hunger and poverty.

4.6.1 Climate trends, impacts and projections

Uganda has a warm tropical climate with average daily temperatures about 28°C and long-term near-surface temperatures around 21°C (Feleke et al. 2025). Uganda experiences two main rainy seasons (March–May and October–December), though the north, particularly the northeast, has a single season from March to mid-October. Annual rainfall averages 1,197 mm, with higher amounts in the south (600–2,200 mm) and lower in the north (400–1,600 mm). While Uganda's equatorial climate supports agriculture, increasing frequency and intensity of extreme weather events, droughts, floods, rainstorms, and landslides pose growing climate risks.

The climate in Uganda is not only unpredictable, but it is also changing, rendering the country highly vulnerable to climate change effects, resulting in huge losses and damages. From 1900 to 2010, the average annual temperature rose by 0.8 to 1.3°C and is expected to rise by 2 to 5°C by 2100 (World Bank, 2025). Umwali et al. (2024) reported declining rainfall patterns in northern and most parts of Uganda, with the west and northwest getting a little more. Droughts are a common climate risk with severe consequences in Uganda (Van Ginkel and Biradar 2021). The 2017 drought was exceptionally severe, destroying crops and leaving over one million people in urgent need of food aid, with hard-hitting impacts in northeastern Uganda and the cattle corridor.

Uganda's average temperature is expected to increase by +2°C in 50 years and +2.5°C in 80 years for RCP 4.5, and up to +4.5°C for RCP 8.5. This rise endangers climate-sensitive industries, especially agriculture, where yields can fall by as much as 30 percent in the eastern and northern regions. Rising temperatures will fuel pest and disease outbreaks, limit milk and meat production (especially in Karamoja and Teso), and speed up water scarcity — projected to fall below the global threshold of 1,000 m³ per capita by 2050. These impacts will affect food security, drinking water access, and hydropower. Health risks, including increased malaria and cholera in highlands, will rise. Without action, GDP losses could reach 2–4.5% by 2050.

By the end of the century, rainfall is expected to rise by 5 to 10 percent across the country, with western and highland areas seeing increases of 15 to 20 percent and the north and northeast seeing decreases of up to 10 percent. Rainfall changes will cause more floods in places like Kasese and Kampala, forcing more than 100,000 people to leave their homes every year and causing landslides in Bududa and Mbale. By 2050, flooding could cost UGX 340 billion (USD 90 million) a year in damage to infrastructure. More rain will also lead to about 30% of crop failure and make diseases more likely in urban slums (Ministry of Water and Environment, 2023 ; World Bank, 2025).

4.6.2 Economic L&D

Due to the high dependency of the Ugandan economy on climate-dependent sectors, particularly agriculture, livestock, water, and fisheries (Uganda Loss & Damage Forum, 2022), the country has lost billions to economic losses and damages from repeated floods, landslides, and droughts, whose frequency and intensity have been exacerbated by climate change. The 2005 drought occasioned the worst food insecurity in Karamoja, necessitating humanitarian interventions resulting in losses and damages amounting to $250 million (Baastel Consortium, 2015). The 2008–2009 drought caused crop losses valued at over UGX 92 billion in maize, beans and livestock losses (Epule et al. 2017). The 2010–2011 regional drought affected more than 1.2 million people in Uganda and inflicted crop, livestock and infrastructure losses estimated at $1.2 billion (Republic of Uganda, 2019). The massive dry spell from 2016 to 2017 affected over 1 million people, leading to a humanitarian crisis and threatening food security in Uganda (IMF Uganda, 2022). Crop failures and pasture losses set by the 2021–2022 drought in Karamoja caused livestock losses, raising food prices that affected national markets (Sagala et al. 2025).

El Niño floods cause widespread destruction of crops, roads, and communication infrastructure (FAO/WFP, 2008). The 2007 floods destroyed roads and affected around 58,000 households, with damages to infrastructure exceeding UGX 60 billion (FAO/WFP, 2008). The 2010 landslide caused damage and losses estimated at US$ 1.2 billion (Department of Disaster Management Office of the Prime Minister, 2012). In 2012, landslides and floods wiped out homes and crops while also rendering rural roads impassable in Bududa, Mbale, and Sironko. In 2015, flooding in Kasese and Kampala ravaged the water infrastructure and urban transport systems, requiring an emergency rehabilitation (Uganda Disaster Risk Profile 2019, 2019). Floods and landslides in 2019-2020 in Uganda resulted in an estimated economic losses and damages of US$152.2 million (NECOC Uganda, 2020). The Mbale City flash floods of 2022 were disruptive to trade, damaging roads, markets, and houses that would cost the local governments. Landslides and floods took a toll on Kisoro, Kapchorwa, and Bundibugyo in 2023, causing damage to schools, health centres, and farmlands, with sector-wide damage estimated at over UGX billion.

Across Uganda, between 2005 and 2023, direct economic losses from major climate events are estimated to have surpassed UGX 1.3 trillion, or about USD 345 million, and this excludes the full costs of the recurrent localized disasters and the indirect economic losses (Economic Assessment of the Impacts of Climate Change in Uganda | PreventionWeb, 2024). Agriculture and livestock, operating under the productive sector, continue to account for most of the losses, at times up to 60% (International Trade Administration, 2023). Secondly, infrastructure (roads, water, and energy) come under any losses incurred, while the third batch includes social sectors (health and education) (Economic Assessment of the Impacts of Climate Change in Uganda | PreventionWeb, 2024). Regular shocks across these sectors reduce GDP growth, increase fiscal pressure, raise rural poverty levels, and consequently threaten the achievement of Uganda's Vision 2040 and SDG targets.

4.6.3 Non-Economic L&D

4.6.3.1 Loss of human lives

Uganda has experienced numerous deadly floods and landslides, especially in highly vulnerable regions including Mount Elgon, Rwenzori, and urban areas (Twinomuhangi, Sseviiri, and Kato 2023). In 2010, a massive landslide in Bududa killed over 350 people, burying the village of Nametsi. Subsequent landslides in 2012 across Bududa, Mbale, and Sironko killed dozens and displaced hundreds. The 2015 flash floods in Kasese and Kampala caused infrastructure damage, while 2018's Bududa landslide left 51 people dead and destroyed homes and schools (Bwire et al. 2023). In 2020, severe floods in Kasese displaced over 100,000 people and destroyed Kilembe Mines Hospital The 2022 floods in Mbale killed 29 people while the 2023 landslides in Kisoro, Bundibugyo, and Kapchorwa killed more people and displaced many people. These disasters also cause indirect deaths by spreading diseases through water, causing malnutrition, and hindering provision of health care services.

Deadly droughts have caused immense human suffering, especially in the northern and northeastern Uganda (Epule et al. 2017). The 2008–2009 national drought caused widespread crop and livestock losses. The 2010–2011 East Africa drought affected over 1.2 million people, especially in Karamoja and Teso. In 2016–2017, one of the worst droughts in recent history affected 80% of Uganda, with Karamoja and western regions hit hardest (Epule et al. 2017). Most recently, the 2021–2022 drought led to at least 91 hunger-related deaths in Karamoja between June and August 2022, with over 500,000 people facing acute food insecurity (Sunday et al. 2023). These prolonged dry spells severely weaken vulnerable populations, particularly children, pregnant women, and elderly people, who are most at risk of hunger-related mortality and disease.

4.6.3.2 Migration and displacement

Floods and landslides have caused the displacement of hundreds of thousands in Uganda over the years. The floods of 2007 affected more than 30,000 people (Bberinya 2017). The Bududa landslide of 2010 forced the displacement of more than 5,000 people, while landslides of 2012, 2018, and 2023 displaced hundreds of people in Bududa, Mbale, Kisoro, and Bundibugyo. Over 12,000 people continue to live in high-risk zones without being permanently resettled. The Kasese floods of 2020 displaced over 100,000 persons, while the Mbale flash floods of 2022 displaced over 10,000, damaging homes, roads, and services (Bwire et al. 2023).

Floods and droughts have pushed hundreds of thousands of people into displacement, chiefly in Karamoja and northern Uganda. An estimated 1.2 million people were affected by the drought of 2010–2011, while that of 2016–2017 affected 80% of the country and triggered massive rural-urban migration. Perennial droughts in Karamoja during 2021–2022 displaced more than 100,000 people, with families fleeing hunger and water scarcity to towns like Mbale, Moroto, and Kampala (Chetto, Mdemu, and Kihila 2024).

4.6.3.3 Heritage L&D

Climate disasters have devastated cultural heritage and traditional systems in Uganda (Okonya and Kroschel 2013). The Bududa landslides of 2010 buried the ancestral graves and sacred forests of the Bagisu, thus obliterating important spiritual sites and displacing communities from culturally significant land. The landslides in 2012, 2018, and 2023 in Bududa, Mbale, Kisoro, and Bundibugyo further destroyed the community shrines, sacred springs, and communal meeting points (Bwire et al. 2023). Floods in Kasese in 2020 injured the riverside spiritual places of the Bakonzo people in the west and displaced the elders, who were custodians

of oral traditions. Flash floods in Mbale (2022) and Kampala (2015, 2021) interrupted burial rites, religious events, and clan-based leadership roles.

In addition to the collapse of traditional knowledge and social integration (Aklilu et al., 2021), droughts in the region have also weakened intergenerational knowledge transfer and affected agricultural calendars of indigenous peoples. The 2005 droughts forced Karamoja pastoralists to migrate, isolating families and clans along ancestral grazing routes. The droughts of 2008–2009, 2010–2011 and 2016–2017 led to mass school dropouts, premature marriages, and loss of community festivals brought on by water and food scarcity. The 2021–2022 drought in Karamoja, which resulted in the displacement of over 100,000 people, caused a break in the traditional caregiving pattern and the roles of women in herbal medicine and food preservation (Aklilu et al., 2021). Taken together, such trends erode Uganda's intangible cultural assets, weaken local identity and reduce resilience to future shocks.

4.6.3.4 Loss of biodiversity and ecosystem services

Climate-related disasters like floods and landslides have severely degraded the ecosystems of Uganda. Repeated landslides between 2010 and 2023 in Bududa, Sironko, and Mbale took a toll on forest cover and ecosystem services such as water filtration and slope stabilisation. The flooding events in Kasese and Mbale between 2020 and 2022 changed river processes and damaged riparian habitats of the Nyamwamba and Namatala Rivers, respectively: they were detrimental to aquatic biodiversity and caused pollution to water sources. Urban floods in Kampala have also negatively impacted wetland buffer areas like Nakivubo, reducing the flood mitigation functionality and degrading water quality for thousands of residents.

Droughts have resulted in loss of biodiversity and decline in function of ecosystems across dryland and highland ecosystems. More than 30% of Uganda's wetlands experienced a loss between 1993 and 2020, resulting in encroachment and drying spells (Matovu et al. 2024). Forest cover dwindled from 24 per cent in 1990 to 12.4 per cent in 2017, exacerbated by drought-related wildfires and water stress (Osaliya 2021). During the 2010–2011, 2016–2017, and 2021–2022 droughts, there was high evidence of stream drying, shrinkage of grazing lands, and loss of pollinators essential for food production. A lack of water and bushfires threaten the future of such wildlife as elephants and hippos within Queen Elizabeth and Murchison Falls National Parks (Chapman, Nyboer, and Fugère 2022). Warming temperatures and forest degradation have already begun to threaten the habitat of mountain gorillas, while drying wetlands around Lake Kyoga and Lake Victoria have disrupted fish breeding grounds, also destabilising fisheries and food security.

In eastern and northern Uganda, higher temperatures can reduce yields of crops by up to 30% (World Bank, 2025). Heat will stress the crops, which will amplify outbreaks of pests (fall armyworm) and animal diseases; therefore, less milk and meat will be available in places like Karamoja and Teso. The rising temperatures are also expected to increase the urgency of the water shortfall in Uganda; it has been suggested that by the year 2050, Uganda's per capita water availability will fall below 1,000 m^3, which is the global water scarcity threshold (Ministry of Water and Environment, 2023).The effects of these changes will be reflected on agriculture, drinking water access, and hydropower production. On the health front, rising temperatures will cause malaria and cholera to spread, particularly in highlands. From an economic perspective, Uganda might experience a decrease in its GDP of about 2–4.5% in 2050 if no measures are taken (World Bank, 2025).

Table 10: Institutional Arrangements for Climate Change

Institution	Role and Responsibility
Ministry of Water and Environment (MWE)	Overall coordination of climate change policy and action through the Climate Change Department (CCD).
Climate Change Department (CCD)	Leads policy development, coordination, monitoring, and reporting on climate change issues.
Uganda National Meteorological Authority (UNMA)	Provides climate and weather data, early warning information, and seasonal forecasts.
National Environment Management Authority (NEMA)	Oversees environmental regulation and integration of climate change into environmental planning.
Office of the Prime Minister (OPM)	Coordinates disaster risk reduction and emergency response, including the National Policy for DRM.
National Emergency Coordination and Operations Centre (NECOC)	Manages disaster preparedness, early warning, and coordination of emergency responses.
Ministry of Finance, Planning and Economic Development (MoFPED)	Ensures integration of climate change into national planning and budgeting processes.
Local Governments (District & Sub-County)	Implement climate actions on the ground, often with limited capacity and resources.

4.6.4 Institutional arrangements

The institutional mechanism of climate change in Uganda is embedded in the Climate Change Act, 2021, which established the National Climate Change Department (NCCD) under the Ministry of Water and Environment as the body that coordinates the country in acting against climate change (FAO, 2020). The National Climate Change Advisory Committee (NCCAC) provides technical advice. District Climate Change Task Forces administer the planning and implementation of District task forces at the local level. Other major players include the National Environment Management Authority (NEMA), the Uganda Meteorological Authority (UMA), and the Ministry of Finance, which will ensure the integration of climate considerations into policy formulation, budgeting, and reporting. National adaptation planning is also another way that Uganda adheres to international frameworks such as the UNFCCC and the Paris Agreement.

Table 11: Current State of Institutional Capacity

Institution/Level	Strengths	Key Capacity Gaps
Climate Change Department (CCD)	National coordination and policy development; focal point for UNFCCC	Limited funding, inadequate staff, weak monitoring systems
UNMA	Weather and climate forecasting; early warning systems	Insufficient equipment, limited local data coverage
NEMA	Environmental compliance and integration of climate into EIAs	Needs stronger enforcement capacity and technical expertise
Office of the Prime Minister (OPM)	Coordinates DRM and humanitarian response	Reactive rather than proactive; limited long-term climate risk planning
Local Governments	Frontline implementers of adaptation and resilience projects	Severe capacity gaps: lack of trained staff, funds, and climate planning tools
Ministry of Finance (MoFPED)	Supports integration into planning and budgeting	Inconsistent mainstreaming of climate into sectoral budgets

4.6.5 Current state of institutional capacity

Uganda has registered significant achievements in institutionalising climate change. Nevertheless, institutional capacity at the moment is still low, particularly at the local governmental level. Although it has been operating some national agencies such as the Climate Change Department (CCD), NEMA, and UNMA, they have huge limitations since they have a limited number of personnel, lack funds, and have poor horizontal coordination and technical expertise. Local governments, which play a major role in implementation, usually do not have the resources, the climate information, and the trained personnel to build climate resilience into their planning and delivery of services. Such capacity deficiencies are an obstacle to useful climatic response and mainstreaming adaptation to national and subnational plans.

4.6.6 Gender intersectionality and L&D

Climate change associated L&D disproportionately affects women, girls and marginalized groups in Uganda, particularly in rural communities. Women face greater vulnerability to floods, droughts, and landslides due to entrenched social and economic inequalities. They are frequently the first to suffer from food insecurity and bear the burden of unpaid care during crises. In drought-prone areas like Karamoja, women and girls travel longer distances for water and fuel, increasing their exposure to gender-based violence. Crises also heighten school dropouts and early marriage among girls. Women-headed households, 38% of rural households, have limited access to land, credit, and information, increasing their risk of displacement and livelihood loss. Women are largely excluded from decision-making and formal post-disaster recovery systems. Climate impacts also erode critical non-economic assets, such as traditional knowledge, caregiving networks, and communal land, undermining the resilience and cultural roles of indigenous women. Addressing these gendered impacts requires targeted, inclusive, and intersectional policies that prioritise women and girls in climate planning, response, and recovery.

5 TRANSBOUNDARY LOSS & DAMAGE

The impacts of climate change are not constrained to political borders, and many of the key impacts from climate change affecting the IGAD region affect multiple Member States simultaneously. This is because of the region's deep interdependence across water, energy, food, and migration systems, and its high vulnerability to climate change impacts. The transboundary risks facing the IGAD region demand a coordinated regional response, currently implemented through the IGAD Climate Adaptation Strategy (2023-2030).

5.1 Transboundary climate change impacts

Climate-related extreme weather events, such as floods, droughts, and climate-induced resource conflicts, often cause cross-border human displacement and migration, loss of livelihoods, and economic losses in the IGAD region (The IGAD Climate Adaptation Strategy (2023-2030), 2023). The 2019 flooding in Somalia displaced more than 700,000 people, forcing them to seek refuge across the border in Ethiopia and Kenya (Kassegn and Endris 2021). Political instability intensifies these climate events and exacerbates displacement, posing a significant challenge for the host nations. Migration overburdens the resources that are yet scarce in such countries in terms of food, water, health facilities, and places to stay. They are also exposed to a lot of health risks, such as disease contagion, as the migrants lack access to water and sanitation and are specifically susceptible in refugee camps. In 2017, the refugee camps in Ethiopia were struck by the outbreak of cholera that infected more than 10,000 individuals because of insufficient water and sanitation systems (Charnley, Kelman, and Murray 2022). Droughts and floods, weather-related disasters, have led to an internal displacement of 3.1 million people in the IGAD region in 2022, thus creating new demands on the ability of countries to handle the crisis (The IGAD Climate Adaptation Strategy (2023-2030), 2023). Migration puts additional pressure on the limited resources in the host country. The migrants, particularly those living in refugee camps, are more vulnerable to health hazards such as disease transmission due to lack of access to essential amenities such as clean water and sanitation. Weather-related disasters, including drought and floods, resulted in internal displacement of 3.1 million people in the IGAD region in 2022.

The key local livelihood sectors of the IGAD region, such as agriculture, pastoralism, and fisheries, are adversely affected by climate change. Crop loss through drought and flooding, depletion of water resources and degradation of fisheries associated with rising ocean temperature and acidification fuel a growing cycle of poverty and food insecurity (Jha and Dev 2024a). As per FAO (2021), the 2017 drought caused a 40% crop

yield decline, a change that had an irreversible effect on the agricultural sector. Similarly, the pastoral societies of Somalia and Ethiopia also lost millions of livestock that were vital to their livelihoods (Tenaw 2021).The ocean temperatures and acidification levels are significantly depleting fish stock and also directly impacting the livelihoods of more than 3 million people whose livelihoods depend on the fish sector (Elver and Oral 2021). In 2020 alone, extreme weather events that were caused by climate change resulted in a 10–20 per cent reduction in agricultural productivity, which represents the loss of 10 per cent of crop production and food insecurity for millions of people in the IGAD region (Omay, Bahaga, and Fidar 2025). As such, the impacts of climate change intensify the cycle of poverty and food insecurity in the region, with lasting consequences for the local economy and the well-being of its people (Jha and Dev 2024b). Extreme weather events are attributed to the 10-20% loss of agricultural productivity in 2020, accounting for 10% of crop production loss and increased food insecurity for millions of people in the IGAD region (John 2024).

Furthermore, climate change has imposed enormous economic costs in the IGAD region. The rising cost of disaster response and recovery consumes a huge portion of the national budgets, limiting investment in long-term adaptation. Disaster response and recovery is getting expensive, gobbling most national budgets, leaving limited funds to invest in long-term adaptation measures. In Kenya, for example, the 2019 drought led to an economic loss of approximately US$1.4 billion, which strained the national budget and delayed infrastructure and development projects (World Bank 2019). The high costs of dealing with climate-induced disasters have hindered efforts to build long-term resilience to future climate risks. In addition to these, climate change has caused economic costs that are enormous in the IGAD region. The rising cost of disaster response and recovery consumes a huge portion of the national budgets, limiting investment in long-term adaptation. By 2030, the entire cost of climate change-related L&D throughout the IGAD region could exceed US$195.8 billion (The IGAD Climate Adaptation Strategy (2023-2030), 2023).

5.2 Transboundary climate change risks

Across the IGAD region, flood-prone areas are mainly low-elevation zones near major lakes, rivers, and wetlands. Urban flooding is recorded in Addis Ababa caused by development along the upper Awash basin. In Kenya and Uganda, flood risk centres around Lake Victoria and its tributaries, Yala, Nyando, and Nzoia, exacerbated by poor drainage, heavy rainfall, and population pressure. Although not high-risk, Nairobi and Kampala face urban flooding from nearby flood-prone watersheds. Somalia's southern flood risks stem mainly from the Juba and Shabelle rivers, which supply vital water sources in the Gu and Deyr seasons but also pose hazards. Flood risks are moderate across the Blue and White Nile basins of South Sudan. Djibouti and Eritrea tend to remain flood-free, owing to arid climates and higher elevations. In general, flood exposure is dictated by topographical variation, seasonal rainfall, and proximity to water bodies, with low-lying land near dense river systems most vulnerable to flooding.

The eastern and northeastern parts of the IGAD region, including eastern and southeastern Ethiopia, Somalia, eastern Sudan and northern and northeastern Kenya, face high drought risk (Figure 6). The Ethiopian lowlands in the east and south, including the Afar and Somali regions, constitute the high-risk areas, while the central and western highlands, with relatively stable rainfall, have lower drought risk. The aridity and water scarcity in Somalia make the country highly vulnerable to drought, with Puntland and Juba land hit hardest by extreme droughts that adversely affect agriculture and pastoralism.

This is particularly significant for regions in northern and eastern Kenya such as Turkana and Wajir counties, that are very drought-affected, whereas a favourable rainfall pattern accounts for the low to medium drought risk in the central and western areas like Nairobi and the Lake Victoria basin. Despite isolated parts with medium drought risk in the north, most parts of Uganda are categorised as low to medium risk, particularly the southern and western regions like the Lake Victoria catchment, which receives relatively high rainfall and has established water systems. High-risk areas dominate the eastern part of Sudan with medium and low risk zones in the west along the Nile corridor. Eritrea is generally low risk, while the entire Djibouti is high risk due to its arid climate and very low rainfall.

Table 12 presents major transboundary losses, damages and the risks involved across the IGAD region.

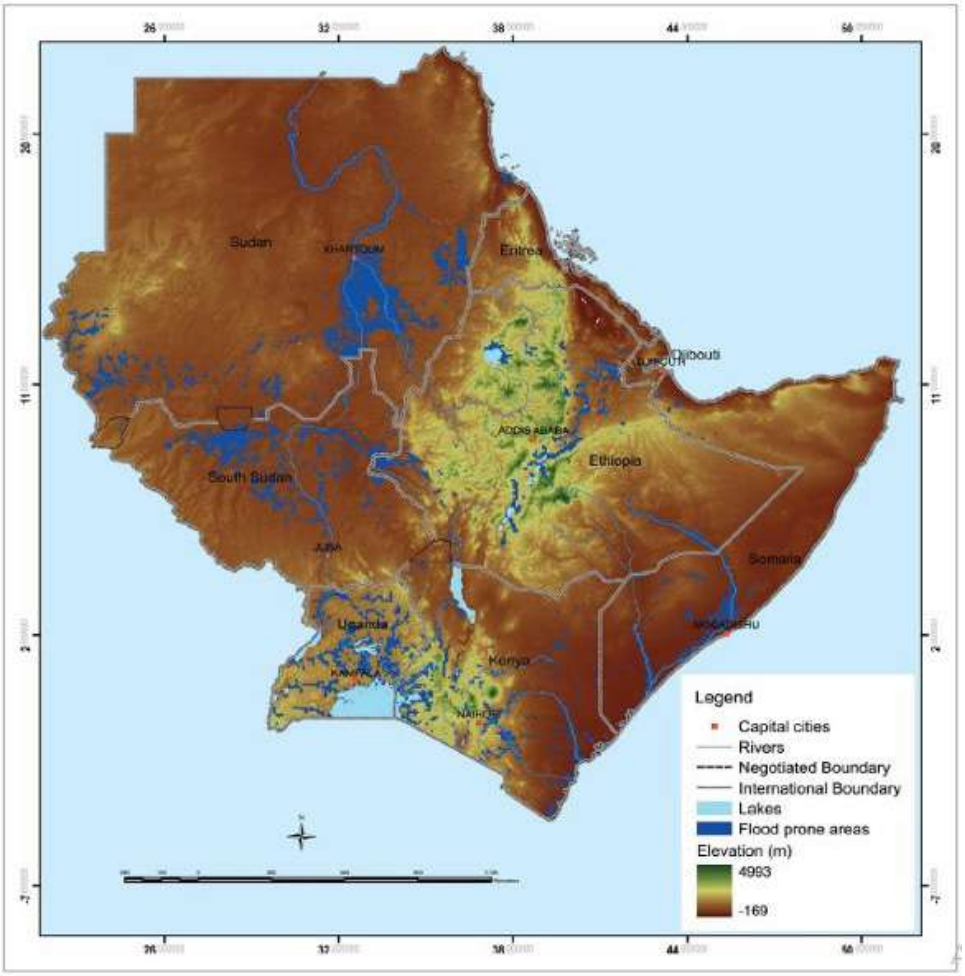

Figure 5: Flood-prone areas in the IGAD region (IGAD Regional Flood Risk Management Strategy (2020-2030), 2023)

5.3 Implications for the IGAD Region

5.3.1 Regional Cooperation

The transboundary climate-related L&D mitigation in the IGAD region (landmass: 5.2 million km² / over 270 million people) (Omay et al. 2025) requires close collaboration and cooperation among member states. More than 60% of the landmass is categorised as ASAL, indicating that the area is very vulnerable to climatic

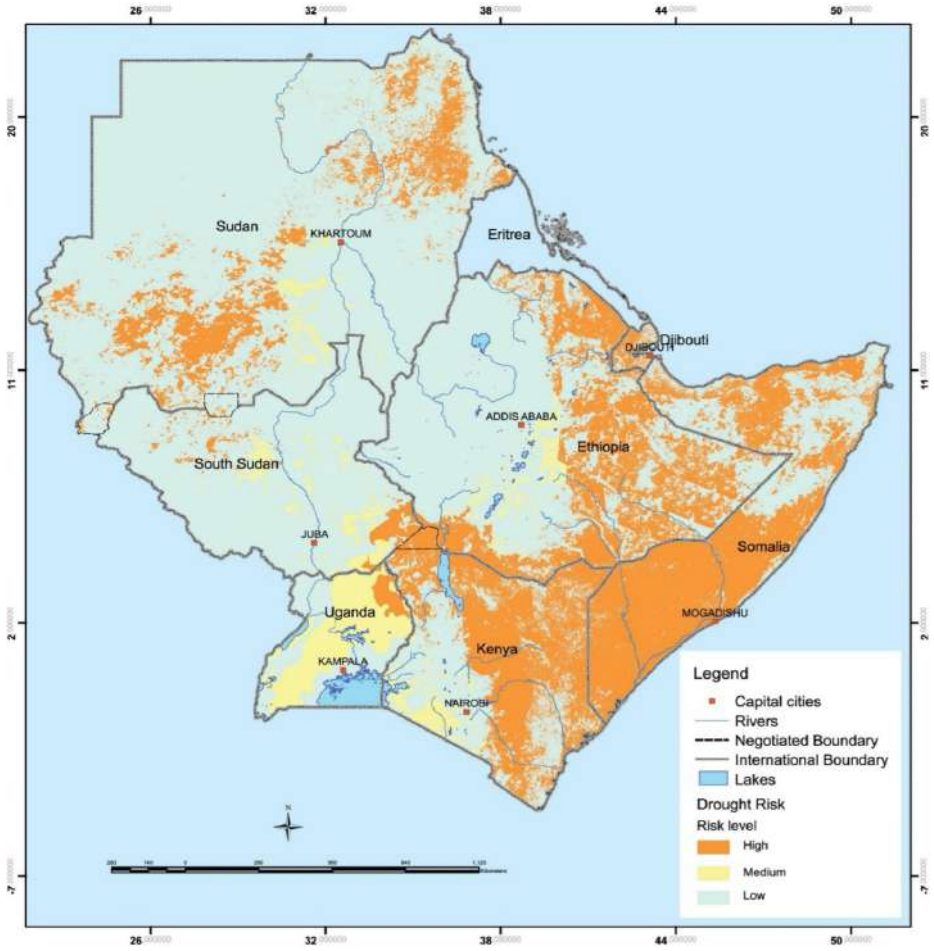

Figure 6: Drought prone areas in the IGAD region.
Source: (Drought Prone Areas in IGAD, 2025)

variability and climate-related disasters (Omay et al. 2025). The 2019-2021 desert locust infestation affected over 70 million people in Ethiopia, Somalia, and Kenya (Sokame et al. 2024), while recurrent floods in Ethiopia also have regional consequences for communities in South Sudan via the Nile Basin. At the same time, an extended drought in Somalia is likely to facilitate cross-border livestock migration between pastoralists in Kenya and Ethiopia.

Existing regional mechanisms, including the IGAD Climate Prediction and Applications Centre (ICPAC) and Conflict Early Warning and Response Mechanism (CEWARN), allow for regional climate forecasting and early conflict detection and response. Still, there is a need for more organised cross-border risk management approaches (The IGAD Climate Adaptation Strategy (2023-2030), 2023). The IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI) has succeeded to some extent in harmonizing the disaster management plans of the member states; however, only four of the eight member states have integrated IDDRSI's priorities into their national development strategies. This means more collaboration needs to take place to enable synchronised anticipatory action, harmonised data sharing, joint contingency planning, and coordinated humanitarian actions, which can bolster L&D reduction across the region as well.

Table 12: Transboundary Losses and Damages

Hazard	L&D	Transboundary Risk	Implications for the IGAD Region	Sources
Hazard 1: Slow Onset – Drought	• Over 9.5 million livestock lost (2020-2023) in Horn of Africa (Ethiopia, Somalia, Kenya). • Crop failures in Somalia (Bay, Bakool), worsening food insecurity. • Water shortages in Kenya (Marsabit, Turkana) lead to daily treks of 10–20 km for water. • Loss of 3.4 million livestock in Borena zone, Ethiopia, causing displacement	Pastoral migration across borders (Somalia-Ethiopia-Kenya) increases resource tensions. Cross-border clashes over overburdened resources in drought-affected regions. Regional food insecurity due to crop failures in Ethiopia and Sudan	Agriculture dependent (over 70% of population) at risk. Water security and human mobility affected due to resource depletion. IGAD's IDDRSI aims for coordinated drought response, but droughts outpace national capacities. SDGs (1, 2, 6, 13) jeopardized by prolonged drought cycles	IGAD (2024); IMF (2022); ACAPS (2022); ETHIOPIA Food Security Outlook (2023); Longoli and Iyer (2022); IGAD (2022); IGAD Regional Strategy (2023)
Hazard 2: Rapid Onset – Flooding	• Destruction of infrastructure and livelihoods in Kenya (Tana River, 2018-2020) displaces 70,000 people. • Floods in South Sudan (2021-2023) lead to cholera and malaria outbreaks. • Lake Victoria floods (2020-2021) displace lakeshore communities and disrupt fish landing sites	Transboundary flooding from shared basins (Juba-Shabelle, Nile, Tekeze) impacts neighboring countries. Tensions over water governance, especially after heavy rains in Ethiopia causing downstream flooding in Somalia. Disease outbreaks (malaria, Rift Valley Fever) cross porous borders, stressing regional health systems	Cross-border flood risk management is poorly coordinated. Damages exceeded $870 million (2019-2023) in Horn of Africa. Flood-induced waterborne diseases demand urgent transboundary health responses. SDGs 6, 11, 13 and regional development hindered by inadequate disaster response frameworks	World Bank (2020); WHO (2022); Gichuhi, Achieng, and Adero (2024); IGAD (2023); World Bank (2022)
Hazard 3: Slow Onset – Sea-Level Rise & Coastal Erosion	• Infiltration of seawater threatens freshwater supplies in Djibouti City. • Erosion displaces fishing communities in Somalia (Bander Beyla, Kismayo). • Loss of coral reefs in Somalia affects biodiversity and fisheries. • Cultural heritage (Zeila ruins) undermined by erosion and rising sea tides.	Coastal erosion disrupts trade in Djibouti and Berbera, affecting landlocked countries (Ethiopia, South Sudan). Saltwater intrusion threatens shared marine ecosystems in Gulf of Aden. Port disruptions (e.g., Djibouti Port) hamper regional supply chains.	Coastal zone adaptation is underdeveloped. IGAD Blue Economy Strategy (2023–2030) aims for coastal protection, but lacks effective implementation. SDGs 13, 14 and regional trade integration at risk due to ecosystem degradation. Limited investment in nature-based solutions (e.g., mangrove restoration).	World Bank Group (2024); World Bank Group Somalia (2018); IGAD Regional Strategy (2023)
Hazard 4: Slow Onset – Water Stress: Shared Groundwater Depletion	• Merti Aquifer depletion due to over-extraction by Kenya and Somalia. • Borehole depths increased by over 30 meters in Wajir, Kenya, making water access more costly. • Loss of clean water in Bardera and Dolow districts, Somalia, impacting health centers and schools.	Over-extraction from shared aquifers (Merti, Afar Triangle, Karamojong-Karamoja basin) causes cross-border water scarcity. Tensions over borehole use, especially during drought periods (2017-2019). Lack of coordinated aquifer management leads to growing conflicts.	Transboundary aquifer governance is critical but underdeveloped. Water stress threatens rural economies and pastoralism. Without regional cooperation on water management, water insecurity will persist. SDGs 6, 13, 17 depend on effective water resource governance and monitoring systems.	IGAD (2023); UNESCO-HP (2021); IGAD Groundwater for Resilience Program (2023)
Hazard 5: Transboundary Climate-Induced Conflict	• Livestock raids and violence in the borderlands (e.g., Turkana-Karamoja, South Sudan-Eastern Equatoria). • Climate-induced resource scarcity escalates violence over water and pasture. • Displacement due to cross-border violence, exacerbating humanitarian crises.	Cross-border migration of armed groups due to drought-related resource depletion. Increasing tensions between pastoralist communities (Somalia-Ethiopia, Kenya-South Sudan). Militarised responses to climate-induced conflicts destabilize the region.	IGAD's Peace and Security Strategy and CEWARN hindered by escalating climate-induced violence. Increased conflict undermines SDGs 13 (Climate Action) and 16 (Peace, Justice, and Strong Institutions). Integrated climate-peace action required to prevent further violence and displacement. Funding gaps hinder climate adaptation and peacebuilding efforts.	FAO (2023); Craze (2025); Burka, Roro, and Regasa (2023); IGAD (2021)

5.3.2 IGAD Climate Adaptation Strategy (2023–2030)

Adoption of the IGAD Climate Adaptation Strategy (2023-2030) marks a significant step toward a more coordinated approach to regional climate change adaptation. As Africa's first adaptation-only regional strategy, it includes 11 key action areas, cutting across cross-border planning, greater climate information services, nature-based solutions, and enhanced monitoring and learning. The strategy's ambitious targets include ensuring 100% of IGAD Member States have operationalised multi-hazard early warning systems by 2030, aligning all National Adaptation Plans (NAPs) with regional focus areas by 2026, and mobilising an estimated $2 billion to implement regional adaptation actions (The IGAD Climate Adaptation Strategy (2023-2030), 2023). This strategy promotes a unified approach by member states to managing shared ecosystems such as the Juba–Shabelle and Nile River basins and different fragile pastoralist corridors across multiple countries. Incentivising climate-smart technologies and ecosystem-based adaptation techniques used by ASALs through the introduction of the strategy, if completely operationalised, could reduce flood-associated economic losses by up to 30% and increase agricultural productivity in ASALs by up to 60%. This strategy also encourages inclusive and participatory mechanisms to be implemented in adaptation interventions to address the vulnerability and needs of women, youth, displaced persons, and marginalised communities who are often the hardest hit by the impacts of climate change. IGAD must remain supportive of the process whereby technical guidance, monitoring, and frameworks are maintained at the national level to enable national policy and budgets to align with the regional vision for this strategy to succeed.

5.3.3 Resource Mobilization

Mobilising resources to develop sound risk mapping, early warning, and adaptation systems is resource-intensive and requires ongoing sustained commitment and financing. Despite facing some of the world's most severe climate shocks, IGAD countries are unable to prioritise adaptation due to an overwhelming financing gap. Less than 5% of total climate finance accessed by IGAD has been allocated to adaptation, and only a minor portion of that supports regional initiatives. There is a gap of $4–6 billion in adaptive financing available for adaptation across the IGAD region, impeding collective resilience-building efforts (The IGAD Climate Adaptation Strategy (2023-2030), 2023). Historical damages from climate-related disasters underscore the need for increased investment and resource allocation for climate risk mitigation and adaptation. The 2010-2011 drought alone resulted in $12.1 billion in damages and losses in the Horn of Africa. The 2020-2023 drought affected over 43 million people, creating substantial food insecurity, livestock loss, and mass displacement (The IGAD Climate Adaptation Strategy (2023-2030), 2023). IGAD and its member states are encouraged to utilise several financing sources, including both public and private, the Green Climate Fund (GCF), the Adaptation Fund, the African Adaptation Acceleration Program (AAAP), and the social impact finance instruments. There are efforts to improve regional climate action with an IGAD Climate Adaptation Fund, which could act as a vehicle for pooled investment in transboundary projects such as shared irrigation systems, early warning systems, and climate-resilient infrastructure. Member states should also aim to raise domestic adaptation budgets by 50% by 2030 and to mainstream adaptation in development and sectoral planning.

5.3.4 Strengthening Institutions

The need to strengthen and enhance both country and regional institutional adaptation capacity cannot be overemphasised. Most national disaster management authorities and climate agencies in the region are characterised by systematic weaknesses, including inadequate technical expertise, poor digital systems,

ineffective coordination mechanisms, and lack of consolidated adaptation institutions, evidenced by overlapping roles and responsibilities among various institutions. Only 3 out of 8 IGAD countries have comprehensive up-to-date databases on climate disaster-related L&D. Many of the meteorological services do not have the instruments or trained personnel to provide timely and accurate forecasts. The IGAD Disaster Risk Management (DRM) Strategy 2019–2030 highlights the importance of building strong institutions and increasing DRM funding by 20% each year, developing a fully digital early warning system by 2027, and training at least 10,000 DRM workers in each IGAD country by 2030 (The IGAD Climate Adaptation Strategy (2023-2030), 2023).

Regional institutions like ICPAC, which hosts the Centre of Excellence for Climate Adaptation and Environmental Protection (CAEP), require long-term funding and political support to deliver on their mandates, especially in supporting fragile countries with limited technical and institutional capacities. Functional institutions are key to converting policy intentions (such as DRM policy) into action (early action protocols) and supporting risk-informed development through inclusive planning.

6 BARRIERS AND CHALLENGES TO ADDRESSING L&D

Limited Data on Economic and Non-Economic Losses (NELD)

IGAD countries face persistent data gaps with regard to both economic and non-economic climate-related losses. While economic impacts such as damage to roads or crops are irregularly quantified. For instance, Ethiopia's $200M lost in flood damages in 2024 (Multi-hazard early warning systems in Ethiopia UNDRR 2024), non-economic losses and damages (NELD) go almost entirely undocumented. Between 2019 and 2022, floods in South Sudan submerged sacred burial grounds in Fangak and displaced spiritual leaders, finally eroding cultural identity. Landslides in Bududa, Uganda, disrupted the structure of families and clans, breaking the link of intergenerational knowledge transfer (Khanakwa 2023). These intangible losses have no valuation frameworks and thus remain invisible in national accounting and in donor reports. The absence of structured tools for recording or measuring psychological trauma, cultural erosion, or at least biodiversity loss gravely constrains IGAD's capacity for L&D finance mobilisation and inclusive recovery strategy design.

Limited Climate Finance and L&D Not Prioritized

Despite the rising climate damages, L&D continues to be financed inadequately in IGAD states. According to Somalia's NDC (2021), a $5.5B funding gap exists for adaptation (Somalia NDC, 2021) while Sudan's 2023 conflict has frozen all climate allocations. Kenya's climate financing is mostly targeted at mitigation (clean energy), and hardly any attention is paid to slow-onset damages such as groundwater depletion in Marsabit or salinisation in the Tana Delta (Kempa et al. 2021). Djibouti has left its coastal infrastructure unprotected while rapid sea-level rise endangers ports and housing (Alexandru 2021). Ethiopia's recovery budget does not yet cover flood-prone zones along the Blue Nile. With L&D being almost completely absent from national climate investment plans, IGAD countries have missed out on opportunities to tap new global finance options such as the Fund for Responding to Loss and Damage (FRLD) or the Global Shield. Leaving vulnerable communities behind means they are left to self-finance recovery if such recovery is even possible.

Weak Institutional and Technical Capacities

Most IGAD countries have fragmented institutional mandates and limited technical know-how for monitoring or addressing L&D. In Ethiopia, overlapping mandates by the MoWE and the NDRMC led to delayed responses to Afar drought losses in 2020 (Raven-Roberts 2022). In Somalia, the Federal Ministry of Environment does

not have a field presence in the two flood- and erosion-prone regions of Puntland and Juba land. The fledgling South Sudanese institutions cannot track damages related to displacement from floods in Jonglei and Unity. The county governments in Kenya are without the L&D skilled workforce, and Uganda's disaster offices are undersized for post-disaster impact tracking. In the region, there aren't enough skilled workers for geospatial tasks, using satellite data, and measuring losses, which makes it hard to respond quickly, coordinate across borders, and set up climate compensation systems.

Fragmented Frameworks and Policy Duplication

L&D governance in IGAD countries is often fragmented into sectoral silos. In Eritrea, several sectoral policies mention sea-level rise and drought but do not practically rear a singular framework for L&D, thus realising disconnected responses. In Uganda, while disaster relief remains under the Office of the Prime Minister's sense of jurisdiction, climate resilience affairs lie with the Ministry of Water, and this duality generated a void of coordination during the 2021 Kasese floods (Navarro et al. 2024). Likewise, in Kenya, the various climate, agriculture, and disaster agencies take care of their drought data collection independently and prepare their reports to IGAD and UNFCCC in parallel, causing duplication.

Evolving NELD Methodologies vs Escalating Impacts

While methodologies for assessing these non-economic losses continue to evolve, their frequency seems to rise in IGAD. In Turkana, droughts stretching beyond the tenth year of the calendar have erased traditional festivals and practices as communities transition from nomadic existence into survival migration (Hoque and Hope 2025). In the Union of Djibouti, areas of Tajourdah have seen sea-level rise wash away burial sites and erode community ties to sacred sites. In the Bugisu community in Uganda, cultural dislocation has taken place due to the repeated landslides of Bududa, which disturbed clan cohesion and ancestral land connection (Serwajja, Kisira, and Bamutaze 2024). Yet the formal assessments do not take these factors into account. South Sudan fails to document or address the mental health impacts of such repeated displacements. Thus, the mismatch between the pace at which NELD impacts are occurring and the lack of standard methodologies weakens holistic climate resilience-building and under-represents community needs in national plans.

Insecurity and Fragile Governance

Several IGAD states suffer from armed conflict, political instability, and the politicisation of war, undermining climate-related planning, which is essential for L&D responses. South Sudan's militia activity cuts off humanitarian access to flooded areas, including Fangak, slowing down assessments of damage (Kuol, 2023). Insufficient governance in Somalia's climate-vulnerable Shabelle and Juba regions prevents investment in flood protection or post-disaster rebuilding (Anisa 2021). Ethiopia's Tigray conflict has disrupted early warning systems and blocked climate data flows essential to understanding drought impacts. Throughout IGAD, fragile political environments deprioritise investment in L&D, complicate donor engagement, and divert resources from climate-proofing toward security and emergency response, making climate shocks more damaging and less recoverable.

Weak Cross-Border Early Warning and Coordination

Transboundary climate risks are not coordinated well among IGAD countries because of poor joint early warning systems. The Merti aquifer, shared between Kenya and Somalia, faces unsustainable withdrawals but

has no bilateral governance agreement to protect against possible depletion of the resource. Locust invasions in 2019, 2020, and 2021 affected the territories of Ethiopia, Kenya, and Somalia, preventing a coordinated response due to the absence of regional alerts. Lake Victoria floods in 2020 battered Uganda, Kenya, and South Sudan without a shared monitoring or evacuation system. Without real-time data sharing across borders, any collective response by IGAD is limited, which means increased losses and diminished faith in regional solidarity and coordinated resilience.

7 RECOMMENDATIONS

Africa's pronounced susceptibility to climate change underscores the urgent need for immediate and sustained investments in both mitigation and adaptation. Addressing these challenges effectively requires decentralised approaches, inclusive policy frameworks, strategic partnerships, and active private sector involvement. These efforts should be rooted in comprehensive risk management and adaptive planning to react appropriately to regional climate risks (UNEP, 2023).

The IGAD region bears a particularly catastrophic burden of climate change, thus requiring rapid investment in both mitigation and adaptation. This should be done by devolving, localising climate solutions which diminish L&D whilst creating an ability to draw on a reserve of resources to deal with the existential threats presented by climate change to communities and ecosystems. Responding to L&D calls for joint strategic partnerships, the efficient allocation of resources and redirection of private sector investments, including the insurance industry. That might mean building climate index-based insurance products with dedicated climate finance injections.

In the Horn of Africa, the region confronts both the opportunity and the challenge of a growing youth population. This demographic dividend requires action for youth empowerment and constructive stakeholder engagement. Youth engagement should shift from talking on paper to real engagement by enabling access to finance and engaging youth as agents of change to combat L&D. Collective action is critical in tackling L&D across agrifood systems to protect vulnerable communities and safeguard food security. Agrifood systems should implement innovative, sustainable, and climate-resilient practices to enhance productivity, efficiency, quality, and diversity. However, despite the adoption of climate adaptation measures, the rising frequency and intensity of climate events are likely to continue driving L&D (FAO, 2023).

Effectively addressing L&D in the IGAD region requires urgent attention to institutional gaps. Unfortunately, current UNFCCC and Paris Agreement frameworks do not come equipped with the tools and mandates needed to comprehensively address L&D. It is important that IGAD member states tackle technical gaps, such as updating National Adaptation Plans (NAPs) to reflect the scale and urgency of L&D as an existential risk.

These efforts need to include the participation of multiple actors to create a common benchmark for climate risks, adaptation levels, and L&D responses. Moreover, institutional fragmentation needs to be addressed, given that coordination among international and regional actors is still weak, leaving the response effort with little coherence. An improvement in the planning and the integration of L&D with financial and development

planning tools is required. This includes clear metric and data frameworks in place, and streamlined solutions for non-economic losses. Ongoing negotiations are required to institutionalise and operationalise L&D beyond the existing framework of the UNFCCC. Operationalisation should help clear ambiguity in language and vague categories regarding L&D. Engagement with key actors also requires the development of a practical implementation framework (Boyd et al., 2017).

Global actors (e.g., the UNFCCC) and regional bodies (e.g., IGAD) should coordinate with their member states to act as a support for vulnerable regions, including the Horn of Africa. This imperative is emerging from a state where L&D has been delayed and insufficient (Calliari, Serdeczny, & Vanhala, 2020). Moreover, the international community must confront contested aspects of the L&D discourse, such as its positioning within the adaptation space and ongoing debates around liability and compensation. A depoliticised and justice-orientated discourse is necessary to make progress. Investing heavily in effective economic and non-economic loss and damage (NELD) data systems is essential. The data need to be current to support integrating L&D into national reporting tools such as Nationally Determined Contributions (NDCs), to ensure that the member states are prepared to access funding under the Loss and Damage Finance Facility (LDFF). Investments should also be aligned with joint early warning systems, cross-border infrastructure, and climate-resilient energy, water, and transport systems.

Establishing and operationalising a sustainable regional framework for addressing climate-related L&D in the IGAD region is essential. This will enhance adaptation, build resilience, and reduce the socio-economic impacts of both current and projected climate change. The regional L&D assessment advocates for the need to:

Establish knowledge management protocols and data-sharing frameworks to support L&D assessments, and encourage joint training across member states in the Post-Disaster Needs Assessment (PDNA) methodology. The Regional IGAD Loss and Damage Data Hub should standardise Post-Disaster Needs Assessment (PDNA) templates and integrate Non-Economic Loss and Damage (NELD) metrics for health, education, cultural heritage, and ecosystem services, among others, to support Santiago Network-aligned evidence-based proposals. IGAD's Multi-Hazard Early Warning System and Anticipatory Action Roadmap must include hazard triggers and thresholds to unlock pre-arranged funds and show avoided losses for FRLD claims. Finally, cooperation with global attribution centres is necessary to quickly assess extreme events and slow-onset processes such as sea-level rise and desertification, meet FRLD eligibility standards, and enhance regional resilience.

Accelerate the integration of quantified Loss and Damage risks—including Non-Economic Losses and Damages—into National Adaptation Plans and Nationally Determined Contributions to improve eligibility for emerging climate finance mechanisms and strengthen alignment with national budgeting systems. IGAD must also create a Regional Loss and Damage Task Force to coordinate climate-related efforts, facilitate technical support through the Santiago Network, accelerate access to the Fund for Responding to Loss and Damage, and promote peacebuilding in fragile and conflict-affected states. This task force should harmonise Warsaw International Mechanism focal points, Santiago Network contact points, and financial access entities to decrease institutional fragmentation and enable regional climate-related initiatives.

Spearhead efforts to operationalize the Fund for Responding to Loss and Damage (FRLD) by creating a Regional Access Facility to assist member states in developing competitive proposals, with an emphasis on grant-based financing and direct access mechanisms under the World Bank's interim hosting arrangements and initial commitments. IGAD should advocate for the incorporation of a specific Loss and Damage sub-goal

within the New Collective Quantified Goal (NCQG) for climate finance to ensure predictable replenishment cycles and equitable burden-sharing to implement key relevant policies and strategies, such as the IGAD Regional Strategy for Disaster Risk Management (2019–2030), the IGAD Climate Adaptation Strategy (2023–2030), Nationally Determined Contributions, National Adaptation Plans, and national disaster management policies. To diversify financing streams, the region should utilise existing mechanisms such as the Green Climate Fund, Least Developed Countries Fund, and Special Climate Change Fund, while also promoting innovative instruments such as debt-for-resilience swaps, climate disaster clauses, and global levies. IGAD should advocate for debt relief strategies tailored to fragile and conflict-affected states, including state-contingent debt terms and resilience-linked swaps. This approach would facilitate fiscal space for climate action and reduce the risk of disaster-induced debt distress, while ensuring that these mechanisms are acknowledged in future Loss and Damage finance eligibility frameworks and COP negotiations.

Prioritise strategic advocacy and shift from policy debate to actionable engagement from COP31 and beyond with key players, including the private sector. Mobilising the private sector to innovate and invest in climate solutions through index-based insurance, risk-transfer products, and climate-resilient infrastructure financing tailored to the region's high vulnerability and fragility is crucial. IGAD can unleash scalable solutions that increase resilience, decrease systemic risk, and accelerate sustainable development across the Horn of Africa by fostering public–private partnerships and incentivising private capital to flow into adaptation and Loss and Damage

Embedding peacebuilding into resilience strategies is essential as climate-related losses and damages are increasing disaster management costs and insecurity, especially in fragile states such as Somalia, Sudan, South Sudan and Ethiopia. Climate shocks increase resource scarcity and social tensions, perpetuating vulnerability and conflict. Thus,. Loss and Damage interventions should adopt conflict-sensitive approaches, strengthen governance, and promote inclusive resource-sharing among member states and cross-border communities. Linking climate finance with stability objectives and investing in cross-border cooperation, social protection, and livelihoods can transform Loss and Damage responses into drivers of peace and sustainable development in the IGAD region.

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Appendix

8. Swot analysis for the member states L&D institutional capacity

SWOT ANALYSIS ON INSTITUTIONAL CAPACITY					
COUNTRY	FOCAL POINT	STRENGTH	WEAKNESS	OPPORTUNITY	THREATS
DJIBOUTI	Ministry of Environment and Sustainable Development (MESD)	Existence of disaster risk management institutions under the ministry of interior. Djibouti developed National Climate-informed Disaster Risk Reduction Strategy and Action Plan aligned with the Sendai Framework for Disaster Risk Reduction 2015-2030. The country has operationalized a multi-agency emergency response team supported by the UN and the government, with the agency actively collecting data, developing an inventory and modernizing the domestic market regulatory framework. Djibouti emergency response plan focuses on NELD through the provision on social protection that include psychosocial support to children and PWD.	The country has a weak institutional capacity to address L&D. The collaborations occur mostly during emergency response denying Djibouti an opportunity to build long term capacity for L&D. Limited L&D data, roles duplication between environment, disaster and sector agencies and limited climate finance	L&D presents a collaborative opportunity for sustained funding to tackled both economic and NELD in Djibouti. There is also an opportunity to build capacity for resilience in Djibouti. IGAD platforms provide an opportunity to share early warning and climate information relevant for L&D	Climate extremes (floods, heat and droughts) are big threat its economy because of over-dependence on the port and its related logistics sectors. There are threats of heat related stress and increased burden of malaria in Djibouti. Over population in Djibouti City presents climate proofing challenges of infrastructures (energy, transport, water, etc)
ETHIOPIA	Ministry of Planning and Developed (MOPD)	Developed ambitious NDC 3.0 explicitly mentioning L&D related impacts on productive sectors, infrastructure and vulnerable groups including children. The National disaster in Ethiopia is addressed on a two-layer engagement of government staff with sectoral ministries addressing multi-hazard context. The National disaster risk in Ethiopia is evidence-based policy and programmatic decision making. Ethiopia is in the process developing a comprehensive national disaster L&D tracking system. Ethiopia considers addressing climate risk as integral to adaptation, climate risk insurance and network of social security.	Ethiopia suffers high vulnerability with low adaptive capacity makes it extremely to climate change extreme and related L&D. Ethiopia lacks risk transfer schemes (e.g., insurance or social protection programs), with a limited finance. Also, Ethiopia faces risk factors like lack of investment in water-related infrastructure, gaps in access to agricultural technology, or lack of health care services, contributed to increasing losses and damage.	Ethiopia can access climate finance with enabling policies in place. Ethiopia is in the process of rolling out a L&D tracking system to help the country build on evidence-based policy and financing need. Ethiopia is also transiting from a reactive crisis response to a proactive DRM. IGAD DRR and climate information platforms provide readiness support	Ethiopia is faced with recurrent climate related losses and damages. It has faced conflict in the recent years in different part of the country that has worsen climate impacts, humanitarian crisis and overall disaster preparedness.
KENYA	Ministry of Environment, Climate Change & Forestry	Active and update climate change policies (NCCAP 2023-2027, NDC 2031-2035 etc) take whole-of-society approach to climate adaptation and disasters recovery relevant to L&D. 2nd NDC 2031-2035 recognizes the need to avert L&D focusing on vulnerable groups, climate proofing critical sectors (agriculture, infrastructure, ecosystems etc). Kenya made a submission to the Santiego Network focused on addressing L&D. Kenya proposed and created a National Loss and Damage Focal Points (or Focal Institutions) to advice and guidance from TEG, for the operationalisation of L & D based on Decision 2/CMA.2. The focal point is also the coordinates all the climate crises. (extreme and slow onset) working closely with the relevant sectors.	Limited L&D data, institutional misalignment (NDMA in charge of droughts while Ministry being the focal point to UNFCCC. The humanitarian and projectized approaches overshadow long term strategic planning. The funding needed to address loss & damage in these communities is acute and unmet.	Kenya requires support to translate Santiago Network decision to concrete action. Kenya Policies such as NDC and NAP recognize the need to avert L&D starting with undertaking robust L&D needs assessment and capacity development to allow Kenya an opportunity to generate L&D reports to be utilized to access the Funds for Responding to Loss and Damage (FRLD). IGAD's ICPAC and CEWARN platforms provide early warning and risk management to deal with L&D.	Escalating threats of irreversible L&D, limited funding not matching the cost, increased risks of transboundary hazards such as floods and locusts infestations like in the 2020-2022 case.

SOMALIA	Federal Ministry of Environment and Climate Change (MOeCC)	MOeCC is the focal ministry for climate action in Somalia. The Somali Disaster Management Agency (SoDMA) is the Somali Federal Government organisation in charge of responding to disasters. Somalia's NDC 3.0 recognizes the need to avert L&D	Limited fiscal space and competing socio-economic priorities calls for more support for international partners to address losses and damages. Total volume of funds to be mobilised for the FRLD may be insufficient to cover L&D. The Government of Somalia lacks the capacity to quantify and articulate L&D financing despite recognizing the limitations in its NDC 3.0	Somalia can leverage international L&D finance to address L&D. Collaborative opportunity and training on Disaster Tracking, Data Management, and Early Warning Systems for Somalia with UNDRR. Somalia can roll out Disaster Losses and Damages tracking system (DLDT). IGAD DRR and climate information platforms provide readiness support.	The international finance mechanisms may not be willing to channel resources to fragile and conflict-affected countries limiting Somalia's access to L&D. The modalities for accessing RLD may be limited drawing lessons from GCF and other international financing instruments. Climate vulnerability risks exacerbating the crisis.
SOUTH SUDAN	The Ministry of Environment and Forestry	The Ministry is the focal point for climate action in S. Sudan. Developed NDC and NAP with DRR as an adaptation priority. The Ministry of Humanitarian Affairs and Disaster Management (MHADM) is responsible for disaster management. South Sudan has a National Disaster Risk Management (NDRM) Policy and NDRM strategy aligned to with the Sendai Framework. The policy is a step towards a legal disaster framework that will address climate related L&D. Also, South Sudan has a National Framework for Return, Reintegration, and Relocation of Displaced Persons (July 2019) addressing the displacement crisis caused by conflict and natural disasters.	Decades of violent conflict erodes the population's adaptive capacities leading to climate related L&D. Additionally, weak governance and inadequate infrastructure undermine the capacity of the institutions to adapt to climate change. The existing tension and spill-over of war in Sudan exacerbate the complex and persistence humanitarian crisis in South Sudan. Limited climate finance to improve DRR and enhance investments for climate proofing to deal with L&D	The United Nations agencies in South Sudan and partners including IGAD have an opportunity to coordinate and implement peace responsive climate adaptive initiatives addressing L&D at all levels. Opportunity to access technical assistance from Santiago Network and IGAD's early warning and climate information to enhance readiness and disaster preparedness	South Sudan is plagued by politico-ethnic violence and chronic instability since its independence from Sudan in 2011. The intersectionality of political inability, violent conflict and climate extreme deepens the vulnerabilities in South Sudan leading to more L&D including NELD such as displacement, mental health challenges and loss of cultural identity and cohesion due to forced migration.
UGANDA	The Ministry of Water and Environment (MWE).	MWE is the focal Ministry for climate change in Uganda. Uganda has developed the necessary NDC and NAPs to deal climate related vulnerabilities including disaster. Uganda has a National Policy for Disaster Preparedness and Management, focused on integrated disaster management, flood assessment, monitoring, evaluation, and information dissemination. Also, Uganda's climate policy and NDC have a provision for L&D. In addition, Uganda is an active member of the LDC climate change group and supports action on L&D in the context of the Paris Agreement and WIM. Uganda is among the initial beneficiaries set to benefit from a $400 million FRLD..	Uganda is yet to mainstream DRM in all sector plans and budgets at all levels limiting the capacity to address L&D. Disaster response in Uganda is reactive rather than proactive limit actions on effectively addressing L&D. Limited financial resources, data and inadequate early warning system to avert L&D.	Access to capacity support from Santiago Network. There is an opportunity to establish a compensation policy on L&D in Uganda for the affected communities. Also, focusing on L&D provides Uganda with the opportunity to develop a robust institutional framework linking local processes to national, regional and global climate action. IGAD's platforms such as ICPAC and CEWARN provide climate information and early warning supporting readiness	Extreme vulnerability to floods and landslides including in Kampala city. With more than 1.4 million refugees from more than ten countries including Burundi, DRC, South Sudan, Uganda is the largest refugee hosting country in Est Africa and 3rd Globally. There is limited humanitarian support and climate finance to enhance responses and averting loss and damages.

9. Case Studies and Human Interest Stories

In order to exemplify the lived experience of climate-induced L&D, case studies and human-interest stories of affected communities from the IGAD region are provided in this section. These narratives reveal how climate change interacts with social, economic, and cultural factors to influence vulnerability and resilience. Through centering the voices and experiences of affected persons in this matter, these accounts offer critical insights that supplement quantitative data and inform more inclusive, context-specific policy responses.

9.1 Case Studies

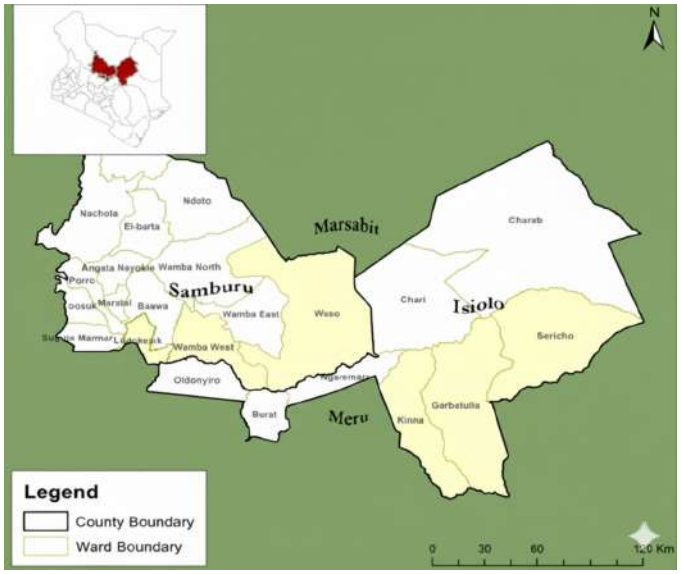
As the international climate negotiations frequently become bogged down in technicalities and diluted commitments, millions of people in the IGAD region continue to face firsthand a relentless circle of climate emergencies, resulting in economic and non-economic losses of immense magnitude. The case studies go beyond statistics and provide a voice to individuals who are on the frontlines by bringing together human-centred case studies from all over the region. It attempts to make the climate catastrophe more real by sharing stories of people who have experienced droughts and floods, resulting in deaths, destruction, displacement, and losses. These stories aren't only about harm; they're also about dignity, strength, and the need to put people at the front and centre of the L&D conversations.

The case studies are developed jointly with partner organisations working in the IGAD region to spotlight the existing vulnerabilities, challenges, coping mechanisms of communities, actions being taken and gaps in addressing L&D in the region. The case studies illustrate local experiences in addressing L&D, highlight existing best practices, and identify entry points for enhancing policy development and establishing appropriate institutional frameworks to manage climate-induced L&D in a proactive, adaptive, and responsive manner.

9.1.1 From five failed rainfall seasons to flood impacts in Northern Kenya. Lessons for responding to L&D from a locally led project in Kenya

Authors: Chiara Liguori (OXFAM), Jamie Livingstone (OXFAM), Ahmed Ibrahim (AHN), Dida Ali Ibrahim (SND) and Molu Tepo (MID-P)

Organization: OXFAM



Country and Location	Isiolo and Samburu Counties, Northern Kenya
Climate hazards	Slow onset: drought, extreme temperatures and water stress. Rapid onset: flash flooding
Vulnerable groups	Local communities, especially Women, children, persons with disabilities and the elderly)

Context

Arid and Semi-Arid Lands (ASALs) make up approximately 80% of Kenya's total land area. It is characterised by high temperatures and low, erratic rainfall and water shortages. Climate change continues to exacerbate the precarious situation, making extreme occurrences, such as unpredictable heavy rain, prolonged droughts, and flash floods, more frequent and severe. Droughts adversely affect rangelands/pasture, agriculture, and water resources, which are vital for livelihoods in ASAL regions. When rains do occur, they are often intense and concentrated over short periods, leading to flash floods that cause deaths, as well as soil erosion, displacement, infrastructure damage, and diseases.

Climate Hazard Impacts

In February 2023, approximately 4.4 million people in Kenya's ASAL region faced hunger and malnutrition because of losing their livestock, which they rely on for both food and their livelihoods. Almost 95% of water sources dried up in 2022, and water infrastructure had been damaged due to overuse during drought. Following months of severe drought, above-average rainfall between October and December 2023 led to floods that resulted in the deaths of 168 people, displaced over 500,000, caused the loss of 17,000 livestock, and flooded 18,000 hectares of cropland. Key infrastructure was also damaged, including roads, bridges,

schools, power, and health facilities. Communities reported that the floods and drought had severely affected their access to clean water for livestock and domestic use, with women and children particularly impacted.

Compounding Risks/impacts created

The extended drought, followed by the flash floods of 2023, led to increased risks, resulting in a combination of negative impacts that overwhelmed already vulnerable communities.

- Destruction of homes and displacement: The rains washed away some houses, displacing people to seek shelter in schools and rental houses. School reopened, and the displaced were forced to move out, adding to their misery.
- Loss of livelihood: loss of livestock and damage to crops increased household food insecurity and dependence on food aid or forced migration into urban areas.
- Water Access, Health, and Sanitation: The rains brought about destruction, both for the community and the water system. The long rains destroyed the piping system used for the borehole waters. The community could only rely on rainwater. Waterborne diseases, including cholera and diarrhoea, are on the rise especially in children due to the lack of clean drinking water, thereby increasing the cost of healthcare.
- Gender disparity: The destruction of water sources caused by climate change also extended the distance women and girls had to walk to access functioning water points, particularly affecting pregnant women. This exacerbated the risks of gender-based violence (GBV) and contributed to the unequal distribution of unpaid care and domestic work.

These risks from the five failed rainfall seasons and the extreme floods that followed further aggravated local communities' pre-existing vulnerabilities and made recovery a slow process, particularly for vulnerable groups, including women, children, the elderly, and persons living with disabilities.

Initiatives to avert, minimize and address L&D

Oxfam, in collaboration with local partners, the AHN and SND in Samburu, and MID-P in Isiolo, initiated a project aimed at supporting individuals who have suffered multiple economic and non-economic losses and damages due to repeated droughts and flooding.

- The first component addressed economic and non-economic losses and damages (including negative health impacts and gendered dimensions) related to the limited access to clean water sources. A total of five water systems were rehabilitated, comprising 6.6 kilometres of pipeline with a water storage capacity of 60m³, including a steel tank, installed for continued access to clean water. Six water points were established for domestic consumption, and a cattle trough was re-established to facilitate cattle watering. These projects supported 22,622 individuals living in climate-related droughts and floods with a specific emphasis on women and girls.
- The second component of the project dealt with the L&D caused to livelihoods, homes and education through the administration of cash transfers. It employed a Survivor and Community-Led Response (SCLR) methodology inviting whole groups of community members to submit proposals for community-based initiatives eligible for group cash transfers. The process was designed to foster participation and local leadership and ownership in project design. Where previously, Oxfam and its partners had given individual

household cash grants to communities as an emergency intervention in food insecurity, it was the SCLR approach that was new to them.

- A second group decided to help displaced community members whose homes were destroyed during the floods by constructing a shelter for the households most in need.
- In Isiolo, a community self-help organization was financed to buy and distribute goats to vulnerable women-headed households. This not only contributed to livelihood restoration and resilience strength, but also the availability of goat milk enhanced nutritional outcomes. With breeding, goats could be shared with other households, spreading these benefits throughout the community.

Positive Outcomes

- The initiative also bolstered the standing of community conflict committees, including the participation of women and youth. The peace committees coordinated discussion sessions and trainings with various communities and authorities on conflict resolution skills, intergroup relations, and community engagement. A peace caravan, or march, was also organised to mobile the people, including community elders, government officials, NGOs, and many others, to engage with and contribute to dialogue, reconciliation, and peaceful coexistence among Isiolo and Samburu counties.
- Reduced household food insecurity by 50% due to the cash received by households
- Reduced burden on women who used to trek long distances in search of water
- Increased school enrolment in the villages where the school was rebuilt

Lessons Learned

- Sufficient time and resources must be allocated to facilitate the community's understanding of L&D, as well as suitable responses.
- Locally led approaches, including access to funding, are essential for more impactful L&D responses.
- L&D responses need to be gender transformative.
- Loss of peace as non-economic L&D and the importance of adopting conflict-transformative responses.
- Programmatic, integrated and long-term approaches are crucial for effectively and comprehensively addressing L&D.

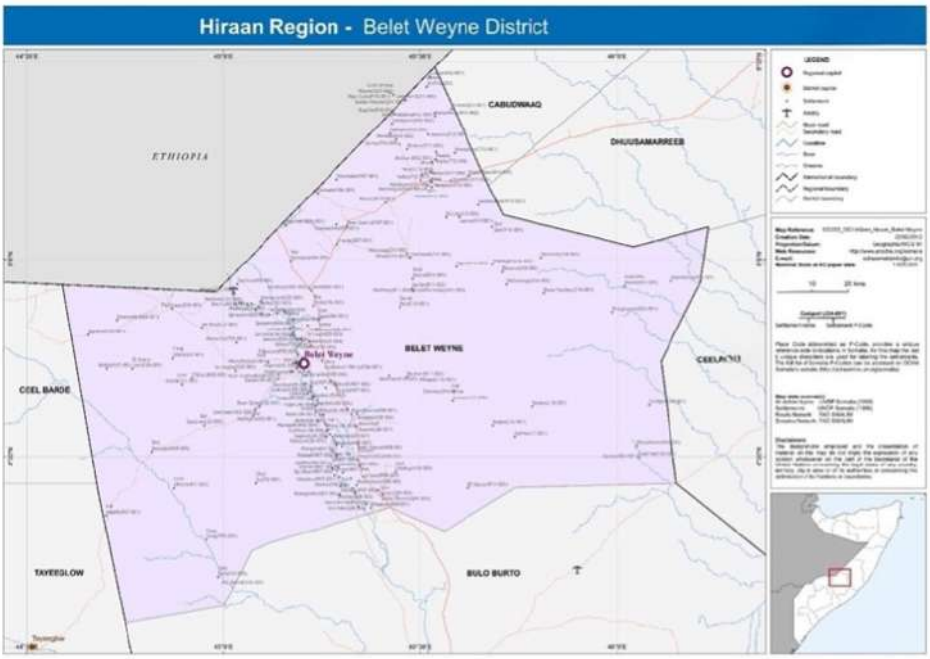
Support required in the future

- Enhanced funding to support the L&D agenda
- More research to understand the L&D extent in the region and develop sustainable solutions
- Promote ownership and community-led approaches in L&D responses, fostering collaboration with all stakeholders, including governments, development partners, CSOs, and academia, among others.
- Disaster risk management training and capacity development for enhanced early warning systems that are responsive.
- Promote human rights-consistent, gender- and conflict-transformative, and locally led responses.

9.1.2 Forecast to Action: Anticipatory Actions Ahead of the 2024 Beledweyne Floods

Authors: Idiris Mohamed/Hafsa Mohamed

Organization: World Food Programme



Country and Location	Somalia – Beledweyne, Hiraan Region, Hirshabelle State
Climate hazards	Slow-onset hazard: Droughts leading to water scarcity, crop failure, and reduced pastoral livelihoods. Sudden-onset hazard: Recurrent floods from the Shabelle River frequently inundate Beledweyne, causing widespread displacement and damage.
Vulnerable groups	Riverine farmers, internally displaced persons (IDPs), women-headed households, and children

Context

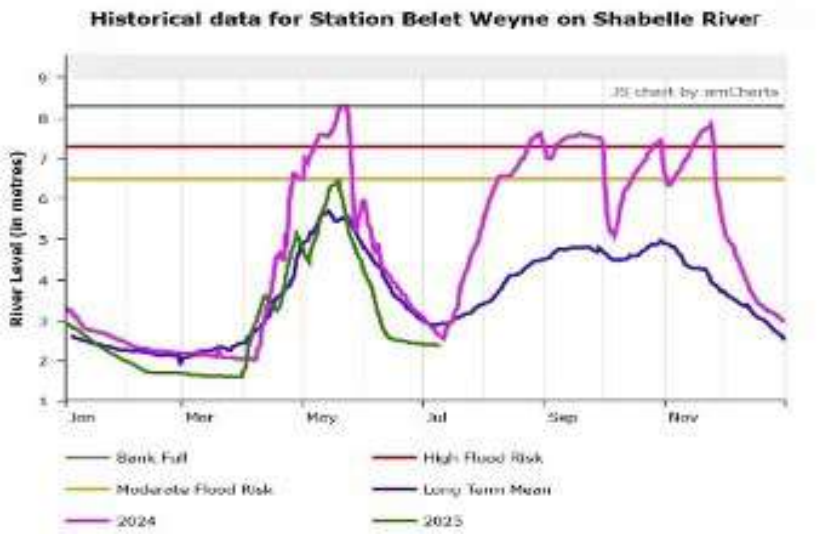
Beledweyne is the capital of the Hiraan Region and one of the most flood-exposed urban centres in Somalia. The town lies in a flat, low-lying area along the Shabelle River, a major watercourse that rises in the Ethiopian highlands. Its geographic location renders it acutely vulnerable to seasonal floods, particularly during the Gu and Deyr rains. In 2024, forecasts from Geospatial Streamflow Models (GeoSFM) and data from the Somali Water and Land Information Management (SWALIM) unit indicated a significant flood risk in the Shabelle Basin. Forecasts were confirmed by hydrological data showing that river water levels were reaching predefined danger thresholds. Compounding the physical risk was Beledweyne's high population density and the presence of large IDP communities. Many families had settled on riverbanks and floodplains after previous displacement due to drought or conflict. These areas lacked formal infrastructure, increasing exposure to inundation, water contamination, and disease outbreaks.

The government of Somalia, in partnership with WFP and partners, activated anticipatory action protocols in Beledweyne based on these scientific triggers, allowing support to be delivered before flooding occurred.

Climate hazards impacts

By early May 2024, heavy rains in upstream catchments caused the Shabelle River to breach its banks in Beledweyne, submerging several neighbourhoods in both the eastern and western parts of the town. Roads became impassable, hundreds of homes were inundated and vital infrastructure like markets, healthcare facilities, and schools were severely disrupted. Flooding also left thousands without access to clean water, intensifying the public health risks. Overall, more than 23,000 people were affected, at least 9,300 were displaced and four lives lost. Of those displaced, 11,676 people self-relocated to higher ground for safety. According to a statement by humanitarian partners, more than 10,500 shelters – largely makeshift – and 1,112 latrines were destroyed, increasing sanitation issues.

More than 5,800 hectares of agricultural land were inundated, destroying crops and food stocks and worsening an already fragile food security situation. The economic damages in Beledweyne due to the floods of May 2024 are conservatively estimated to exceed USD 15–20 million and include damage to housing, agricultural livelihoods, water and sanitation facilities, education infrastructure, and displacement-related costs. For



context, the overall economic losses due to the 2023 floods caused by El Niño in Somalia were estimated at over USD 230 million, and this reflects the rising economic impact of climate-related disasters and the necessity of preventive action in advance.

Compounding risks and impacts

- The flooding triggered a chain of risks that, taken together, overwhelmed household and institutional coping capacities:
- Health and Sanitation: The flooding caused contamination of water supplies and increased the number of reported cases of acute watery diarrhoea. Conditions for mosquito-breeding got worse, leading to an uptick in malaria and other vector-borne diseases.
- Protection Risks: Overcrowding of shelters and displacement sites have raised the risk of gender-based violence. Women especially were badly affected in terms of privacy and basic sanitation materials.
- Livelihood Disruption: During critical planting periods in riverine villages, the riverine villagers lost their access to the land. Many also lost livestock, tools, and stored harvests due to swift inundation.
- Access to Basic Services: Inundated roads made access to markets, clinics, and schools impossible. Shortages of available goods in health centres and slow mobile outreach.
- These risks intensified vulnerability and slowed the pace of recovery for the more vulnerable.

Anticipatory Action: Initiatives to avert, minimize and address L&D

In anticipation of the May 2024 floods in Beledweyne, WFP, in coordination with the Federal Government of Somalia and partners, implemented a comprehensive package of anticipatory actions aimed at minimising L&D. Based on forecast-based triggers, WFP provided early cash transfers to 39,204 vulnerable people between 10 and 15 days before the flooding occurred. This early support enabled households to prepare in advance by purchasing essential items, arranging transport, and relocating from high-risk areas. In parallel, WFP and the Logistics Cluster prepositioned boats in flood-prone zones to support the safe evacuation of at-risk communities, ensuring timely movement to higher ground. Early warning messages were disseminated in three distinct phases: before, during, and after the floods, using locally appropriate channels such as local telecommunication network through phone ringback tones, radio broadcasts, and social media. These messages, delivered in local dialects and reinforced by community leaders, provided practical guidance and safety advisories to help communities prepare, respond, and recover more effectively from the floods.

Positive Outcomes

- Post-distribution assessments and focus group discussions indicated significant benefits from the anticipatory action package:
- Improved Evacuation Readiness: 62% of cash recipients evacuated before the flood peak, compared to only 23% among non-recipients.
- Asset Protection: Beneficiaries used cash to transport livestock, purchase food stocks, and reinforce shelter structures. This mitigated damage and loss.
- Enhanced Community Trust: Beneficiaries reported increased confidence in early warning systems and humanitarian coordination, citing timely action and local engagement as key factors.

- Protection of food and assets: 46% achieved acceptable food consumption scores; many safeguarded livestock and property
- Resilience and reduced negative coping: 63% avoided harmful coping strategies; early action reduced reliance on debt and exploitative measures.
- Effective warning uptake: 87% received and acted on early messages through local channels. “We used the cash to leave before the water came. My children didn’t get sick this time because we stayed in a safer place. We didn’t lose our goats either.” – Faduma, cash recipient from Beledweyne East

Lessons Learnt

The 2024 experience in Beledweyne provided several important insights:

- Data-Driven Forecasts Enable Timely Action: The use of hydrological modelling, GeoSFM forecasts, and on-the-ground verification provided enough lead time to implement meaningful and successful anticipatory action.
- Cash is Effective but Must Be Paired with Information: Households that received both cash and early warning information were better prepared than those who received only one.
- Community Involvement Enhances Impact: Involving local leaders and women’s groups in planning and dissemination ensured greater reach and trust in the programme.
- Coverage Gaps Remain: Despite its success, only 60% of at-risk people were reached, showing the need for expanded support.

Support required in the future

- Dedicated and Flexible Funding: Limited resources meant that only 60% of at-risk house- holds received anticipatory support. There is a need for a dedicated and flexible funding stream, ideally through a pooled anticipatory action fund, to enable rapid, scalable responses the moment scientific triggers are met.
- Strengthening Early Warning Access: While mobile ringtones, radio broadcasts, and community structures were successfully used to disseminate advisories, reaching remote and hard-to-access communities remains a challenge. Additional investment is needed to reinforce and expand these systems to ensure no one is left behind.
- Scaling Evacuation Support: The use of prepositioned boats was critical in enabling safe evacuation, but coverage was limited. There is a need to expand evacuation infrastructure and planning, ensuring timely movement to safe areas for all those at risk.
- Investing in Local Capacity and Inclusion: Community-based engagement, particularly through women-led groups and local coordination structures, must be strengthened to enhance trust, relevance, and uptake of anticipatory actions.
- Integration and Sustainability: To ensure long-term effectiveness, anticipatory action must be aligned with national and state-level disaster risk management strategies and coordinated closely with government and local authorities to reinforce institutional systems.

9.1.3 From Home to Nowhere: Gender, Displacement, And Climate-Induced L&D" The Case of Nyumanzi Settlement Communities in Uganda

Authors: Sojung Kang

Organization: UNHCR

Construction Group A1 renovating a tukul's roof in Nyumanzi (Photo Credit: The Luteran World Federation (LWF))

Country and Location	Nyumanzi refugee settlement, Adjumani, Uganda
Climate hazards	Slow onset: Extreme heat, Prolonged dry spell, Heavy rain Rapid onset: flooding
Vulnerable groups	Refugees, Rural populations in refugee hosting district

Context

Nyumanzi refugee settlement, located in Adjumani district, Uganda, hosts over 47,000 refugees, primarily from South Sudan. Established in 2014, the settlement faces significant climate-related challenges, including extreme heat, prolonged dry spells, heavy rains, and flooding. These hazards are compounded by the settlement's reliance on agriculture and limited infrastructure capacity.

The information below is based on the IMPACT Initiatives Assessment "LIVING WITH CLIMATE-RELATED HAZARDS - Impacts and community responses among refugees and hosts in Nyumanzi settlement (Adjumani, Uganda)"

Climate Hazard Impacts

- Extreme Heat: Nearly all residents experience extreme heat, with temperatures often exceeding 45°C. This has led to health issues such as dehydration, heat exhaustion, and reduced productivity.
- Prolonged Dry Spells: Frequent dry spells have resulted in water scarcity, affecting both agriculture and daily living. This has led to reduced crop yields and increased food insecurity.
- Heavy Rain and Flooding: Flooding is a recurrent issue, with significant impacts on shelter, health, and livelihoods. Floods have displaced thousands and damaged infrastructure, leading to increased disease prevalence and economic losses.

Notably, refugees and host communities both face these challenges, though refugees report higher instances of shelter damage and temporary displacement, particularly due to flooding. Refugees also reported experiencing strong winds more frequently (78%) than members of the host community (64%). This disparity may be linked to differences in housing materials and the ability to carry out repairs. Unlike host community members, refugees are not permitted to cut grass for thatched roofing and must purchase it instead, making them more vulnerable to wind-related damage. Their limited resources for roof maintenance may also heighten their awareness of wind events

Compounding Risks/Impacts Created

- Health Risks: Increased prevalence of waterborne diseases, heat-related illnesses, and mental health issues due to climate stressors.
- Economic Strain: Loss of crops and livestock, increased food prices, and reduced income-generating opportunities.
- Educational Disruptions: School closures and reduced attendance due to extreme weather, impacting children's education and prospects. This is particularly evident among refugees.

Vulnerabilities/Impacts by Compounding Risks

- Women: Bear the brunt of household labour and caregiving, facing increased risks of gender-based violence and health issues. For some women, the pressure to secure essential resources may have resulted in the adoption of harmful coping mechanisms, such as transactional sex.
- Children: Higher susceptibility to diseases and educational disruptions.
- Elderly and Persons with Disabilities: Limited mobility and increased vulnerability to health risks and displacement.

Initiatives to Avert, Minimise, and Address L&D

- Below are the interventions needed to address L&D in the Nyumanzi settlement. (Or is this section for current initiatives? Need clearer guidance)
- Water Management: Improved water access through boreholes and rainwater harvesting.
- Infrastructure Reinforcement: Construction of flood-resistant shelters and improved drainage systems.
- Health Interventions: Mobile clinics and community health education to address disease outbreaks and heat-related illnesses.
- Agricultural Support: Introduction of drought-resistant crops and improved irrigation systems.
- Communities have developed strategies such as altering work hours, reinforcing shelters, and relocating to safer areas.

Support Required in the Future

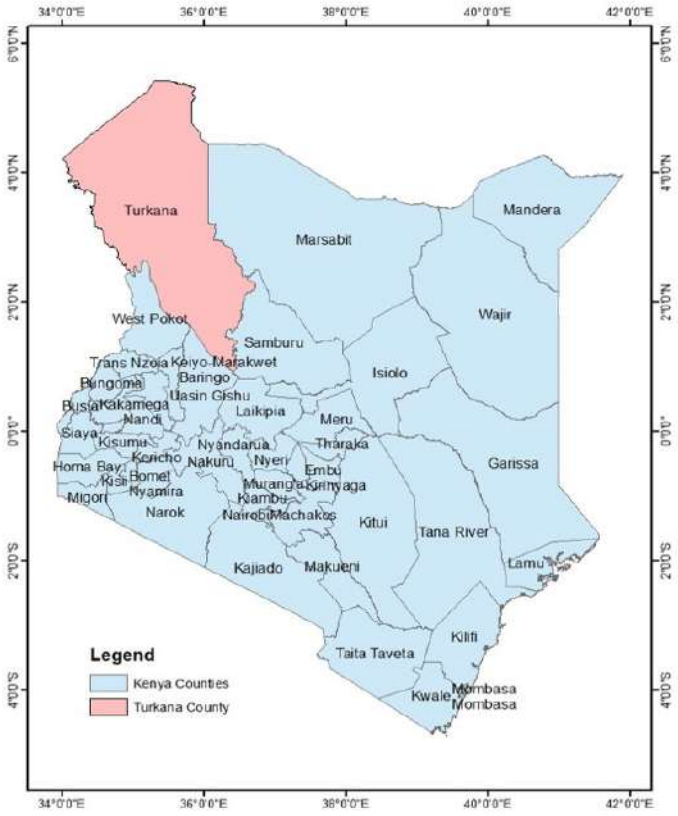
- Financial Assistance: To support infrastructure improvements and livelihood diversification.
- Technical Support: For implementing climate-resilient agricultural practices and water management systems.
- Policy Advocacy: To ensure inclusion of refugees and their hosts in the design and implementation of climate action policies and plans and sustained support for climate adaptation and disaster risk reduction.

Lessons Learnt

- Community Involvement: Engaging local communities in planning and implementing adaptation strategies is crucial for their success.
- Integrated Approaches: Combining infrastructure improvements with health and education initiatives enhances overall resilience.
- Sustained Support: Continuous financial and technical support is essential to address the long-term impacts of climate change.

9.1.4 Seeking resilient livelihoods: a pathway to address climate-related L&D in Turkana County, Kenya

Authors: Edwin Odhiambo Siala, Alma García and Mattias Söderberg DanChurchAid (DCA)



Geography Africa; Landlocked; Lake Turkana

Country and Location	Turkana County, Kenya
Climate hazards	Slow-onset: increase in drought frequency, water stress, increase in evapotranspiration because of higher temperature. Rapid-onset: flash flooding.
Vulnerable groups	Women, children, older people, young people, disabled people, pastoralist communities
Response mechanism	Anticipatory: moving livestock to access pasture and water, keeping mixed livestock herds. Survival: adopting sustainable livelihood alternatives, business skills training Recovery: essential training, climate-friendly policies, investment.

Context

Turkana County accounts for 13.5% of the total land area in Kenya. It is located in the northwest of Kenya and borders Uganda to the west, South Sudan to the north, and Ethiopia to the northeast. It is home to 926,976 people, of whom more than half are below the age of 19. This youth-dominated population profile indicates the need for urgent investments in education, nutrition, water and health. Due to its location, Turkana County has been receiving refugees from neighbouring countries to the Kakuma refugee camp, established in the early 1990s, and Kalobeyei settlement, established in 2016. Population growth, the expansion of the youth population and the adverse impact of recurrent droughts upon pastoralist communities have resulted in rapid levels of urbanisation in Turkana.

Kenya has experienced an increase in drought frequency from once in every ten years in the 1960s and 1970s to once in every two to three years in the 1990s. Since 2000, drought has become increasingly unpredictable. Turkana County is among the most vulnerable arid and semi-arid land (ASAL) regions

in Kenya. Here higher temperatures and an increase in evapotranspiration are expected to cause more frequent climatic extremes, increased aridity, increased water stress, diminished yields from rainfed agriculture, and increased food insecurity and malnutrition

Impacts

Turkana County's economy is dependent on its natural resources and is highly vulnerable to climate variability. Rising temperatures and changing rainfall patterns result in increased frequency and intensity of extreme weather events, such as droughts and flooding. These extreme events threaten the sustainability of the county's development. Despite exposure and sensitivity to frequent droughts, pastoral economy accounts for 90% of the employment opportunities and 95% of family income and livelihood security in Kenya's ASALs. In Turkana County, increasingly frequent extreme drought events have a negative impact on pastoral livelihood.

More than 80% of the droughts that occurred in Turkana County between 1950 and 2012 covered a large area and had widespread impacts on other parts of Kenya. These extreme conditions pose a major challenge to livelihood activities. For example, hot and dry conditions reduce forage availability and increase incidences of disease, enhancing livestock morbidity and mortality. Poor forage availability also leads to lower milk production and consequently to malnutrition and poor health among children, since milk is one of the Turkana people's staple foods. During droughts, the people rely on wild fruits for foraging.

Seasonal mobility forms a critical element of pastoral communities' livelihoods in Kenya's ASALs. But with climate change, rural communities are facing increasing competition and conflicts over limited water and pasture resources. Increased incidences of human-wildlife conflicts threaten their lifestyles and trigger internal migration. In addition to pastoral migration, the refugee population represents some 15% of Turkana County's total population. Nearly 80% of the refugee population is made up of women and children (approximately 148,000 people).

Given the negative impacts of increased drought frequency on livelihoods, communities are increasingly getting involved in environmentally unfriendly alternatives. These include charcoal burning and unsustainable land management practices, such as overgrazing, and illegal and excessive fuelwood collection. All these activities further exacerbate the environmental degradation of already fragile dryland ecosystems. This has been compounded by poor resource governance — often due to institutional or tenurial barriers, poorly

conceived policy enforcement and ineffective climate governance practices—that does not include the wishes and aspirations of the Turkana community.

Although the region is generally hot and dry, when the rains do come, the dry riverbeds fill quickly, causing dangerous flash flooding — a key climate stressor. This is the main factor causing loss of lives and livestock and devastating damage to people's property and infrastructure, such as roads and communication networks. Due to the quick onset of flash flooding and the relative rareness of such events, the population and authorities are not well equipped to deal with their impacts

Compounding risks/impacts created

The poverty rate in Turkana County is 72% versus a national poverty rate of 37%, while unemployment in the county is reported at more than 35%. The primary school enrolment rate is 48%, and secondary school transition rate is 9%. Only 11% of Turkana residents live in improved housing, with only 12% having access to the electricity grid. Most of this privileged population lives in larger towns like Lodwar, Kakuma and Lokichogio. Access to improved water and sanitation services also remains low. Nearly 43% of people

In Turkana, it takes more than one hour to collect water in the dry season, and 24% take more than two hours. Pastoralists are also among the groups most marginalised from socioeconomic services and infrastructure.

Traditionally, Turkana pastoralists have used risk-diversifying strategies. These include moving livestock to access the best quality pasture and water available and keeping mixed livestock species herds to protect against total loss of livestock in case of drought. Over time they have learnt to cope with permanent water scarcity, variable inter- and intra-seasonal rainfall, and the recurrent risks of weather-related shocks. However, because of high poverty rates, changing socioeconomic and political circumstances, and demographic growth—coupled with the increased frequency of extreme events—traditional coping strategies are increasingly becoming insufficient. This has led to the migration of rural communities to urban areas and regions around refugee camps to access basic services like water, sanitation, education and health, as well as job opportunities.

Vulnerabilities and impacts by compounding risks

Decreasing animal herds, due to mortality caused by frequent droughts, have led to what community members refer to as a 'state of despair'. This has led to an increase in demand of a local alcoholic grain-based brew called chang'aa. Susceptibility to addiction, anxiety, and emotional distress among pastoralist Turkana communities is also on the increase. Community members, especially young men and women, are increasingly abusing alcohol as a way of coping with stress and depression. This could be linked to the non-economic loss caused by their transition from pastoralists to a settled community. There are no structured health and social systems in the community to deal with alcohol abuse. People who abuse alcohol have reduced capacity to engage in livelihoods and economic activity, thereby further exposing them to a life of poverty and hopelessness. Migration to urban areas has also led to an increase of other social vices such as prostitution.

For women, alcohol abuse leads to abandonment of caregiver roles and increased exposure to sexual and gender-based violence when they go to urban areas to sell charcoal and firewood. Cultural beliefs and customs that people relied on, and that provided a sense of protection from physical and social harm, are being eroded. People find themselves isolated and alone in urban centers where they have no relatives. The social structures that provided protection seldom exist for people who have migrated. Furthermore, access to education for

children is very poor, with malnutrition, displacement and migration preventing children from attending school.

Adaptation measures

Measures being employed by households and communities to deal with climate impacts and to try to minimise L&D risks include adopting alternative livelihood systems such as growing vegetables or being involved in entrepreneurship. Communities prefer keeping certain livestock. Goats and camels are preferred to cattle, as they can withstand harsher climates and do not have to feed on pasture. The more cows a pastoralist has, the more they are prone to frequent migrations and therefore communal conflicts, because of competition for limited pasture and water resources. For those who have cattle, another way of coping with climate impacts is to migrate to neighbouring countries, including South Sudan and Uganda. Some communities still practise age-old traditions like engaging the services of traditional seers, who often conduct rituals to appease their God to bring rains. This is an age-old tradition still being practised during prolonged drought seasons, albeit in limited cases.

The NGO DanChurchAid (DCA), together with a local partner, has supported the adoption of sustainable alternative livelihoods like fisheries and poultry production among local communities (DCA has worked together with the local partner, SAPCONE, on fish value chain promotion). These are pursued through sustainable market-driven interventions, such as the provision of essential agricultural inputs through input vouchers, training on crop husbandry and poultry production, and capacity building on business. Additionally, communities and women fish traders have been equipped with essential skills to manage their businesses, and support was provided for the formation of community-led savings and loan platforms to strengthen economic resilience

Recent studies show that DCA interventions have helped communities to adapt to climate change and strengthen their livelihoods. According to the results of a recent evaluation of their projects in Turkana, 54% of beneficiaries of DCA interventions have an acceptable food consumption score, while 14% have a borderline food consumption score. This indicates that the proportion of people participating in DCA interventions that can access and consume a variety of foods is higher than average. Additionally, 79% of communities supported by DCA had a high dietary diversity score. And 81% of youth trained in business skills by DCA acknowledge that they have significantly improved, with 50% saying they started businesses after receiving the training

L&D beyond adaptation

Climate change has caused some non-economic losses that could not be avoided through existing coping and adaptation measures. These include the loss of community value systems and traditional protective structures that individuals would turn to in case of vulnerability. In other words, displacement to urban areas has led to the disruption of the social fabric and the loss of community connections. Furthermore, migration to neighbouring territories in search of water and pasture resources triggers inter-tribal and cross-border conflicts over such limited resources. This has in certain cases led to loss of lives among the Turkana or the neighbouring Pokot communities. The influx of light arms is a compounding problem, which has led to the deterioration of security in the area.

Economic L&D due to climate change, specifically related to Turkana County, is not documented.

Support needed in future

To help communities cope with these existing and anticipated climate losses and damages, both economic and non-economic support are needed:

- Provide essential training to communities on climate-smart agriculture, agroecology, livelihoods diversification, water resource management and economic empowerment. This will inform them of various aspects of climate change adaptation and disaster risk mitigation.
- Promote access to climate-smart agriculture technology such as shade nets, irrigation equipment, solar-powered energy sources, livestock breeding and appropriate water harvesting to provide communities with alternative livelihood sources.
- Develop climate-friendly policies at the county government level and establish structures to operate carbon compensation mechanisms at the national level. These should promote local community participation in climate mitigation projects. For example, carbon compensation mechanisms could finance afforestation programmes to increase forest cover affected by climate change-induced desertification. This would address the loss of forest cover and prevent the indiscriminate logging of trees for charcoal.
- Develop policies to enable investment of more resources to counties affected most by climate change. For example, setting up multi-level climate governance instruments such as partnerships, platforms, funding mechanisms and action plans to support public participation on climate issues, and ensure availability of sufficient finance for local climate action.
- Develop multi-stakeholder initiatives (government, NGOs and so on) to provide psychosocial support to help with non-economic losses related to culture and tradition, as well as resettlement.

Lessons learned

The lessons identified from experience that can help develop climate change adaptation strategies include:

- Prioritise local action in climate governance and mitigation interventions by including local people and communities. Give priority to climate solutions generated in local communities that address their interests.
- Invest in climate change initiatives at local and national levels. Climate change initiatives should be implemented at multiple levels of the economy. National climate change actions can give the necessary impetus for local resource allocations and policy support.
- Support small projects that address different aspects of L&D among affected communities. These projects should deal with livelihoods diversification, climate-smart agriculture, agroecology, nutrition, and household economic development through business and entrepreneurship skills development.
- Promote a nexus approach — merge humanitarian, development, and climate action and support in a way that ensures connected planning and response and builds on community resilience. This would help humanitarian actors to make intentional links between the failure to address climate change L&D, and overall inability to realize development goals

9.1.5 The impact of flooding and sea level rise: the case of Kwale County in southern Coastal Kenya

Author: Robyn Morland

Organisation: The Association for Coastal Ecosystem Services

Country and Location	Kwale County, Kenya
Climate hazards	Slow onset: extreme rainfall, changing rainy seasons, sea level rise, ocean acidification, saltwater intrusion Rapid onset: flash flooding, storm surges
Vulnerable groups	Coastal communities, women, disabled people, fishers
Response mechanism	• Mangrove and seagrass conservation and restoration • Survival: Water storage, sea wall • Innovations: Carbon-financed mangrove protection and restoration to enhance resilience of coastal communities

Context

Kwale County is the most southerly county on Kenya's coastline, bordering Tanzania to the south and Mombasa, Kenya's largest coastal city, to the north. Its coastline stretches for around 250km, with mangrove forests, seagrasses and coral reefs present in locations along the coastline. Tourism is an important sector to the coastal economy here; the town of Ukunda, Kwale's largest settlement, is a popular resort. In addition to tourism, many of Kwale's coastal communities rely on fishing for income; 95% of Kenya's landed fish are from small-scale fisheries. Agriculture is also prevalent on the coast, with cashew, mango and coconut being the primary crops grown in the coastal region. Most of the coastal area throughout Kenya is low-lying; most notably, immediately to the north of Kwale, 4-6 km² of Mombasa would be inundated with just a 0.3m sea level rise.

Coastal ecosystems of mangrove forests and seagrass meadows are in decline in Kenya. An estimated 20% of the country's mangrove forests have been lost, primarily to coastal development and timber cutting. Seagrass meadows are estimated to have declined at a rate of 0.85% per year for the last 40 years.

Kwale County has higher than average poverty rates within Kenya, with 35.9% of the population living on less than $2.15 a day and 90% on less than $6.85.

Climate Hazard Impacts

East Africa, including Kenya, Ethiopia and Somalia, has notably experienced droughts and resulting failure of agriculture and famines in recent years. The coastal region, along with the central and western Highlands of Kenya, in contrast, have higher than average rainfall because of climate change. This rain is concentrated in two rainy seasons – the 'long rains' typically from March to May and the 'short rains' from October to December; although the timing, length and intensity of these seasons are becoming variable and unpredictable, the impacts of this include reduced agricultural yields, challenges in planning of activities including fishing, and reduced trust in scientific forecasts and advice. Higher than average rainfall brings flooding, and with it come impacts including water-borne diseases such as cholera, reduced tourism activity, and impacted access to land, including agricultural land.

Sea level rise brings multiple challenges: saline intrusion affects yields of coastal crops, including mango, cashew and coconuts, reducing income for coastal farmers and raising food insecurity for coastal communities. An estimated $472.8m will be lost from these crops alone with a 1m rise in sea levels in Kenya. Freshwater aquifers are at increased risk of salinisation, compromising the ability of coastal communities to access potable water. The Kenyan coast is largely low-lying, and so rising sea levels will leave areas uninhabitable, leading to displacement of coastal communities and severe economic consequences for those living in poverty suffering displacement.

Compounding Risks/impacts created

Kwale County is highly reliant on the neighbouring city of Mombasa for economic activity and transport, including shipping and international air travel (which is used by many as a route to Kwale's tourism hotspots). Mombasa is at particular risk from sea level rise, with 4-6 km² at risk with just a 0.3m rise in sea level.

While Kwale suffers from increased rainfall with climate change, the majority of Kenya is impacted by droughts. These droughts raise food insecurity and thus raise food prices nationally, impact energy production (particularly

hydro energy) and so raise the risk of outages and increased energy prices, and impact infrastructure, including transport links. These collective risks and impacts compound the risks that Kwale faces indirectly (for example, by raising food prices) and compromise the ability of the Kenyan government to meet the adaptation and resilience needs of Kwale.

Vulnerabilities and impacts by compounding risks

Vulnerable groups on Kwale's coastline include those most exposed to economic disadvantage; with a high rate of poverty, this constitutes most of the population. The ability, or lack thereof, of communities and individuals to adapt to or escape the impacts of climate change is heavily influenced by economic status. In addition to economic impacts, displacement brings with it cultural fragmentation and resulting loss of cultural identity and customs, emotional and mental distress, and dispersal of familial and social units.

Women are at particular risk within these groups; in Kenya, women's voices are typically not heard to the same degree as men's, and their involvement in and contribution to adaptation and resilience strategies is typically low. This leads to women's interests being sidelined and deprioritised. In addition, women typically hold lower socio-economic status in the community and are often reliant on male household leads, compromising their ability as individuals to take action to protect against or evade the impacts of climate change. People with disabilities are similarly disadvantaged by lower access to income-generating activities and a resulting reliance on others in the community.

The fishing community, which comprises up to half the population in particular areas, is vulnerable to the impacts of ocean acidification and sea temperature rise (resulting in changing and, in some cases, reduced target species and stock levels) and unpredictable and volatile weather patterns whilst at sea.

Initiatives to avert, minimise and address L&D

The Mikoko Pamoja and Vanga Blue Forest projects, located in Gazi and Vanga Bays respectively, are two community-led blue carbon initiatives to protect and restore mangrove forests and seagrass meadows, under carbon and biodiversity crediting frameworks, for the benefit of coastal communities, coastal resilience, and climate mitigation. The projects collectively protect and restore over 800 ha of these coastal ecosystems through a governance and management framework that not only includes local people but also embeds the community in project ownership, strategy, decision-making and operations.

The protection and restoration of coastal ecosystems deliver benefits for adaptation and resilience of adjacent communities. Mangrove forests and seagrass meadows have both been proven to dissipate wave energy as it approaches the shore, thereby dampening the impacts of storm surges and reducing the severity and rate of coastal erosion. The habitats also stabilise the shoreline with their extensive root systems. These ecosystems adapt to sea level rise, growing further inland as the shoreline advances; in this way they act as a natural and adaptable sea wall. These effects are 'greater than the sum of its parts' when the two ecosystems are protected together, which is why this 'landscape' approach to conservation is being initiated in Vanga Blue Forest.

Restoring these habitats brings economic benefits to adjacent communities; increased fish stocks and biodiversity boost local fisheries and tourism, as well as providing economic opportunities to local people and increasing food security.

With a model that means that local people are in control of the project, these initiatives empower coastal

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communities to engage in climate adaptation and make informed and locally appropriate decisions. A portion of the funds contributes to community development, and this spending is governed by the community as a whole; all community members can attend meetings and vote on how project funds should be spent.

The Plan Vivo 'PV Climate' standard embeds a strong emphasis on community development, social justice and equitable benefits sharing; through these principles, the projects are maintained to a high social standard, and the involvement of and impacts on the community are independently verified.

Positive Outcomes

The project interventions are having a demonstrable impact on biomass: in Mikoko Pamoja, the longest-running project, this has doubled in the 12 years since the project launched. This increased biomass strengthens the forest's ability to protect the coast and adapt to the impacts of climate change, as well as significantly enhancing biodiversity and fish stocks. Deforestation and forest degradation is reducing in the surrounding area, suggesting that the project is having a positive effect on forest extraction through increased awareness and alternative opportunities.

Community development expenditure has included the construction of a sea wall to protect an important public building from coastal erosion and sea level rise, as well as an extensive water project in the Gazi Bay villages that has brought fresh water to accessible points throughout the villages, increasing access to clean water and reducing the distance needed to travel – primarily by women – to access it. Elsewhere, education, medical facilities and youth sport opportunities have been financed by the projects.

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Support required in the future

Both projects have ambitions to expand and anticipate doing so in the next 1-2 years. This will roughly double the project areas and therefore income from nature-based credits. With this expansion will come increased need to finance community development projects that will adequately compensate for reduced cutting of mangrove timber, and with inflation and increasing population in the project areas, this financial need will increase disproportionately. There will also become a greater and greater need to finance 'survival' adaptation strategies to increase the resilience of the communities in project areas; initial projects such as the water project and the sea wall have already begun this process, but there remain many areas of the villages and agricultural areas unprotected and villages that would benefit from access to potable water, particularly as saline intrusion in aquifers increases.

Lessons Learnt

- High-integrity community engagement takes time: socially equitable and just projects go beyond community consultation; they embed local people at every level and stage of the process. Engaging in nature-based markets is complex, and communication of these frameworks and how projects under them can operate is challenging but essential. Engagement and involvement is a slow, considered and iterative process and should be considered central to project design.
- Local roots and global branches: These projects are small-scale but high-impact, and this is achieved through dissemination at regional, national and international levels, supporting the replication of these projects elsewhere, influencing policy and legislation, and acting as a 'proof of concept' for a project that works for the climate, biodiversity and people.

9.2 Human Interest Stories

Climate change-related losses and damages are not a distant threat for the millions of people living across the IGAD countries, including Djibouti, Ethiopia, Kenya, Somalia, South Sudan, and Uganda. Poor and vulnerable households continue to grapple with slow-onset disasters, such as droughts and extreme temperatures, as well as rapid-onset disasters, including floods and storms. Dealing with loss of human lives, crop failures, loss of livestock, destruction of homes, bridges, hospitals, schools, and roads, and conflicts over resources and displacements have been too familiar in the last few decades.

While the science and statistics tell one side of the story, the voices of people living through the climate disasters often do not get to be spotlighted, revealing the true losses and damages. On the front lines of the climate crisis, there are stories of mothers displaced from their homes by droughts, families with semi-permanent homes washed away by floods, pastoralists helplessly watching their herds decrease with every drought and flood, and farmers witnessing their once-productive land turn to dust. These stories reveal the reality of human suffering, survival, and resilience in the face of increased climate-related hazards in the IGAD region.

The following human-interest accounts offer a human face and voice to climate change in the IGAD region, underscoring that the climate crisis is not solely about data but also about the people affected.

9.2.1 Human Interest Story, Country: South Sudan

Climate Hazard: Rapid Onset—Flooding
L&D Impact: Displacement
Name: Nyaguen Koang
Source: Adopted from UNHCR 2025

Introduction

Nyaguen Koang was displaced from her home due to flooding and has been living in a displacement camp in Bor, South Sudan, since 2013. She and her seven children live in a small shelter that leaks badly when it rains.

Although Nyaguen works as a casual labourer in a restaurant, she doesn't make enough money to feed her family properly, and they often go to bed cold and hungry.

"My name is Nyaguen Koang and I came to this camp in 2013. I was displaced by flash flooding caused by heavy rain.

"Lack of food and durable shelter are the major challenges affecting us here in the camp. I am a mother of seven children with no capacity to buy plastic sheeting to cover my shelter. There is no dry place to put my children, and there is no space for me to sleep with them either.

"The house I have been residing in since 2013 has rainwater that has been pouring into the house from the roof and onto the floor. Whenever I tried to block the water with sand and soil, it is easily washed away by the water.

"The water is very high, and flash flooding is difficult to control. Water pours in through all the corners of the

house. Even dangerous snakes find their way into the house at night. We always live in fear when a snake enters, and there is no light or a bed to climb on. However, my neighbour invited us to share their small room with them. We only stay in the shelter during the day.

"It gets cold during the rainy season. We try to keep warm by covering ourselves in the single blanket that we have, and we try to sleep with our clothes on.

"The children complain of coldness. When they experience the cold, they'll pull the blankets to themselves while shivering. Sometimes the children will start crying for help. Most often, I will know when one of the children is extremely cold by how cold their bodies feel, or that they are sneezing and shivering.

"When my children are cold, I encourage them to stay strong and promise to cook for them the next morning. I also assure them that no condition is permanent. This condition will end after they have studied and have become professionals.

"I work as a casual labourer at a restaurant. My duties include cooking, washing dishes and cleaning tables. I buy food for my children with the little I earn at the end of the working day.

"However, I do not earn enough to buy enough food for my children. We barely eat twice a day. At times we drink porridge in the morning and eat dinner in the evening. We have not eaten since yesterday because I did not go to work.

"I wasn't able to go to work because the person who usually looks after my baby when I go to work has gone to look for a job. Also, I was afraid that heavy rains might affect the children while I was away for work.

"As the bread winner for my children, I will always go to work as long as there is someone who will take care of my baby.

"When I am home, I rely on the grace of God to touch the hearts of my neighbours who provide a little food for my children. After I get someone to take care of the children, I would like to go to the nearby farms to work as a potter and receive some wages for the day.

"If I was unable to work for a long period of time, I would only be able to depend on the grace of God and the support of my neighbours and well-wishers in the community. As a community, we believe that charity is one of the good deeds that comes with a lot of blessings."

Devastating flooding

"The flood was so devastating in 2020. However, we were under the protection of UNHCR, and floodwater was pumped out of the camp on a daily basis.

"The situation is dire now, compared to 2020, because we do not have food or proper shelter, and no one is pumping the water out of the camp.

"This year, flooding will mean a serious disaster for the affected population. People will die of hunger and water-related diseases. Farms will be submerged into water and livestock will die of diseases.

"If the water level increases in the camp, we won't be able to stay here. We will move to the higher ground that has been identified by the flood management committee.

“I am worried about the safety of my children, and the lack of livelihood opportunities to support my children, as jobs will be affected by flooding.

“Sometimes I stay awake thinking about the safety of my children, and where to get food in the morning. What I do after I am deeply sad, is to sing and pray to God to comfort me and provide for my needs. Most often, I don’t get to sleep until around 4am. This makes me exhausted to go to work the next day.

“Sometimes I am so depressed and unable to go to work. But, once I think about the children, I will force myself to go to work.”

9.2.2 Human Interest Story, Country: Somalia

Climate Hazard: Slow-onset drought and rapid-onset flooding
L&D Impact: Displacement/Loss of livelihood
Name: Fatuma Ismail
Source: WFP July 2025

Fatuma's Story

Fatuma, a 46-year-old widow and mother of four, lives in an informal settlement on the outskirts of Beledweyne, Hiraan Region. She was first displaced by the 2011 drought, which forced her family to abandon their rural home and seek safety in town. Since then, she has lived in a flood-prone area along the Shabelle River, where thousands of displaced families have settled over the years. After losing her husband 15 years ago, Fatuma has worked tirelessly to support her children on her own, relying on informal jobs like washing clothes and fetching water for nearby households. Most days, she can only afford a single meal for her children, often going without herself. Despite the challenges, she continues to prioritise their safety and well-being in the face of repeated climate shocks.

"My name is Fatuma Ismail. I'm 46 years old, a widow, and a mother of four. I've been living in an IDP settlement on the edge of Beledweyne since 2011, after the drought forced us to leave our village. Life hasn't been easy. Since my husband passed away 15 years ago, I've had to raise my children on my own. I do whatever small jobs I can find washing clothes, fetching water just to get by. Some days, we only eat once. I always try to make sure the children eat, even if I don't.

I've experienced many floods over the years, and each one has taken something from us, our shelter, our

food, our peace of mind. In the past, we had no warning. The water would rise suddenly, and we would run with nothing. I've had to carry my children through flooded streets with nowhere to go. But this year, it was different. I started hearing messages on the radio and then on my phone warning that the river would flood. The mes- sages were clear and, in Somali language, telling us to prepare and move to safer ground. Not long after, I received cash support from WFP before the flooding even started. That had never happened before. I didn't wait. I used the money to buy a tent, and some food. We packed what we could and got ready to leave. When the river began to rise, boats came to our area. We evacuated with the boat before the water reached us and moved to higher ground. That boat made all the difference. We didn't get stuck. We weren't forced to wade through the water like before.

This time, my children didn't get sick, and we didn't lose our goats. It was the first time I felt like we were ready, not just reacting after the damage. The early warning, the cash, and the boat all helped us prepare. It saved us.

I have faced many hardships, but this time I felt supported. I didn't feel alone. I was able to protect my children before the worst came."

9.2.3 Human Interest Story, Country: Ethiopia

Climate Hazard: Slow Onset—Drought and Water Stress
L&D Impact: Loss of Livelihood
Name: Jawar Umer
Source: BBC Media Action—Support from Down2Earth July 2025

Amid instability and conflict, the people of the Oromia region in Ethiopia are also increasingly affected by extreme drought and flooding. Five consecutive failed rainy seasons led to the worst drought in 40 years; this was followed by major flooding in the rainy seasons in 2023, displacing many, and destroying livelihoods. Across Eastern Africa, tens of millions are facing food insecurity.

Jawar Umer in Gorbo Kebele, Mieso District, narrates life before climate-related disasters became frequent, leading to the loss of livelihood.

"My name is Jawar Umer. I live in Gorbo Kabele, Mieso District, Eastern Ethiopia. have three children. In the past, our living conditions were very good. We had plenty of milk and butter. We had an abundance of milk from our many cattle, and we made good money by selling it in the market. The crops were also abundant, as our farm was very productive.

Due to climate change, we face nowadays our herd of 30 cattle has been reduced to only one. There's not enough food even for the single cow we are left with. Having lost most of our cattle, now we depend on aid to avoid starvation and for our survival. We used to get plenty of milk before, but things have changed due to climate change. If you come back in a month or two, you won't find anything green almost everything will have dried up. The rivers are drying up, and the soils is parched. We can no longer easily get water by digging and now we share a single waterhole with people from 20 (twenty) other Kebeles (neighbourhoods).

We are in a time, where we plough the fields, but the soil dries up before we sow seeds and cultivate crops. During the dry season, we migrate to other places. That's why we started creating this pond with the intention to have a larger space for collecting rainwater. It's been five years since I began digging this pond, but I still can't afford the plastic cover to hold water.

We do not have the necessary resources because of recurrent droughts. The local people can't even dig their land properly. If I had the money to expand the pond and buy the plastic cover it would help us stay productive during most months of the year. That way, I could help not only my family but also other people in our neighbourhood. If we had made the pond larger and more efficient, our cattle would not have died and there would not have been a need to migrate. Our children could have attended school comfortably. We could have taken care of our farms, and our crops could have grown properly. However, a lack of basic resources has exposed us to all these adversities even when we know the solutions.

9.2.4 Human Interest Story, Country: Uganda

Climate Hazard: Slow-onset—Drought and extreme temperatures
L&D Impact: Loss of crops/livelihoods
Name: Wamboko Rose
Source: ICCCAD (A story of L&D from Uganda by Watsemba Miriam)

Many smallholder farmers in Eastern Uganda rely on rain to irrigate their crops. But because of the climate crisis, rain is becoming less predictable and less frequent. The dry season is lasting longer, and the scorching sun is leading to the loss of crops.

The story of Wamboko Rose on her matooke (banana) plantation: *"In 2018, I decided to start this project expecting that my retirement was about to come. So, I retired as an inspector of schools from Sironko District, and I started this project in Kadimonkoli, in the Budaka district, Kadimonkoli Sub County.*

When I planted this matooke (banana), it started very well. But later on, it started going down, especially because of the sunshine. The sunshine affected the production. When we would come here (before), we would pick like 20 – 30 bunches, but they all dwindled. So, when the sunshine was too much, it lost productivity. Also, people of this area were stricken by hunger. They cut the matooke (banana), they ate. When I complained to the chairman, the chairman told me it's not that they are thieves, but they lack what to eat. That this was the only project in this place. So, all these homes were coming to get matooke (banana) here.

Mariam Namumbeiza, a plantation labourer working at Wamboko Rose's matooke plantation, reiterated the same statement of climate change-related L&D impacting Rose's project and those like Mariam who were employed to earn a living working on the plantation.

We used to work in the garden. In the beginning, it went well. Then the sun came and affected our work so badly. Madam Rose use to give us some money for working in the garden, which was very helpful. But later

on, when the sun came and the matooke (banana) plants died. The sun was too much; it brought hunger in the village. People came and stole the matooke. The plantation dying has affected me so much because I no longer have a source of income. The money I used earn from the matooke project used to help me a lot especially with my children.

Mutege Ismail, husband of Mariam Namumbeiza.

"My wife used to work in that plantation as a farm manager. Every time she made money from there, it helped us, it helped both of us. I used to work, but then I went blind. And right now, I don't see. I have been blind for three years now. When I sit down here, I cry because I don't have any help. Because my wife used to work in that garden and money to help. But now, that help is no more! Because the matooke plantation died. The plantation dying discouraged Madam Rose, who was my wife's employer, from continuing with the project.

Wamboko Rose continues…

"So, one time we gave up and said let all the villagers eat the matooke. When we went to the chairman, he told us frankly, do you forgive us, we are not thieves. But this whole area has been affected by the sunshine, and the only refuge is in this food here. So, they would all come and cut from the other side…. the other side. Even these women can give witness, the ones who are working here.

Grace Nakelo, a plantation labourer also gives her testimony agreeing with Rose's story

"In that period, the sun came and it was too hot. The first time, we were able to harvest some good matooke. Madam Rose would come, and we would harvest together, and she would give us some good money. And we would help our families and homes. But currently, the sun has killed the whole plantation. We are not able to make any more money.

Katoko Sofia, another plantation labourer, joins the conversation, confirming that extreme temperatures had led to reduced matooke production, which in turn affected the project yields, ultimately impacting not only her boss, Madam Rose, but also her employees and their families.

"The matooke plantation used to help us. When we worked there, Madam Rose was giving us some money to support our families".

Madam Rose again

"For me, I have no capacity to solve this problem. When the matooke was hot, it died the way it has died. Now that the rain has come it is sprouting up again. So, I hope I will dig again and have new matooke here when there is rain. Otherwise, in this place, we have no irrigation; there are no rivers around, so for me, I have no solution as a person, but I guess what happened with the matooke, it died and I am waiting for the next rainy season.

Because when we started this project, we event went with my husband to the sub county to look for the agriculture extension person. He never even came here, he would tell us that he would come and advise us,

but they never came. So even the district authorities never helped us. Because when we started the project, we went to them and told them we are also doing a project from Budaka, we need your support as agriculture extension worker to come and guide us. They never came. So, we have received no support, but we are doing it individually as a family. Because the land is mine, I am going to look for money, dig it up again, plant maize, plant some cassava, hoping that with the continued rains the matooke will come up again and we will see where we are going.

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