Jamhuuriyadda Federaalka Soomaaliya
Federal Republic of Somalia
جمهورية الصومال الفيدرالية

NATIONAL ADAPTATION PLAN OF SOMALIA (2026-2030)

2026-2030

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Acronyms

AfDB	African Development Bank
AF	Adaptation Fund
DRR	Disaster Risk Reduction
FGS	Federal Government of Somalia
FMS	Federal Member States
FRS	Federal Republic of Somalia
GCF	Green Climate Fund
GEF	Global Environmental Facility
GESI	Gender Equality and Social Inclusion
GIS	Geographic Information Systems
GRF	Global Refugee Forum
HIPC	Heavily Indebted Poor Countries
IDP	Internally Displaced Persons
IPCC	Intergovernmental Panel on Climate Change
IMTC	interminstreil Technical Committee
IWRM	Integrated Water Resources Management
LFA	Logical Framework Approach
MEL	Monitoring, Evaluation and Learning
MoECC	Ministry of Environment and Climate Change
MoF	Ministry of Finance
MoHADM	Ministry of Humanitarian Affairs and Disaster Management
MoPIED	Ministry of Planning, Investment and Economic Development
MRV	Monitoring, Reporting and Verification
MSME	Micro, Small and Medium-sized Enterprises
NAP	National Adaptation Plan
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contributions
NDP	National Development Plan
NGO	Non-Government Organization
NTP	National Transformation Plan

PPP	Public-Private Partnership
RVF	Rift Valley Fever
SDG	Sustainable Development Goal
SoDMA	Somali Disaster Management Agency
UHI	Urban Heat Island
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

Welcoming remarks

Climate change is one of the greatest challenges of the 21st century. According to projections by the Intergovernmental Panel on Climate Change (IPCC), if greenhouse gas emissions continue to rise, global temperatures are expected to exceed 1.5°C. This increase poses severe risks, including rising sea levels, shifting agricultural seasons, biodiversity loss, and more frequent and intense extreme weather events such as heatwaves, storms, floods, and droughts. Somalia, like many other nations, will not be spared from these impacts.

Somalia's economy is particularly vulnerable to climate change due to its geographical location, limited adaptive capacity, and existing socio-economic challenges. Climate-sensitive sectors, including energy, agriculture, water, health, infrastructure, fisheries, wildlife, and forestry are already experiencing the consequences.

The country faces recurrent droughts, flash floods, and extreme temperatures, all of which are expected to intensify and have long-term repercussions.To address these challenges and build resilience, the Government of Somalia has taken significant steps. These include the development of the National Adaptation Program of Action (NAPA, 2013), the National Climate Change Policy (NCCP, 2020), the Nationally Determined Contribution (NDC updated/3.0), as well as the Initial National Communication on climate change. Building on these efforts, Somalia has also prepared its National Adaptation Plan (NAP), which identifies medium- to long-term adaptation priorities. The NAP is designed to guide the systematic implementation of measures that strengthen resilience and support the country's Vision 2030, National Development Plans, and NDC commitments.

Successful implementation of the NAP requires inclusive participation and strong collaboration among all stakeholders. This includes development partners, the private sector, civil society organizations, academia, research institutions, the media, local communities, as well as marginalized groups such as women, youth, persons with disabilities, and children. Through collective action, Somalia reaffirms its commitment to safeguarding the climate system for both present and future generations.

H.E, LT. General Bashir Mohamed Jama,
Minister of Environment and Climate Change

ACKNOWLEDGEMENTS

The development of the National Adaptation Plan (NAP) was achieved through a broad-based consultative process involving key stakeholders at both the national and provincial levels. We would like to express our gratitude to the various stakeholders who contributed to the development of this NAP, including traditional leaders, civil society organizations, academia, the private sector, local communities, government line ministries and departments, and cooperating partners. The Somali Government also extends its heartfelt thanks to the Green Climate Fund (GCF) and the United Nations Development Program (UNDP) for their invaluable financial and technical support in formulating the NAP. We are truly grateful for their assistance.

Furthermore, the Government acknowledges the technical contributions made by consultants, the Least Developed Countries Expert Group (LEG), all Somali line ministries under the Ministry of Environment and Climate Change, and federal member states during the formulation of the NAP. Your expertise and dedication have been instrumental in shaping this important plan.

Mr. Abdirisak Ahmed Ali
Director General

II. Executive summary

Somalia's National Adaptation Plan (NAP) is a crucial step towards enhancing the country's resilience to the multifaceted impacts of climate change. As a nation facing significant environmental challenges due to its geographic and socio-economic conditions, Somalia is particularly vulnerable to droughts, floods, extreme heat, and water scarcity. The NAP outlines a strategic framework that addresses these vulnerabilities and integrates climate resilience into Somalia's overall development agenda. The NAP aims to build long-term adaptive capacity across key sectors through a coordinated, cross-sectoral approach while promoting sustainable economic growth and safeguarding the most vulnerable populations.

The NAP's primary focus is strengthening resilience in key sectors highly vulnerable to climate risks, including agriculture, water resources, health, and infrastructure. Agriculture, the backbone of Somalia's economy, remains particularly sensitive due to its reliance on rain-fed systems susceptible to drought and erratic rainfall. In **Southwest State**, recurring droughts have led to extensive crop and livestock losses, affecting food security. **Hirshabelle** experiences severe water shortages and crop failures, worsened by its proximity to the Shabelle River, fluctuating between drought and flood conditions. **Galmudug** faces prolonged dry spells, straining pastoralist communities heavily reliant on limited water sources. In **Jubaland**, the main challenge is impact of the floods and droughts on the agriculture. while **Puntland** is struggling with intensified desertification and increasing water scarcity due to climate change. **Banadir** *(Mogadishu)* faces rapid urbanization challenges compounded by drought-induced water scarcity. Lastly, in **Somaliland**, recurrent droughts and rangeland degradation continue to threaten pastoralist livelihoods, placing added stress on already fragile ecosystems. The NAP advocates climate-smart agriculture practices, such as drought-resistant crop varieties, improved irrigation systems, and sustainable land management across these states, aiming to bolster agricultural productivity, protect livelihoods, and enhance economic stability in rural areas.

Water resource management is another cornerstone of the NAP. Somalia faces chronic water scarcity, exacerbated by prolonged droughts, over-extraction of groundwater, and the degradation of water infrastructure. The NAP calls for the rehabilitation of river systems such as the Shabelle and Juba, improved rainwater harvesting, and sustainable water management systems that can support agricultural and domestic needs. Investments in water infrastructure will be particularly critical in arid and semi-arid regions like Puntland, where water availability is already a major constraint on development. Through these initiatives, the NAP aims to reduce the vulnerability of water-dependent sectors and ensure equitable access to water for all communities.

In the **health sector**, the NAP seeks to build resilience against climate-sensitive diseases such as malaria, cholera, and respiratory illnesses, projected to increase with rising temperatures and more frequent extreme weather events. Somalia's health system is particularly vulnerable to climate change due to limited infrastructure, inadequate access to safe water and sanitation, and a shortage of trained healthcare personnel. According to the World Health Organization (WHO), less than 40% of Somalis[1] have access to essential health services, leaving many regions, especially rural and conflict-affected areas, without adequate healthcare facilities.

[1] WHO, Somalia page

Increased temperatures and erratic rainfall contribute to the spread of vector-borne diseases, such as malaria, which already affect a significant portion of the population in southern and central Somalia. Flooding events, which are anticipated to increase, also elevate the risk of waterborne diseases, particularly cholera. During past flooding in 2021, cholera outbreaks surged, affecting thousands, especially in regions with limited access to clean water. Respiratory illnesses are expected to rise due to worsening dust storms and indoor air pollution, exacerbated by the widespread use of wood and charcoal for cooking.

The NAP outlines a strategy to bolster the health sector's adaptive capacity by strengthening public health infrastructure, enhancing disease surveillance systems, and training healthcare workers to respond to climate-induced health risks. However, Somalia faces significant challenges: only 28% of healthcare facilities currently have access to electricity[2], which limits their capacity to store vaccines and operate essential equipment during emergencies. To mitigate these vulnerabilities, the NAP includes provisions for solar-powered health facilities, improved water sanitation systems, and targeted vaccination.

By addressing these foundational gaps, these interventions aim to reduce mortality and morbidity rates, particularly among vulnerable populations such as children, the elderly and low-income households who are disproportionately affected by climate-sensitive diseases. Enhanced healthcare resilience will be crucial as Somalia's climate changes, ensuring that communities are better equipped to handle the health challenges posed by more frequent and intense climate events.

Somalia's infrastructure faces high vulnerability to extreme weather events, such as floods, storm surges, and heat waves. The NAP emphasizes climate-proofing critical infrastructure across all Federal Member States, ensuring that new roads, bridges, and public buildings are built to withstand future climate impacts. In urban areas such as Mogadishu, Kismayo, Baidoa, Beledweyne, Galkayo, and Qardho, the NAP advocates for enhanced drainage systems and flood management infrastructure to mitigate urban flooding risks, which have intensified due to increased urbanization and migration from drought-affected rural areas. For instance, Beledweyne faces frequent, severe flooding due to its location on the Shabelle River, requiring robust embankments and flood defenses to protect communities.

In line with Somalia's commitment to inclusive adaptation, the NAP adopts a gender equality and social inclusion (GESI) approach, prioritizing the needs of groups most affected by climate change - including poor women, internally displaced persons (IDPs), and persons with disabilities. Targeted actions aim to reduce systemic vulnerabilities and promote equitable participation in climate decision-making processes at national and local levels.

In coastal regions like Bosaso and Hobyo in Puntland and Galmudug, where sea level rise poses increasing threats, the NAP emphasizes building coastal defenses, restoring mangroves, and employing other nature-based solutions to counter erosion and protect communities. Inland areas such as Qardho face drought-related challenges, and thus, investments in water management infrastructure are essential to ensure resilience during prolonged dry spells. Furthermore, the NAP includes provisions for Mogadishu and other urban centers to implement improved drainage and

[2] WHO Article, October 2024

flood defenses to handle flash floods, which are becoming more frequent due to erratic rainfall patterns.

A key feature of the NAP is its focus on **cross-sectoral coordination** and **institutional capacity building**. Climate change is a cross-cutting issue that affects all sectors of the economy, and the NAP recognizes the need for coordination among government ministries, local authorities, NGOs, and international partners. The Ministry of Environment and Climate Change (MoECC) will play a central role in coordinating the implementation of the NAP, working closely with the Ministry of Agriculture, Ministry of Water Resources, Ministry of Health, Ministry of Fisheries and Blue Economy and Somalia Disaster Management Authority (SODMA), previously called as MOHADM, as well as other relevant bodies. To facilitate this coordination, the NAP proposes the establishment of inter-ministerial committees and multi-stakeholder platforms, ensuring that adaptation efforts are aligned with national and regional priorities. This collaborative approach will also enhance the capacity of institutions at both the national and sub-national levels to manage and monitor climate change adaptation measures effectively.

The financial requirements for implementing the NAP are substantial, with the estimated cost of priority adaptation measures amounting to approximately $2.5 billion over five years. This includes significant agricultural investments, water resource management, health, and infrastructure resilience. The NAP outlines a comprehensive financing strategy that leverages **domestic resources**, **international climate finance mechanisms**, and **private sector investment**. Key funding sources will include the Green Climate Fund (GCF), Adaptation Fund, and other bilateral and multilateral donors. To supplement these funds, the NAP proposes innovative financing mechanisms, such as public-private partnerships and climate bonds, which could attract additional investments for large-scale adaptation projects.

The immediate next steps following the approval of the NAP include launching high-priority projects across all Federal Member States, focusing on water management and agricultural resilience tailored to each region's unique climate vulnerabilities. **Southwest State** faces recurrent droughts that impact pastoral and agricultural communities, necessitating investments in drought-resistant crop varieties and water-efficient irrigation systems[3]. **Hirshabelle**, with its proximity to the Shabelle River, suffers from frequent flooding, requiring reinforced embankments and flood prevention infrastructure to protect farmlands and settlements[4]. **Puntland** and **Jubaland** face coastal erosion and sea-level rise, which threaten infrastructure and communities along the coast. Here, the NAP emphasizes coastal defenses like seawalls and the restoration of mangroves to mitigate these risks. In **Galmudug**, which endures arid conditions and water scarcity, rainwater harvesting and soil conservation are prioritized to sustain agriculture. In Somaliland, the NAP prioritizes initiatives to combat desertification and improve rangeland management through community-led soil restoration projects and sustainable grazing practices, addressing the region's severe arid conditions and dependence on pastoral livelihoods. **Banadir**, especially Mogadishu, is vulnerable to flash floods due to unplanned urban growth, so drainage upgrades and strategic urban planning are critical to reducing flood risk[5]. The top priorities are ensuring these projects are community-driven and securing financing for early NAP implementation. Stakeholder

[3] UNDP Somalia NAP Lessons
[4] NAP Global Network
[5] World Bank Somalia Urban Resilience Project II

engagement will ensure adaptation measures address local needs and strengthen partnerships for long-term support from the private sector and international climate finance sources. In parallel, strengthening the resilience of the health sector will remain a key national priority, particularly in regions where climate-sensitive diseases and health infrastructure gaps pose immediate risks to vulnerable communities. Investments in climate-resilient health systems - such as solar-powered facilities, improved water and sanitation services, and early warning disease surveillance - are critical to reducing the health burden associated with climate change.

An essential component of the NAP is its **Monitoring, Evaluation, and Learning (MEL)** framework, which will track progress, ensure accountability, and allow for adapting strategies based on real-time data. The MEL framework will provide a clear structure for monitoring the implementation of adaptation measures, assessing their effectiveness, and making necessary adjustments to ensure that the NAP remains responsive to changing climate conditions. Regular reporting to stakeholders, including international donors, will ensure transparency and build confidence in the effectiveness of the NAP's implementation.

In conclusion, Somalia's NAP represents a bold and comprehensive approach to addressing the impacts of climate change while simultaneously advancing the country's development agenda. By integrating climate change adaptation into national policies, the NAP provides a roadmap for building a more resilient and sustainable future for Somalia. The NAP has also been developed with conflict-sensitive principles in mind. While not a direct peacebuilding framework, the NAP aims to ensure that adaptation measures do not exacerbate existing social or political tensions and, where possible, contribute to stability by promoting inclusive governance, equitable access to resources, and locally led implementation in fragile settings. By leveraging international support, fostering cross-sectoral collaboration, and ensuring that adaptation measures are inclusive and participatory, the NAP sets the stage for transformative change in Somalia's ability to withstand and adapt to the challenges of a changing climate.

III. Introduction

As a country facing significant environmental, social, and economic challenges, Somalia is particularly vulnerable to the impacts of climate change. The NAP represents a crucial strategic framework designed to guide the country's efforts in adapting to climate change, ensuring that national development remains sustainable and resilient in the face of evolving climate risks. By establishing a long-term process for enhancing adaptive capacity and reducing vulnerabilities across various sectors, the NAP is an essential tool for climate action, aligned with national and international climate objectives. The overarching goal of the NAP is to integrate climate resilience into Somalia's development planning, enabling the country to address the adverse impacts of climate change while promoting sustainable growth and prosperity.

3.1 Purpose of the NAP

The primary purpose of Somalia's NAP is to provide a comprehensive roadmap for strengthening the country's climate resilience for the period of 2026-2030. It aims to build adaptive capacity at all levels of government and society, reduce the vulnerability of key sectors, and integrate climate change adaptation into national development planning. Recognizing that Somalia's communities

and ecosystems are highly sensitive to climatic shifts such as prolonged droughts, flooding, and extreme temperatures, the NAP provides a strategic approach to mitigate these challenges. It promotes actions that reduce risks and safeguard the nation's livelihoods, infrastructure, and natural resources. By doing so, it positions climate change adaptation as a core component of Somalia's long-term sustainable development, reinforcing its national priorities and objectives.

3.2 Scope and Objectives

The scope of the NAP covers all federal member states of Somalia, with special attention given to the most vulnerable communities and ecosystems. The plan addresses adaptation needs across various sectors, including agriculture, water resources, public health, infrastructure, and coastal management. Specifically, the NAP outlines key objectives such as:

- enhancing the adaptive capacity of communities, institutions, and ecosystems;
- building resilience to climate shocks and stresses; and
- mainstreaming climate change adaptation into national policies, strategies, and sectoral plans.

These objectives are designed to create synergies with existing national development goals, ensuring that adaptation measures are responsive to climate risks and support sustainable economic growth.

3.3 Process of development

The development of Somalia's NAP has followed a participatory, evidence-based, and inclusive process, drawing from a wide range of national and international expertise. This process has involved consultations with key stakeholders at the federal and state levels, including government agencies, civil society, and development partners. Expert inputs from various sectors have been integrated, ensuring that the plan is well-aligned with Somalia's development goals, including the National Transformation Plan (NTP) for 2025-2030. The process also adhered to international best practices, using guidelines from the United Nations Framework Convention on Climate Change (UNFCCC) and aligning with the Paris Agreement. Somalia's unique socioeconomic and ecological context has been carefully considered to produce a NAP that addresses the most pressing climate risks.

A critical contribution to this process has been made through the UNDP and GCF readiness project titled **"Support for Strengthening Climate Change Adaptation Planning for the Federal Republic of Somalia."** This US$2.7 million project, launched in August 2020, plays a pivotal role in enhancing national and state-level capacities for climate change adaptation planning. The project has facilitated the establishment of the interminstreil Technical Committee (IMTC)and supported the development of climate change adaptation frameworks at national and state levels. Also, key outputs from this project include the development of vulnerability assessment plans, formulation of preliminary state-level climate change adaptation plans, and a harmonized national framework, which are integral to the NAP. Additionally, the project has strengthened Somalia's financial planning for climate change adaptation, helping to lay the groundwork for future investment in climate resilience.

3.4 Alignment with international and national commitments

Somalia's National Adaptation Plan is closely aligned with its commitments under international frameworks such as the Paris Agreement and its **Nationally Determined Contributions (NDCs)**, submitted in 2021. The NAP advances the objectives in these commitments by establishing medium- and long-term adaptation strategies. Somalia's NDCs, submitted under the Paris Agreement, aiming to reduce vulnerabilities in key sectors such as water, agriculture, coastal management. The NAP supports the **ambition to enhance national resilience** and aligns with **Sustainable Development Goal (SDG) 13**, which seeks to strengthen resilience and adaptive capacity to climate-related hazards.

The NAP is also aligned with the **Sendai Framework for Disaster Risk Reduction (2015–2030)**, which emphasizes the need to prevent new and reduce existing disaster risks through integrated and inclusive measures that strengthen resilience. The NAP contributes to the implementation of Sendai's four priorities - understanding disaster risk, strengthening disaster risk governance, investing in resilience, and enhancing preparedness for effective response - by mainstreaming climate risk considerations into development planning and budgeting. Somalia's vulnerability to droughts, floods, and other climate-induced hazards necessitates the integration of disaster risk reduction (DRR) and climate adaptation actions. The NAP serves as a strategic vehicle to promote coherence between DRR and adaptation efforts, thereby advancing a holistic, risk-informed approach to resilience-building in line with the Sendai Framework.

Nationally, the NAP is closely aligned with Somalia's overarching development strategy as articulated in the National Transformation Plan (NTP 2025–2029), which identifies climate resilience as a standalone pillar of national transformation. The NAP and NTP exhibit deep synergies by prioritizing adaptation in key sectors such as agriculture, water, health, and infrastructure, while also advancing cross-cutting goals such as institutional strengthening, community-level resilience and durable solutions for displaced populations. The NTP builds upon previous development frameworks by integrating climate resilience more explicitly, including urban adaptation, nature-based solutions, and the mobilization of private sector investment for green infrastructure. This strategic alignment ensures that adaptation efforts contribute meaningfully to poverty reduction, food and water security, public health and economic diversification. By embedding climate change adaptation across national planning processes and financing strategies, Somalia is positioned to coordinate resources more effectively and pursue sustainable, climate-resilient development outcomes across all sectors and regions. The NAP also contributes to Somalia's peacebuilding agenda by promoting inclusive governance, reducing climate-related conflict risks, and supporting climate-resilient livelihoods in fragile and post-conflict areas.

In addition, the NAP incorporates crucial national frameworks related to displaced communities, including the **Refugee Law** and the **Refugee Returnee Policy**. These frameworks are essential for ensuring that climate change adaptation efforts address the needs of refugees and returnees, who are among the most vulnerable populations affected by climate change. By integrating the Refugee

Law and Returnee Policy, the NAP aims to enhance coordination with national policies on displacement, thereby supporting adaptation measures tailored to displaced communities. This integration highlights Somalia's commitment to inclusive resilience planning, ensuring adaptation actions that contribute to stability and support vulnerable groups. Furthermore, this approach is fully aligned with **Somalia's National Climate Change Policy** (2020), which emphasizes the protection of vulnerable populations - particularly internally displaced persons and returnees - through integrated and cross-sectoral adaptation responses. The policy recognizes displacement as a major socio-economic challenge aggravated by climate change and promotes the harmonization of climate action with national legal and policy frameworks to strengthen adaptive capacity and social cohesion.

IV. Somalia's National Circumstances

4.1 Geographical and climate context

Somalia, strategically located in the Horn of Africa, spans approximately 637,657 square kilometers. Its geography is characterized by a diverse array of physical features, including vast arid and semi-arid landscapes, mountainous northern regions with elevations ranging from 900 to 2,408 meters, central plateaus, and fertile floodplains along the Juba and Shabelle rivers in the south. The country's extensive coastline, stretching over 3,333 kilometers along the Indian Ocean, is the longest on mainland Africa and serves as a vital resource for fishing and trade. However, these coastal areas face significant threats from climate change, including sea level rise projected to range between 11 and 42 cm by 2080, coastal erosion, and saltwater intrusion, which jeopardize local ecosystems and livelihoods[6].

Somalia's climate is predominantly arid to semi-arid, with four agro-ecological zones: Desert, Arid/Sahel, Semi-Arid, and Highlands. Annual rainfall is highly variable, averaging less than 200 millimeters in many regions, with higher precipitation of 400–600 millimeters in the northern highlands and the southern river basins. The country experiences four distinct seasons: Gu (April to June) and Deyr (October to December) are the main rainy seasons, while Jilaal (January to March) and Hagaa (July to September) are typically dry. These seasonal patterns, however, have become increasingly unpredictable due to climate change, resulting in intensified droughts, flash floods, and extreme weather events that exacerbate food and water insecurity[7].

The Juba and Shabelle rivers, originating in the Ethiopian highlands, are lifelines for Somalia, supporting agriculture, livestock, and drinking water supply for millions. However, these rivers face critical challenges from upstream damming, overuse, and climate-induced reductions in flow. These pressures have heightened competition over water resources, often leading to local conflicts, particularly during periods of drought. In recent decades, overgrazing and deforestation have further degraded the surrounding ecosystems. Forest cover, which stood at 8.28 million hectares in 1990, has decreased to 5.98 million hectares as of 2020, leaving the land increasingly vulnerable to desertification and biodiversity loss[8].

[6] "Climate Risk Profile Somalia", Adelphi, 2022
[7] "Somalia Country Environmental Analysis: Diagnostic Study on Trends and Threats for Environmental and Natural Resources Challenges", WB, 2022
[8] ibid

Somalia's rich biodiversity, adapted to arid conditions, includes a number of endemic and threatened species. The country lies within the Horn of Africa biodiversity hotspot, home to unique fauna such as the beira, Speke's gazelle, and several endemic reptiles. However, habitat degradation from charcoal production and overgrazing poses a severe threat to these species. For example, Acacia bussei, a drought-resistant tree crucial for pastoral livelihoods, is now listed as threatened due to unsustainable exploitation[9].

Agriculture remains central to Somalia's economy, despite its challenges. Only 13% of Somalia's land is arable, primarily in the Juba and Shabelle river valleys. Rain-fed and irrigated farming produce staple crops such as maize and sorghum, alongside cash crops like bananas and sesame. However, productivity is hampered by outdated irrigation systems, erratic rainfall, and desert locust infestations. Livestock farming dominates rural livelihoods, contributing nearly 90% of agricultural output and providing sustenance to over 60% of the population. Yet, increasing herd sizes have strained rangelands, accelerating land degradation and resource depletion[10].

Urbanization is transforming Somalia's socio-economic dynamics, with over 54% of its population now living in cities. Major urban centers such as Mogadishu and Hargeysa are hubs of economic activity but face significant infrastructure deficits. Approximately 20% of the population are internally displaced, with most IDPs settling in urban areas. These settlements often lack adequate access to clean water, sanitation, electricity, and housing, intensifying the vulnerability of their residents. Projections suggest that by 2030, water availability in Mogadishu will be insufficient to meet its population's needs, highlighting the urgency for sustainable urban planning and resilient infrastructure.

Somalia's geographical diversity, climate variability, and reliance on natural resources underscore the country's high vulnerability to climate change. Addressing these challenges requires a concerted effort to promote sustainable land and water management, protect biodiversity, and invest in resilient infrastructure to support both rural and urban populations.

4.2 Socio-economic context

Somalia's socio-economic context is shaped by a growing but uneven rural-urban distribution. While over 54% of the population now resides in urban areas, approximately 60% of the population remains engaged in pastoralism or agro-pastoralism, particularly in rural regions. Somalia's total population of 15.8 million is growing at an annual rate of 2.9%, one of the fastest globally, and over 70% are under the age of 30[11]. Livestock farming and subsistence agriculture remain economic mainstays, alongside small-scale fisheries along the coastline. These sectors are heavily climate-dependent and particularly vulnerable to erratic weather patterns, droughts, and floods.

The country faces high levels of poverty, with over 68% of its population living below the poverty line (> $1.90 per day) and 90 percent living in multidimensional poverty that includes the great need for education of children and adults, improved access to water, improved sanitation, and

[9] "Climate Risk Profile Somalia", Adelphi, 2022
[10] "Somalia Country Environmental Analysis: Diagnostic Study on Trends and Threats for Environmental and Natural Resources Challenges", WB, 2022
[11] Somalia NDC stocktaking report 2024

access to electricity[12] The economy relies heavily on climate-sensitive sectors such as agriculture and livestock. Agriculture accounts for over **60% of GDP** and employs **80% of the workforce**, yet less than **1.8% of land** is arable. Furthermore, local food production meets only **22% of the national cereal demand**, making Somalia heavily dependent on imports. Climate-related shocks, such as droughts, floods and locust invasions, exacerbate food insecurity, with over **5.7 million people** affected during the 2020 drought alone. Livestock, which contributes over **45% to GDP[13]**, is similarly impacted by climate variability, with recurring droughts leading to large-scale losses. This economic vulnerability is further compounded by ongoing conflict, weak governance, and limited access to infrastructure. Dependence on natural resources and the degradation of these resources due to overuse and climate stress have heightened communities' susceptibility to climate-induced shocks, such as food insecurity, water shortages, and displacement.

Urbanization is accelerating rapidly, with **6.38 million people** residing in urban areas and another **4 million** expected to move to cities by 2025[14]. This migration, often driven by rural-to-urban displacement due to climate stress, has led to the growth of informal settlements in cities like Mogadishu, Baidoa, and Bosaso. These areas are highly vulnerable to flooding, heatwaves, and poor living conditions, creating significant public health and socio-economic challenges.

Somalia's progress toward debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative presents a pivotal opportunity to align financial strategies with climate change adaptation goals. By reaching the Decision Point in March 2020, Somalia has gained access to interim debt relief measures, significantly reducing its external debt and enabling the reallocation of fiscal resources toward critical development needs, including climate change adaptation. As Somalia advances toward the Completion Point, achieving full debt relief will further enhance its fiscal space, allowing the government to increase investments in climate-resilient infrastructure, disaster risk reduction, and sustainable livelihoods. This debt relief milestone also bolsters Somalia's credibility in engaging with international donors and climate finance mechanisms, positioning the country to secure additional funding for mitigating climate change impacts and safeguarding its socio-economic progress.

Climate change has exacerbated displacement in Somalia, with approximately 1.2 million people forced to move within the country over the past three years due to climate-related shocks, such as droughts and floods. This adds to a total of 3.9[15] million IDPs across Somalia, many of whom face heightened vulnerability to climate impacts in overcrowded settlements with limited access to basic services such as clean water, healthcare and education. Furthermore, over 1.5 million Somalis have sought refuge in neighboring countries, underscoring the regional implications of climate-induced displacement and the urgent need for adaptive measures. Addressing these climate-related risks within Somalia’s adaptation plan is essential to mitigate further displacement and ensure sustainable support for displaced communities.

The socio-economic impacts of climate change exacerbate existing inequalities, particularly for women and youth. Women, who constitute 40% of displaced households, are disproportionately

[12] Somalia Socio Economic Update: Investing in Social Protection to Boost Resilience for Economic Growth, WB Feature Story, November 2022
[13] MoECC 2023: Somalia UNFCCC Bi-Annual Report
[14] Adelphi 2022 : Climate Risk Profile Somalia
[15] Data from National Commission for Refugees and IDPs

affected due to their roles in resource collection and caregiving. Youth, while representing a significant share of the workforce, face limited opportunities for employment and education, leaving them vulnerable to economic and social instability. These factors underscore the urgent need for targeted climate change adaptation strategies that integrate social equity and economic resilience[16].

4.3 Political and institutional context

Governance in Somalia is structured as a federal system, with a central government based in Mogadishu and six federal member states - Jubaland, Southwest State, Galmudug, Hirshabelle, Puntland, and Somaliland. Somalia's political and institutional context presents both challenges and opportunities for implementing the National Adaptation Plan (NAP). After decades of conflict and instability, the Federal Government of Somalia (FGS) has made significant strides in establishing governance structures, yet institutional capacity remains uneven across federal and state levels. The Federal Member States (FMS) and Somaliland exhibit varying degrees of autonomy, governance capacity, and resource availability, complicating unified adaptation efforts. The institutional landscape for climate change management is still developing, with the MoECC leading national efforts. However, coordination across federal, regional, and local levels remains challenging, partly due to decades of conflict and instability.

The Provisional Constitution (2012) has laid the foundation for decentralization, assigning climate and environmental governance responsibilities to the FGS, FMS, and local governments. However, the lack of harmonized laws and policies between these levels has led to fragmented efforts in addressing climate change adaptation challenges. For instance, disputes over water resource management and land use persist between federal and state authorities, exacerbating vulnerabilities in agriculture and pastoralist communities.

Somalia is a signatory to the three Rio Conventions – the **UNFCCC**, **CBD**, and **UNCCD** each of which provides an essential foundation for the National Adaptation Plan (NAP). The UNFCCC establishes the overarching framework for climate action, guiding Somalia's adaptation planning and integration of resilience into national development. The CBD complements this by emphasizing the role of biodiversity and healthy ecosystems in strengthening adaptive capacity and providing nature-based solutions to climate risks. Meanwhile, the UNCCD addresses land degradation and desertification, challenges that are central to Somalia's vulnerability, and highlights sustainable land and water management as key adaptation priorities. By aligning the NAP with these conventions, Somalia ensures that its adaptation strategies are holistic, mutually reinforcing, and consistent with its international commitments to build climate resilience, protect ecosystems, and promote sustainable development.

Existing climate policies, such as the **National Climate Change Policy (2020)** and the **National Disaster Risk Management Policy and Strategy (2020)**, provide a framework for addressing climate risks. The NAP process is guided by Somalia's commitments under international agreements, including the Paris Agreement and the Sustainable Development Goals. However,

[16] MOECC 2024 : NDC stocktaking report

limited technical and financial capacities at national and state levels hinder the full implementation of adaptation strategies.
Strengthening institutional coordination and capacity-building and fostering collaboration between various levels of government and non-governmental actors will be crucial for effective adaptation planning.

Security remains a significant challenge to institutional development. Insurgent extremist groups continue to target critical infrastructure and undermine state authority in rural areas, particularly in Galmudug, Jubaland and parts of South West State. This insecurity hampers the delivery of basic services, including those related to climate change adaptation, such as early warning systems and water resource management. Furthermore, conflict over resources, including water and grazing land, highlights the urgent need for integrated climate and conflict-sensitive strategies.

Despite these challenges, Somalia has opportunities to strengthen its institutional framework for climate change adaptation. Regional institutions, such as the Intergovernmental Authority on Development (IGAD), provide platforms for cross-border collaboration on climate-related issues like drought and flood risk management, combating desertification and transboundary water cooperation. Additionally, ongoing capacity-building initiatives with international partners aim to improve technical expertise, data collection, and policy formulation at both federal and state levels.

V. Climate change trends and scenarios

5.1 Somalia's Historical Climate Change Trends (1960–Present) and Future Outlook

Somalia's climate history is shaped by persistent aridity, high variability, and recurrent extremes that have deeply influenced livelihoods, ecosystems, and development trajectories. Data from SWALIM, FEWS NET and USGS and other regional climate monitoring systems reveal that from 1960 to the present, the country has faced increasing temperature trends, erratic rainfall patterns, and a growing frequency of extreme weather events.

Temperature and Rainfall Patterns

Since 1960, Somalia's mean annual temperature has risen steadily, accelerating since the early 1990s. Analysis by FEWS NET and USGS indicates that average temperatures have increased by about 1–1.5 °C over the last three decades, contributing to prolonged heatwaves and elevated evapotranspiration rates. Rainfall has become increasingly unpredictable, with the two main rainy seasons, Gu (April–June) and Deyr (October–December) often shortened, delayed, or delivering intense rainfall over brief periods, followed by extended dry spells. SWALIM records show that over 70% of Somalia's land area now receives less than 300 mm of annual rainfall, amplifying drought vulnerability.

Droughts

Historical drought records indicate major national-scale drought events approximately every 8–10 years, with localized or seasonal droughts occurring every 2–3 years. Severe droughts in 1974–75, 1991–92, 2011, 2017, and 2021–2023 have devastated pastoral and agropastoral systems. The

2020–2023 drought, the worst in four decades, left 7.8 million people in need of humanitarian assistance and caused an estimated 43,000 excess deaths in 2022 alone. SWALIM's hydro-climatic data highlight a steady increase in drought duration and severity, directly linked to warming trends and La Niña-driven rainfall failures.

Floods

Flood hazards, particularly flash floods and riverine floods, have intensified along the Jubba and Shabelle Rivers due to heavier rainfall events in upstream catchments in Ethiopia. Major floods in 1961, 1997, 2006, 2007, 2018, and 2020 caused widespread displacement, loss of crops, and infrastructure damage. For example, the 2020 Gu floods affected 1 million people and displaced over 400,000, according to SWALIM and FAO assessments. Urban flooding in Mogadishu, Beledweyne and Bardhere is becoming increasingly common due to inadequate drainage and land use pressures.

Cyclones and Coastal Hazards

While tropical cyclones are rare, their impact has been severe. Cyclone Sagar (2018) brought record-breaking rainfall to Somaliland and Puntland, while Cyclone Gati (2020) was the strongest storm ever recorded in Somalia, bringing up to 250 mm of rain in 48 hours equivalent to two years of average rainfall causing loss of life, livestock, and damaging livelihoods in Bari and Sanaag regions. Warmer sea surface temperatures in the Arabian Sea are increasing the likelihood of more intense cyclones reaching Somali coasts.

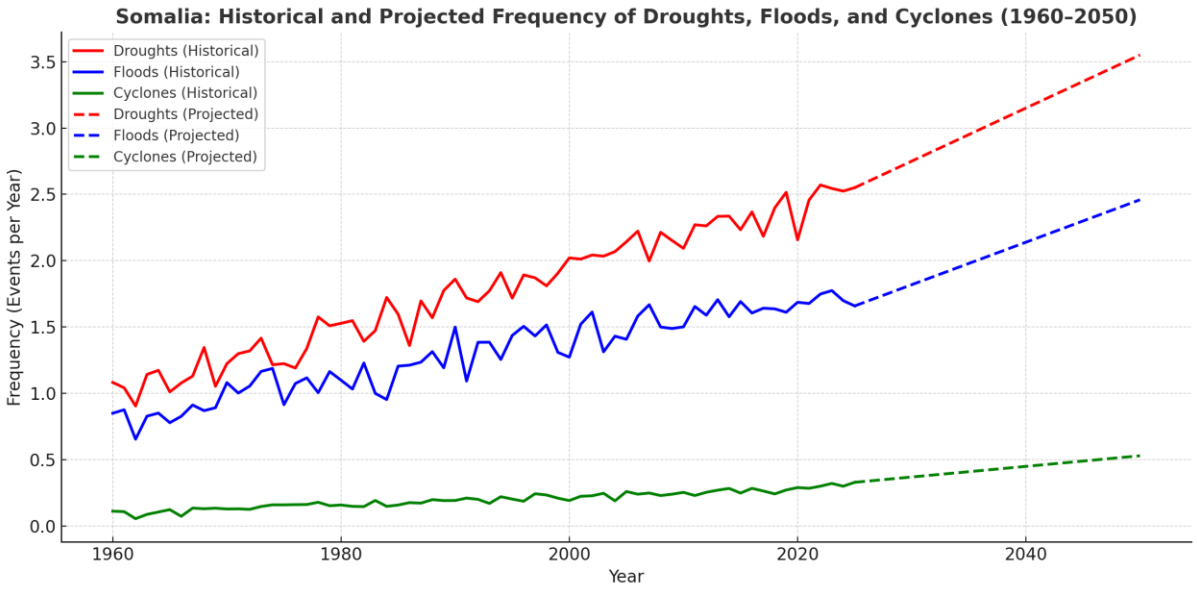
Projections to 2050

Climate models from FEWS NET, ICPAC, and the IPCC's CMIP6 simulations project that Somalia will experience:

- Temperature increases of +1.0 to +1.75 °C by mid-century.
- More frequent and prolonged droughts, potentially occurring every 1–2 years in some regions.
- Heavier, short-duration rainfall events, increasing both flash and riverine flood risks.
- Slightly higher probability of cyclonic activity, driven by warming oceans.

This convergence of hazards will exacerbate water scarcity, degrade ecosystems, and intensify competition over natural resources, posing significant risks to food security and human health

Diagram 1. Somalia Historical and Projected Frequesncy of Drought, Floods and Cyclone



Source: *SWALIM, FEWS NET, and FAO records, while the projections align with IPCC CMIP6 mid-century scenarios indicating rising frequency and intensity of extremes*.

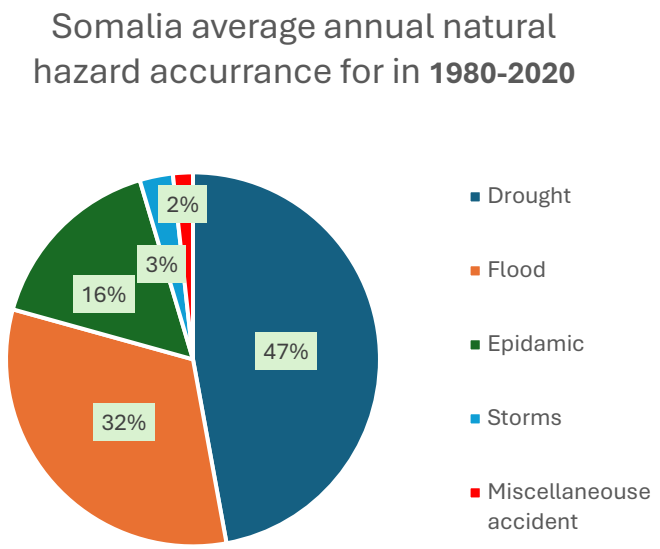


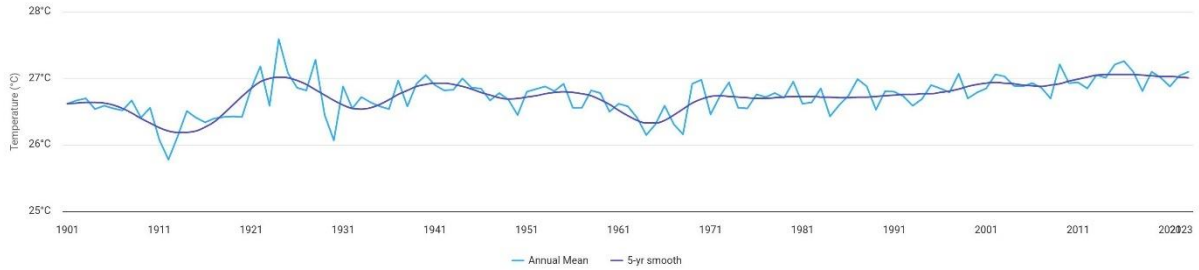
Diagram 2. – *Monthly climatology for temperature and precipitations (1991-2020)*[17]

Somalia has experienced a warming trend over the past seven decades, consistent with broader regional trends in the Horn of Africa. Between 1950 and 2020, the average temperature in Somalia increased by approximately **1.5°C**, with more significant warming observed in the arid central and southern regions. This increase has led to more frequent and prolonged heatwaves, particularly in densely populated urban areas and pastoral zones. High temperatures, often exceeding **40°C during peak months**, have intensified evaporation rates, further reducing the availability of

[17] Climate Change Knowledge Portal, WB

critical water resources. Communities reliant on livestock have reported increased mortality rates due to heat stress, particularly among camels and cattle.

Diagram 3. – *Observed annual average mean surface air temperature of Somalia for 1991-2023*[18]



Rainfall in Somalia is characterized by high inter-annual variability, which has become more pronounced over recent decades. Northern highlands receive 400 to 600 mm of annual rainfall, while central and southern regions frequently receive less than 200 mm, making them highly vulnerable to droughts. Notably, drought cycles that historically occurred every 5–7 years now recur every 2–3 years. The severe drought of 2016–2017, which resulted in the loss of over 3 million livestock and affected 6.7 million people, illustrates the devastating impact of erratic rainfall. Similarly, the 2020–2023 drought saw significant crop failures, leaving over 6 million people in need of urgent food assistance.

Land degredation due to Climate Change Impact

According to SWALIM assessments covering the period 1980–2009, the dominant forms of land degradation in Somalia were vegetation loss, soil erosion, and reduced soil moisture. Vegetation loss included both a decline in plant species diversity and overall ground cover. The findings showed that central and north-eastern Somalia were the hardest hit, experiencing a 37% reduction in vegetation cover between 1982 and 2008 equivalent to an average annual decline of about 1.4%. Evidence of this degradation is also visible through high-resolution satellite imagery, which highlights the spread of gully erosion in these regions.[19]

Assessments by SWALIM have revealed that for the period 1980 to 2009, the most prevalent types of land degradation in Somalia were loss of vegetation, topsoil loss, and the decline of soil moisture. Loss of vegetation comprised of loss of vegetation composition (species) as well as cover. The assessments found the central and north-east areas of Somalia are most affected by loss of vegetation cover. These areas had a net cover loss of 37% ***High resolution satellite image of gully erosion*** **between 1982 and 2008 - which translates into approximately 1.4% per year.**

[18] Climate Change Knowledge Portal, WB

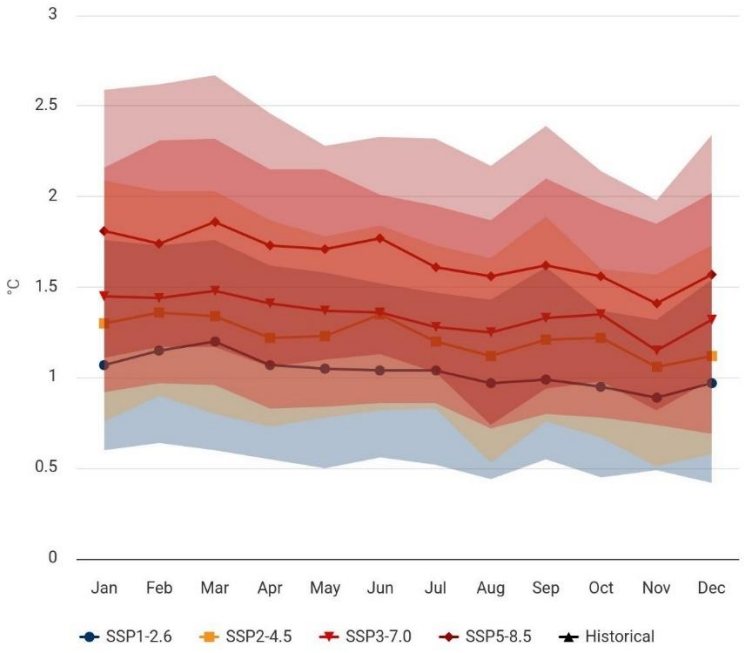
[19] FAO SWALIM: Somalia Water and Land Information ManagementLand Degradation in Somalia | FAO SWALIM: Somalia Water and Land Information Management

The economic toll of climate variability is immense, with annual losses in agriculture and water sectors exceeding **$500 million**. Climate-induced displacement has surged, with over **3 million people** displaced by droughts and floods in the past decade. Urban centers, particularly Mogadishu and Kismayo, struggle to accommodate these displaced populations, leading to overcrowded informal settlements with limited access to basic services.

5.2 Climate projections and scenarios

Looking to the future, climate models predict that Somalia will continue to experience rising temperatures and increased climate variability. Projections suggest that average temperatures could rise by 1.5 to 2.5°C by 2050[20] under moderate emission scenarios (RCP4.5), with end-of -century estimates suggesting increases of up to 4.3°C under high emissions (RCP8.5). These rising temperatures will amplify heat stress, reduce agricultural productivity, and intensify water scarcity, especially in arid regions. Rainfall patterns are expected to become even more erratic, with the likelihood of prolonged droughts and more frequent flooding events. Sea level rise poses an additional threat, particularly to coastal regions, with estimates predicting an increase by 20–36 cm by 2050 [21]. This rise poses significant risks of flooding, erosion, and salinization, especially for communities in coastal cities such as Mogadishu and Kismayo.

Diagram 4. – *Projected average mean surface air temperature anomaly for 2040-2059*[22]



Extreme weather events, including droughts and floods, are expected to intensify in frequency and severity, further stressing livelihoods reliant on rain-fed agriculture and livestock. Water availability per capita is predicted to decline by over 50% by 2080 due to both climate change and

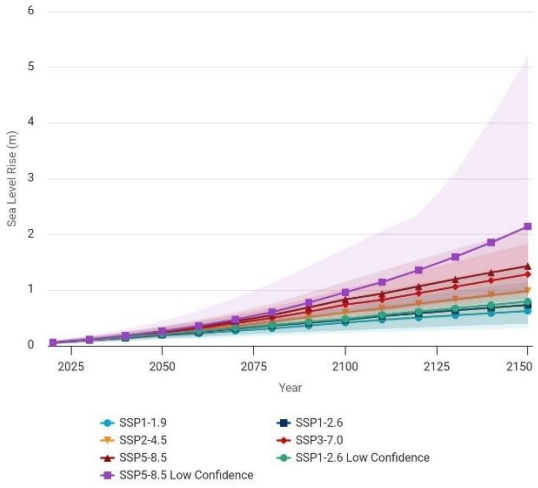
[20] Climate Change Knowledge Portal, WB
[21] Climate Change Knowledge Portal, WB
[22] Climate Change Knowledge Portal, WB

rapid population growth, necessitating urgent adaptation in water governance[23]. These climate projections underscore the importance of integrating climate scenarios into Somalia's development policies and prioritizing investments in climate-resilient infrastructure and community-based adaptation measures.

Temperature trends and projections[24]: Somalia's future climate is expected to witness significant warming due to increasing greenhouse gas emissions. Projections indicate that mean annual temperatures could rise by 1.4 to 3.4°C by 2080 compared to pre-industrial levels, with variations depending on the emissions scenario (RCP2.6 vs. RCP6.0). For instance, under the lower emissions scenario, the average temperature increase is expected to be 1.6°C by 2030, while higher emissions could result in an increase of 2.8°C by 2080. This warming trend will have profound implications, including heightened heat stress, particularly in central regions such as Galmudug, which may experience up to 152 additional very hot days (temperatures exceeding 35°C) annually by 2080. Urban areas will face compounded heat-related challenges due to the urban heat island effect, exacerbating risks to public health and productivity.

Sea-level rise[25]: Coastal regions in Somalia face a significant threat from rising sea levels, projected to increase by 11–21 cm by 2050 and potentially reaching up to 42 cm by 2080 under high emissions scenarios. This rise will intensify flooding, coastal erosion, and saline intrusion into freshwater sources, severely impacting communities in Mogadishu, Kismayo, and other coastal areas. The loss of habitable land and damage to infrastructure will require significant adaptation investments to protect vulnerable populations and economic hubs.

Diagram 5. – *Projected sea level change; Somali exclusive economic zone, relative to 2005 (1995-2015)* [26]



Precipitation and extreme rainfall events[27]: While projections indicate a potential increase in annual precipitation by up to 67.3 mm by 2080 under RCP6.0, this trend is characterized by high

[23] MoECC 2023: Somalia Bi-Annual Report to UNFCCC.
[24] "Climate Risk Profile Somalia", Adelphi, 2022
[25] "Climate Risk Profile Somalia", Adelphi, 2022
[26] Climate Change Knowledge Portal, WB
[27] "Climate Risk Profile Somalia", Adelphi, 2022

inter-annual variability and regional disparities. Northern regions, such as Puntland and Galmudug, are expected to experience significant increases in rainfall, whereas the southern areas might face slight declines. Increased precipitation will not necessarily translate into improved water availability due to the intensity and irregularity of rainfall, leading to higher runoff, soil erosion, and flash flooding. Heavy rainfall events are likely to become more frequent, particularly in northern Somalia, exacerbating risks to infrastructure, agriculture, and water management systems.

Diagram 6. – *Annual mean precipitation projections for Somalia for different GHG emissions scenarios, relative to the year 2000*[28]

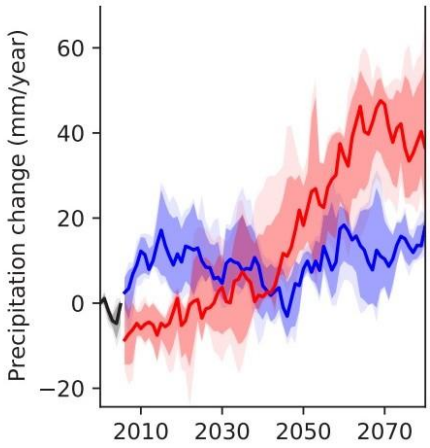
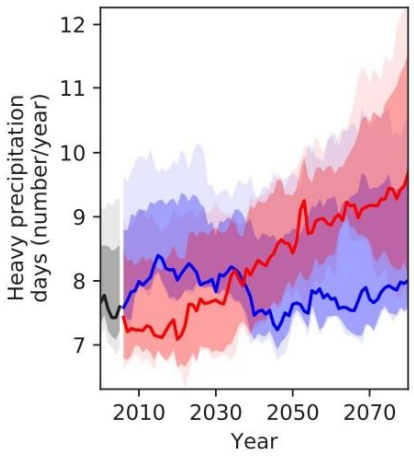


Diagram 7. – *Projections of the number of days with heavy precipitation over Somalia for different GHG emissions scenarios, relative to the year 2000*[29]



Soil moisture and evapotranspiration: Soil moisture trends show significant uncertainty, with models projecting changes ranging from -3.9% to 20% by 2080. However, higher temperatures

[28] "Weathering Risks – Climate Risk Profile Somalia", Adelphi
[29] "Weathering Risks – Climate Risk Profile Somalia", Adelphi

will likely increase evapotranspiration rates, particularly in northern and southern regions, intensifying water stress and reducing agricultural yields. These changes underscore the need for advanced water management strategies to mitigate the combined effects of increased evaporation and irregular rainfall patterns.

Diagram 8. – *Soil moisture projections for Somalia for different GHG emissions scenarios, relative to the year 2000*[30]

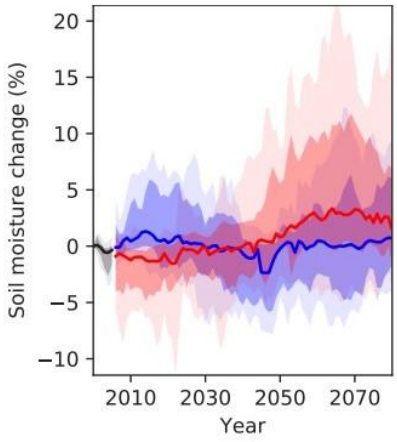
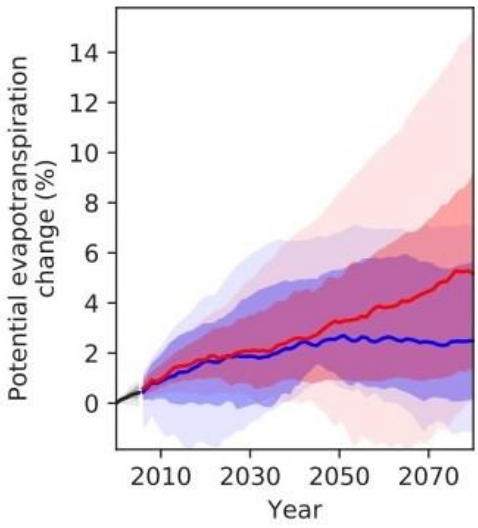


Diagram 9. – *Potential evaporation projections for Somalia for different GHG emissions scenarios, relative to the year 2000*[31]



5.3 Impacts of climate change

[30] "Weathering Risks – Climate Risk Profile Somalia", Adelphi
[31] "Weathering Risks – Climate Risk Profile Somalia", Adelphi

The impacts of climate change in Somalia are expected to be severe, affecting key sectors such as agriculture, water resources, health, and infrastructure. Agriculture, which contributes over 60% of GDP and employs 80% of the population, is acutely affected by climate variability. Recurrent droughts, such as the 2021–2023 drought that killed over 3 million livestock and reduced crop yields by 70% in some regions, have led to widespread food insecurity[32]. Water scarcity will come under severe pressure due to climate impact, with declining groundwater levels and increasing evaporation rates driving resource competition. This has led to heightened tensions and conflicts over access to water, especially in arid and semi-arid regions. The economic repercussions are severe, with annual drought-related losses in agriculture and water sectors running into hundreds of millions of dollars , intensifying poverty and unemployment[33].

The health sector faces mounting challenges due to climate-related factors such as increased heat, water scarcity, and changing rainfall patterns, leading to higher incidences of heat-related illnesses and vector-borne diseases such as malaria and dengue, while malnutrition rates soar during climate shocks. During the 2021–2023 drought, an estimated 1.8 million children faced acute malnutrition, exacerbating public health crises[34].

Climate-induced displacement has also surged, with over 1 million people displaced in 2022 alone due to drought and conflict. Urban centers are overwhelmed by these movements, as displaced populations strain already inadequate infrastructure and social services. Coastal areas, meanwhile, face unique challenges from sea-level rise and increased salinity, further threatening the livelihoods of fishing communities.These changes underscore the urgent need for targeted adaptation measures to mitigate climate impacts on Somalia's development trajectory.

VI. Vulnerability and risk assessment

6.1 Sectoral vulnerability assessment

Somalia’s sectoral vulnerabilities to climate change are extensive and deeply interconnected, reflecting the country’s dependence on fragile, climate-sensitive systems that underpin its economy and livelihoods. From agriculture and livestock to water resources, health and infrastructure, each sector faces unique and compounding challenges exacerbated by a changing climate. Recurrent droughts, erratic rainfall patterns, rising temperatures and intensifying extreme weather events are not only disrupting ecosystems but also destabilizing communities, livelihoods and public health systems.

These vulnerabilities disproportionately impact the most marginalized groups, including rural populations, women and IDPs, who often lack the resources and infrastructure needed to adapt. For instance, agricultural failures and water scarcity trigger food insecurity and displacement, while insufficient health systems struggle to address the rising prevalence of climate-driven diseases. Urban areas are equally strained, with poorly planned infrastructure unable to withstand recurring floods and rising heat stress.

[32] Adelphi 2022 : Climate Risk Profile Somalia
[33] MoECC 2024: Somalia NDC Stock taking Report
[34] MoECC 2023: Somalia UNFCCC Bi-Annual Report

Addressing these diverse and overlapping challenges demands an integrated approach that prioritizes resilience across sectors. By embedding climate change adaptation into national and local planning processes, Somalia can strengthen its ability to manage risks, protect vulnerable populations and create pathways for sustainable development. Investments in innovative, context-specific solutions, community engagement, and international partnerships will be essential to safeguard the country's future amidst a changing climate.

Agriculture: Agriculture is the backbone of Somalia's economy, employing over 60% of the population and contributing significantly to GDP. However, this sector is critically vulnerable to climate change, particularly droughts and erratic rainfall. In recent years, the frequency of droughts has increased, with major droughts occurring in 2011, 2017, and 2021-2022. These severe drought conditions displaced **7.8 million people**[35] from their communities. With the devastating loss of their livelihoods (**80% of livestock**) and livestock, many families were forced to flee their homes and headed to camps and informal settlements, hoping to find support there. During the 2021-2022 drought, more than in the hardest-hit regions died, causing the loss of livelihoods for millions of pastoralists and agro-pastoralists. Crop failures during the same period reached unprecedented levels, with food production reduced by more than **60%** in some areas. The vulnerability of agriculture is also compounded by the lack of irrigation infrastructure, as only **3% of Somalia's agricultural land** is irrigated, leaving most crops dependent on unpredictable rains.

In addition to droughts and erratic rainfall, agriculture in Somalia faces severe threats from locust infestations, pests and diseases, all of which are exacerbated by climate change. Desert locust outbreaks have periodically devastated crops and pastures, with the most severe plague in over 70 years occurring in 2019-2020. During this event, locust swarms consumed an estimated 1.8 million metric tons of vegetation daily, destroying over 175,000 acres of farmland in Somalia and neighboring Ethiopia[36]. The increase in locust outbreaks is closely tied to changing climatic patterns, including more frequent cyclones and higher rainfall, which create ideal breeding conditions. Climate models suggest that as Indian Ocean warming anomalies become more frequent, the occurrence of locust swarms in Somalia is likely to rise significantly[37]. These outbreaks not only destroy crops but also drive food insecurity and displacement, particularly for vulnerable rural households lacking resources for crop protection.

Pests such as the fall armyworm and fungal infections further jeopardize food security. The fall armyworm, which emerged in Somalia in 2016, has caused substantial maize and sorghum yield losses, with annual damage estimated at up to $3 million[38]. Similarly, fungal toxins, such as aflatoxin B1 found in maize and sorghum, present serious health risks, with contamination levels exceeding EU safety thresholds by over 400 times [39]. These challenges are compounded by Somalia's limited pest management infrastructure and reliance on outdated crop protection methods.

[35] Profiles of Adaptation: Somalia, article by WRI, April 2023
[36] "Six Things You Didn't Know About Desert Locusts", Qasim, Arsheen. 2020; ReliefWeb press release February 14.
[37] Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
[38] "Fall Armyworm: Impacts and Implications for Africa", Day R et al. 2017. Outlooks on Pest Management. Nairobi: CABI.
[39] "Occurrence and Human-Health Impacts of Mycotoxins in Somalia." Journal of Agricultural and Food Chemistry 67 (7): 2052–60.Wielogorska, E., M. Mooney, M. Eskola, N.E. Ezekiel, M. Stranska, R. Krska, and C. Elliott. 2019.

The cumulative impacts of these risks are profound. From 1972 to 2012, per capita cereal production in Somalia declined by 66%[40], with yields of staple crops like sorghum and maize remaining among the lowest in the region. For instance, sorghum yields in Somalia average 0.6 tons per hectare, compared to 1.5 tons per hectare in neighboring Kenya[41]. Without significant investment in irrigation, agricultural extension services, and pest management, Somalia's agriculture sector will continue to struggle against the combined pressures of climate change, pest outbreaks, and environmental degradation. These systemic vulnerabilities underline the urgent need for targeted interventions to enhance agricultural resilience and food security.

Livestock: Livestock is central to Somalia's economy and the primary livelihood for over 60% of the population, especially among pastoral and agro-pastoral communities. The sector contributes around 80% to the agricultural GDP and 45% to the national GDP[42], thus providing food, income and social status, as well as making it a socio-economically vital asset. However, Somalia's livestock industry is highly vulnerable to climate variability, as recurrent droughts, erratic rainfall, and rising temperatures reduce the availability of pasture and water resources, essential for livestock health and productivity. In recent years, drought events, such as those in 2017 and 2021, led to significant livestock losses, severely impacting household incomes and food security. Continuing from the significant role of pastoralism and agro-pastoralism in Somalia's socio-economic landscape, the sector has faced staggering losses due to recurrent droughts. The 2017[43] drought alone led to approximately 4 million excess animal deaths, particularly among small ruminants, resulting in estimated damages of around USD 290 million. In that year, total economic losses from the livestock sector reached nearly USD 1.3 billion, primarily driven by a sharp reduction in milk production and a decrease in the market value of animal offtake. Additionally, the effects of the drought extended over the next five years, with further economic losses of USD 640 million due to the overall decline in the livestock population, severely impacting rural incomes and food security for millions of Somali household.

The impact of climate change on livestock is also intensified by diseases that thrive in warmer temperatures. Outbreaks of livestock diseases like Rift Valley fever and foot-and-mouth disease are linked to changes in climate and rainfall, leading to losses and restrictions on livestock trade. The lack of veterinary services and infrastructure to manage outbreaks exacerbates these challenges, leaving pastoralists ill-equipped to protect their herds. Adaptation measures in the NAP aim to strengthen the resilience of the livestock sector through improved veterinary services, enhanced pasture management, and water infrastructure investments, enabling communities to better withstand and adapt to climate pressures. Climate change adaptation for Somalia's livestock sector must also address water resource management, as access to water is critical for both livestock and the livelihoods of those who depend on it. The NAP emphasizes the need for sustainable water infrastructure, such as rainwater harvesting and the development of boreholes, particularly in drought-prone areas. By improving access to water, supporting sustainable grazing practices, and investing in climate-resilient infrastructure, Somalia's adaptation strategies aim to reduce climate-induced vulnerabilities and stabilize food security and income sources for its pastoral communities.

[40] "Somalia is Facing Another Food Crisis: Here's Why - And What Can Be Done to Stop the Cycle." The Conversation, Keogh, Bryan. 2021.
[41] "Overview: Rebuilding Resilient and Sustainable Agriculture in Somalia." Country Economic Memorandum. World Bank and FAO, 2018.
[42] Exploring investment opportunities for the livestock sector in Somalia, Article by International Livestock research institute, August 2023
[43] Impact of the 2016/2017 droughts on Somali livestock keepers, FAO Statistics Working paper Series, 23-37, page 5, paragraph 3

Somalia's livestock sector is increasingly vulnerable to physiological heat stress, driven by rising temperatures and relative humidity. Heat stress directly impacts livestock productivity by reducing food intake, weight, fertility, and milk production. For instance, mid-lactating dairy cows experience a 30% decline in milk production under higher temperatures, while goats, despite their adaptation to tropical climates, face reduced growth, milk, and meat production by 12%, 3-10%, and 4%, respectively, when exposed to temperatures above 38°C[44]. Heatwaves, which are projected to intensify, increase livestock mortality and diminish reproductive performance, particularly in sheep and camels. For example, female sheep exposed to heat stress during early gestation experience up to a 26-fold increase in embryo mortality[45]. This stress not only reduces productivity but also exacerbates water demand, placing further strain on already scarce water resources.

Climate-induced shifts in rainfall patterns and temperatures also exacerbate disease prevalence in livestock. Outbreaks of Rift Valley Fever (RVF) and African trypanosomiasis are closely linked to heavy rainfall and flooding, which create conducive conditions for vectors like Aedes aegypti mosquitoes and tsetse flies[46]. Historical RVF outbreaks, such as the one in 2006-2007, resulted in economic losses of approximately $470 million[47]. Additionally, diseases like *Trypanosoma evansi* in camels and the contamination of water reservoirs during floods further jeopardize livestock health. Projections suggest that the geographic range of vector-borne diseases will expand, with northern Somalia increasingly affected by RVF and trypanosomiasis by 2050 as temperatures and rainfall rise.

Pasture degradation due to late-onset rains, prolonged dry spells, and higher temperatures compounds the challenges for livestock. Increased lignification of plant tissues under high temperatures reduces the digestibility and quality of forage, leading to further declines in productivity. During droughts, up to 30% of livestock mortality is typically observed, translating into hundreds of millions of dollars in economic losses annually. For instance, the 2017 drought resulted in significant reductions in livestock prices, contributing to rural income declines and severe food insecurity. These impacts, combined with poverty and gender inequalities, leave pastoralist households disproportionately affected, with women and children bearing the brunt of the economic and nutritional deficits.

Adapting Somalia's livestock sector to these climate challenges will require significant investments in veterinary services, sustainable grazing practices, and climate-resilient water infrastructure. Enhancing disease surveillance, controlling outbreaks through better vector management, and rehabilitating pasturelands are critical strategies emphasized in the NAP. Additionally, targeted interventions, such as early warning systems for heatwaves and disease outbreaks, can mitigate economic losses and protect livelihoods for millions of pastoralists and agro-pastoralists.

[44] "A Shift from Cattle to Camel and Goat Farming Can Sustain Milk Production with Lower Inputs and Emissions in North sub-Saharan Africa's Drylands.", Rahimi et al, 2022.
[45] "Impact of Heat Stress on the Reproductive Performance and Physiology of Ewes: A Systematic Review and Meta-Analyses.", Romo-Barron et al, 2019, International Journal of Biometeorology.
[46] "Dengue Vectors in Africa: A Review.", Diallo et al, 2022. Heliyon 8 (5)
[47] The Impact of Disasters and Crises on Agriculture and Food Security. FAO, 2017

Water Resources: Somalia's water resources are under significant strain due to climate change, characterized by recurrent droughts and regular flooding, leading to failed crops, loss of livestock, and chronic food insecurity. Over **80%** of the country is classified as arid or semi-arid, with surface water resources extremely limited[48].

Major rivers such as the Shabelle and Juba are increasingly unreliable, with flow reductions of 20-40% observed during drought years. Groundwater supplies are over-exploited, and salinization is a growing problem due to both overuse and sea level rise. The increasing variability in rainfall has led to severe droughts followed by flash floods, such as the 2019 floods that displaced **370,000** people and caused **$70 million** in damages[49]. The impacts of climate change, including recurring floods, droughts, and unpredictable weather patterns, have led to widespread human displacement in Somalia.

Climate-driven stress on Somalia's water resources also directly impacts access to safe drinking water and sanitation services. Droughts reduce water availability for households, particularly in rural and displacement-affected areas, while floods contaminate water points and overwhelm sanitation infrastructure. According to the WHO/UNICEF Joint Monitoring Programme, Somalia continues to face major gaps in WASH service coverage, with rural communities disproportionately affected. These interlinked challenges highlight the urgency of integrating climate-resilient water resource management with expanded and reliable WASH service delivery.

Climate crises threaten Somalia's socio-economic progress by increasing water and food scarcity, the need for humanitarian assistance, displacement, and the degradation of traditional livelihoods. Addressing these challenges requires integrated economic policies that prioritize water resource management, strengthen governance, and embrace innovative approaches to build resilience against climate-induced vulnerabilities.

Health: Climate change is also exacerbating public health challenges. Rising temperatures and shifting precipitation patterns are leading to the spread of vector-borne diseases, such as malaria and dengue, particularly in riverine and coastal areas. According to WHO estimates, Somalia could see a **50-60% increase** in the incidence of malaria by 2050 if climate change trends continue. Heat-related illnesses are also on the rise, with vulnerable populations, including children and the elderly, at increased risk. Additionally, waterborne diseases, including cholera, are more frequent during flood events, particularly in urban slums where access to clean water and sanitation is limited.

Rising temperatures and extreme weather events pose significant health risks, with physiological heat stress being one of the most critical challenges. Heat stress, exacerbated by high temperatures and humidity, has profound effects on human productivity and health, particularly among agricultural workers and other outdoor laborers. Occupational heat-related mortality among agricultural workers is 35 times higher than in other industries, highlighting the disproportionate impact on Somalia's rural workforce[50]. Additionally, urban populations in Somalia face Urban Heat Island (UHI) effects, particularly in poorly planned and densely populated areas such as

[48] Integrating Climate Change with Somalia's Development: The Case for Water, WB Article, Novermebr 2023
[49] UNEP Somalia Country Context
[50] "Thermal Stress, Human Performance, and Physical Employment Standards", Cheung S., J. Lee, and J. Oksa, 2016, Applied Physiology, Nutrition, and Metabolism 41 (6): 148–64.

Mogadishu and Kismayo. These effects, combined with frequent heatwaves, exacerbate risks of cardiovascular diseases, respiratory problems and heat-related illnesses. Vulnerable groups, including the elderly, children and IDPs, are disproportionately affected due to inadequate shelter, lack of access to cooling mechanisms and poor health infrastructure.

Climate-driven changes are also influencing the prevalence of vector-borne diseases. Malaria, dengue and RVF are projected to increase in incidence as rising temperatures and changing rainfall patterns create favorable conditions for mosquito populations, particularly in southern and riverine areas. WHO estimates suggest that malaria incidence in Somalia could increase by 50-60% by 2050 if current trends persist. Similarly, outbreaks of RVF, which are closely linked to periods of heavy rainfall and flooding, threaten both livestock and human health. Past outbreaks, such as the 2006-2007 East African RVF epidemic, caused significant economic and health impacts, with mortality rates of up to 12% among remote pastoralist communities.

Waterborne diseases further compound health vulnerabilities, particularly during flood events when contaminated water sources become widespread. In 2019, diarrheal diseases ranked among the top five causes of mortality in Somalia, with unsafe water, sanitation, and hygiene (WASH) conditions contributing to an estimated 86 deaths per 100,000 population annually. These risks are exacerbated during droughts, as restricted access to clean water leads to the spread of diseases such as cholera, typhoid, and hepatitis A in overcrowded IDP settlements. Without significant investments in climate-resilient health systems, improved WASH infrastructure, and vector control programs, the health impacts of climate change in Somalia will continue to grow, undermining public health and economic stability.

Infrastructure: Somalia's infrastructure is critically vulnerable to climate-induced disasters, particularly in urban and coastal areas. Rising sea levels and coastal erosion pose significant threats to infrastructure in Mogadishu, Kismayo, and other coastal regions, threatening critical assets such as ports, roads, and coastal defenses. Flash floods, another frequent hazard, overwhelm drainage systems, damage transport networks, and disrupt electricity and water supplies, as seen in the 2023 floods that affected **2.5 million people**, displaced **1.2 million individuals** and **caused $176 million in losses and damages**[51]. These recurring events highlight the need for targeted investments in climate-resilient infrastructure to safeguard Somalia's socio-economic stability.

Somalia's infrastructure faces compounded risks from climate change, with transport, energy and water systems particularly vulnerable. Flooding, high temperatures and extreme weather events have accelerated the degradation of roads, ports and buildings. Approximately 90% of Somalia's primary roads require extensive rehabilitation, with only 13% of the road network paved, and many paved roads deteriorated beyond their design life[52]. Seasonal flooding, which frequently renders roads impassable, further limits connectivity, affecting critical sectors such as agriculture and trade. Urban infrastructure also suffers from substandard building practices in rapidly growing settlements, leading to increased vulnerability to heat stress and storm damage[53]. These urban vulnerabilities are magnified by informal settlements and slums, which lack adequate drainage and insulation, exposing residents to severe health and economic risks.

[51] UN Somalia
[52] "The Africa Infrastructure Index (AIDI) 2020", AfDB, 2020.
[53] "Sustainable Solutions for Mass-Housing Design in Africa: Energy and Cost Assessment for the Somali Context" Del Pero et al, 2021, Sustainability 13.

Sea-level rise and coastal erosion are significant threats to Somalia's ports and coastal infrastructure. Ports such as Mogadishu, Berbera, Bossaso and Kismayo remain vital for trade and economic activity, but they face increasing risks from rising sea levels and storm surges. With sea levels projected to rise by up to **0.6 meters** by the end of the century, significant investments in coastal defenses, such as raising jetty heights and strengthening seawalls, are urgently needed[54]. Without these interventions, critical infrastructure will remain highly susceptible to climate-induced disruptions.

Somalia's energy infrastructure is similarly fragile. The country's electricity supply is dominated by private-sector-operated microgrids powered predominantly by diesel generators. Climate hazards, including flooding and storms, frequently disrupt energy distribution by damaging substations and transmission lines. As Somalia develops its energy sector, incorporating renewable energy sources such as wind and solar power offers significant potential. However, these renewable systems remain highly sensitive to climate variables like high temperatures and inconsistent rainfall, necessitating resilient designs to withstand future climate impacts.

Water and sanitation infrastructure also face growing challenges from climate change. Over **80%** of the population relies on groundwater, much of which is highly saline and often unsafe for consumption.[55] Rising temperatures and changing rainfall patterns are expected to exacerbate water scarcity, while periodic flooding increases the risk of water contamination, intensifying outbreaks of waterborne diseases. Investments in resilient infrastructure, such as protected boreholes, flood-resistant drainage systems and improved urban planning, are critical to mitigating these impacts and safeguarding Somalia's future development.

6.2 Sub-National level vulnerability assessment

Coastal regions: particularly Galmudug, Puntland, Somaliland and parts of southern Somalia, face acute climate vulnerabilities stemming from rising sea levels and coastal erosion. In Puntland, projections indicate that up to **3%** of coastal land could be submerged by 2050, significantly impacting fisheries, which account for **30-40%** of the region's economy. Somaliland's coastline has experienced severe cyclonic activity, including Cyclone Sagar in 2018, which caused widespread damage to ports and fisheries infrastructure. Southern coastal areas, such as Kismayo, are grappling with declining fish stocks due to rising sea temperatures and habitat degradation, threatening the livelihoods of fishing communities.

Arid and semi-arid regions: The arid and semi-arid regions, including Galmudug, Jubaland, and Hirshabelle, are heavily impacted by climate variability, with recurrent droughts disrupting agro-pastoral livelihoods. Rainfall patterns have become increasingly erratic, leading to crop failures and rangeland degradation. For example, the 2021 drought affected over **7.8 million people** in southern regions, with some areas reporting livestock losses exceeding **80%**. In Galmudug, locust infestations in 2020 devastated agricultural productivity, while Jubaland faces compounded risks of desertification and water scarcity, which threaten to reduce rangelands by **20%** by mid-century.

[54] "Transport Sector Needs Assessment and Investment Program" AfDB, 2016

[55] Integrating Climate Change with Somalia's Development: The Case for Water, WB Article, Novermebr 2023

Riverine Areas: Regions along the Shabelle and Juba rivers, including parts of Hirshabelle and Jubaland, are vulnerable to both drought and flooding. Although these areas traditionally benefit from riverine agriculture, shifting rainfall patterns are disrupting the flow of the rivers. Droughts reduce river levels, impacting irrigation, while erratic rains lead to flash floods that destroy crops and homes. For instance, the **2019 floods** along the Shabelle River displaced **500,000 people** and destroyed thousands of hectares of crops. These dual risks make riverine areas particularly challenging for adaptation efforts.

Jubaland[56], located in southern Somalia, faces significant climate vulnerabilities due to its geographical features, socio-economic dependencies, and exposure to recurring climatic hazards. Spanning 110,293 km², Jubaland's economy is heavily reliant on climate-sensitive sectors such as agriculture, livestock and fisheries, making it particularly susceptible to the adverse impacts of climate change. The region has witnessed worsening climatic conditions, including more frequent droughts, erratic rainfall and rising temperatures, which have compounded existing vulnerabilities across various sectors.

Agriculture in Jubaland is under immense stress due to erratic rainfall and prolonged droughts. Crop production has declined by up to **60%** in some areas, exacerbated by soil degradation and locust infestations, such as the severe outbreak in 2020 that destroyed tens of thousands of hectares of farmland. These challenges have deepened food insecurity, affecting over **2.5 million people** in the region.

Livestock, the primary livelihood for many pastoral and agro-pastoral communities, has also been significantly affected. Prolonged droughts have led to water scarcity and declining pasture quality, resulting in large-scale livestock mortality. The 2017 drought alone caused the death of over four million animals, inflicting economic losses estimated at **$290 million**. Additionally, climate-induced changes have heightened the vulnerability of livestock to diseases such as RFV, which disrupt trade and further undermine the livelihoods of pastoralists.

Water resources in Jubaland are critically strained, with the majority of the population lacking access to safe drinking water. The Juba River, a vital source for irrigation and drinking water, is increasingly unreliable due to reduced flow during drought periods and frequent flooding during heavy rains. These dual threats disrupt agricultural activities, destroy infrastructure, and exacerbate health risks. Coastal areas in Jubaland, such as Kismayo, face the additional challenges of sea level rise and coastal erosion, which threaten infrastructure, displace communities, and disrupt the fisheries sector. Fisheries, a significant contributor to local livelihoods, are increasingly affected by rising sea temperatures and changes in marine ecosystems, resulting in declining fish stocks and income for coastal communities.

Climate change has also intensified health risks in Jubaland. Rising temperatures and extreme weather events have led to increased incidences of waterborne diseases such as cholera and Acute Watery Diarrhea, particularly during flood events. Heat stress, exacerbated by high temperatures,

[56] Jubaland Climate Vulnerability Assessment, GCF/UNDP "Support for strengthening climate change adaptation planning for Somalia" Readiness Project, January 2024.

has become a growing concern for outdoor laborers, while vector-borne diseases like malaria continue to pose significant public health challenges.

The region's infrastructure is not immune to climate impacts, with seasonal floods frequently damaging roads, bridges, and other critical facilities. In Kismayo and other urban centers, coastal erosion poses a persistent threat to ports and transportation networks, further hindering economic development. Addressing these vulnerabilities requires a concerted effort to build climate resilience through investments in adaptive infrastructure, improved water resource management, and targeted health interventions, ensuring sustainable livelihoods and economic stability for Jubaland's communities.

Puntland[57], located in northeastern Somalia, faces significant climate vulnerabilities that are intricately tied to its geographic, climatic, and socio-economic characteristics. With an arid and semi-arid climate and over 1,600 kilometers of coastline, Puntland is highly exposed to both terrestrial and marine climate risks. Recurrent droughts, coastal erosion, and cyclones pose severe challenges to its economy, infrastructure, and the livelihoods of its over 4.9 million residents.

Agriculture in Puntland is limited but essential for subsistence and local markets. Recurrent droughts have slashed crop yields, with some years seeing losses exceeding **70%**, leaving rural populations highly food-insecure. The 2020 locust outbreak caused extensive damage, with tens of thousands of hectares of farmland rendered unproductive, exacerbating hunger and economic vulnerability. Inadequate water for irrigation and poor soil conditions further diminish agricultural productivity, leaving the sector ill-equipped to cope with climate stressors.

Livestock losses in Puntland have been catastrophic, particularly during the 2017 and 2021 droughts, where up to **60%** of herds were lost in some regions. Water scarcity and heat stress continue to degrade animal health and productivity. Additionally, diseases such as RVF and foot-and-mouth disease have increased, threatening livelihoods and trade.

Water resources are critically strained in Puntland, where over **65% of residents lack access to safe drinking water**. The depletion of groundwater reserves and contamination of surface water during droughts create acute shortages, forcing many communities to rely on unsafe and distant sources. Flash floods, often following erratic and heavy rains, exacerbate water insecurity by damaging critical infrastructure and contaminating reservoirs, increasing the prevalence of waterborne diseases such as cholera and acute watery diarrhea.

Puntland's extensive coastline renders its fisheries sector highly vulnerable to climate change. Rising sea temperatures have disrupted marine ecosystems, reducing fish stocks and threatening the livelihoods of coastal communities. Coastal erosion, exacerbated by storm surges and sea level rise, is displacing entire villages and undermining vital infrastructure, including ports and fish landing sites. Cyclones, such as those in 2018 and 2019, caused widespread destruction, further compounding vulnerabilities.

[57] Puntland Climate Vulnerability Assessment, GCF/UNDP "Support for strengthening climate change adaptation planning for Somalia" Readiness Project, December 2023.

The health sector in Puntland faces mounting challenges due to climate-induced hazards. Rising temperatures and stagnant water bodies have intensified the spread of vector-borne diseases, including malaria and dengue fever. Droughts and floods contribute to the outbreaks of waterborne illnesses, while limited healthcare infrastructure and resources severely constrain the region's capacity to address public health crises effectively.

Infrastructure in Puntland is frequently damaged by climate-related hazards. Seasonal floods destroy roads and bridges, isolating communities and disrupting trade and access to essential services. Coastal erosion threatens critical infrastructure in urban hubs such as Bosaso, a key economic and trade center. Inadequate investment and maintenance of infrastructure exacerbate these risks, leaving Puntland ill-prepared to cope with intensifying climate impacts.

Puntland's vulnerabilities to climate change necessitate a comprehensive, multi-sectoral approach to adaptation. Investments in water resource management, sustainable livestock and agricultural practices, resilient infrastructure, and improved healthcare systems are critical to building the region's resilience. Addressing these vulnerabilities requires coordinated action from local and federal authorities, as well as international support, to ensure the long-term stability and prosperity of Puntland.

Somaliland[58], with its arid to semi-arid climate, faces profound vulnerabilities to climate change, which significantly impact its socio-economic fabric and natural ecosystems. The region's geographic and climatic characteristics, combined with its reliance on climate-sensitive sectors such as livestock, agriculture, and fisheries, make it particularly susceptible to the adverse effects of climate change. Prolonged droughts, erratic rainfall, and increasing temperatures exacerbate these vulnerabilities, posing severe risks to livelihoods and ecosystems.

Agriculture, though limited, is a critical livelihood source for many communities in Somaliland. Rain-fed farming predominates, making the sector highly vulnerable to erratic rainfall and prolonged droughts. Over the past decade, recurrent droughts have drastically reduced crop yields, leading to food insecurity and increased reliance on humanitarian aid. Additionally, locust infestations, such as the severe outbreaks in 2019 and 2020, have devastated crops and compounded the challenges faced by smallholder farmers. Poor soil fertility and limited access to irrigation further hinder agricultural productivity, leaving rural households exposed to climate shocks.

The livestock sector, which underpins the economy of Somaliland, is particularly at risk from the impacts of climate change. Prolonged droughts have led to widespread degradation of grazing lands, water scarcity, and significant livestock mortality. For instance, the 2017 drought resulted in the loss of over **60%** of livestock in some areas, devastating pastoralist communities. The increasing prevalence of livestock diseases, exacerbated by heat stress and weakened animals, poses additional challenges. Livestock export, a major revenue source, is under threat due to declining herd sizes and quality.

[58] Somaliland Climate Vulnerability Assessment, GCF/UNDP "Support for strengthening climate change adaptation planning for Somalia" Readiness Project, February 2024.

Water scarcity in Somaliland is critical, with over **half the population** lacking access to safe drinking water. Prolonged droughts deplete groundwater reserves, while flash floods during heavy rains damage infrastructure and contaminate water supplies. In rural areas, the absence of perennial rivers forces reliance on boreholes and rainwater harvesting systems, which are insufficient to meet growing demand.

Coastal areas of Somaliland are vulnerable to the impacts of sea level rise, coastal erosion, and extreme weather events. Fishing communities, which depend on marine resources, face declining fish stocks due to rising sea temperatures and overfishing. Cyclones, such as the devastating "Sagar" in 2018, have caused extensive damage to coastal infrastructure, displaced communities, and disrupted livelihoods. Coastal erosion further threatens settlements and critical infrastructure along the coastline.

Biodiversity and ecosystems in Somaliland are under increasing pressure from climate change and human activities. Loss of vegetation cover due to drought and overgrazing accelerates desertification, while invasive plant species, such as *Prosopis juliflora*, threaten native ecosystems. Wildlife habitats are shrinking, reducing biodiversity and affecting the ecological balance. Reforestation and ecosystem restoration efforts are urgently needed to mitigate these impacts.

Rising temperatures and changing rainfall patterns have exacerbated health risks in Somaliland. Malaria and dengue fever are on the rise, particularly in coastal and urban areas. Waterborne diseases such as cholera spike during flood events, while malnutrition rates soar during prolonged droughts, affecting vulnerable populations, especially children.

Infrastructure in Somaliland is highly susceptible to climate-induced hazards. Floods and cyclones frequently damage roads, bridges, and urban infrastructure, isolating communities and disrupting economic activities. The lack of resilient infrastructure poses a significant barrier to adaptation efforts and economic development.

Addressing Somaliland's climate vulnerabilities requires a multifaceted approach, including investments in climate-resilient agriculture, sustainable water management, ecosystem restoration, and strengthened healthcare systems. Enhancing early warning systems, building adaptive capacities, and promoting community-driven adaptation initiatives are critical to fostering resilience and ensuring sustainable development in the face of climate change.

Hirshabelle[59], often regarded as Somalia's breadbasket due to its reliance on the Shabelle River, is acutely vulnerable to climate change impacts that threaten its agricultural productivity, water security, and livelihoods. This region's climate-sensitive economy is characterized by reliance on agriculture and livestock, which are under increasing stress from recurrent droughts, erratic rainfall and seasonal flooding. Climate variability and extreme weather events amplify the challenges faced by Hirshabelle's predominantly agro-pastoralist population.

Agriculture in Hirshabelle, reliant on the Shabelle River for irrigation, is heavily impacted by erratic rainfall and declining water flows. The 2019 floods destroyed thousands of hectares of

[59] Hirshabelle Climate Vulnerability Assessment, GCF/UNDP "Support for strengthening climate change adaptation planning for Somalia" Readiness Project, February 2024.

farmland, while desert locust infestations in 2020 further devastated crop yields. Poor soil fertility and lack of access to modern agricultural inputs exacerbate these vulnerabilities, leaving farmers ill-equipped to adapt to climate variability.

The livestock sector, another critical component of Hirshabelle's economy, is under severe pressure due to prolonged droughts and diminishing grazing lands. During extreme drought events, such as those in 2017 and 2021, pastoralists reported widespread herd losses, with mortality rates exceeding **50%** in some areas. Heat stress and water scarcity have further contributed to declining livestock health and productivity, while outbreaks of diseases like Rift Valley Fever have compounded the challenges faced by pastoralists. Livestock losses not only undermine household incomes but also destabilize food security and traditional social safety nets.

Water scarcity is a pervasive issue in Hirshabelle, despite the presence of the Shabelle River. Seasonal droughts, combined with upstream water use in Ethiopia, have led to reduced river flows, limiting access to water for drinking, irrigation, and livestock. During periods of heavy rainfall, however, the river frequently overflows, causing devastating floods. For instance, the 2019 floods displaced over **370,000 people** and destroyed thousands of hectares of farmland, severely disrupting livelihoods. Flash floods and poor drainage systems in urban areas exacerbate water management challenges, increasing the prevalence of waterborne diseases such as cholera and diarrhea.

The region's health sector faces significant challenges linked to climate variability. Rising temperatures and stagnant water bodies have increased the incidence of vector-borne diseases such as malaria and dengue fever. Waterborne illnesses spike during flood events, with cholera outbreaks frequently reported in affected areas. Limited access to healthcare infrastructure and services further compounds these risks, leaving vulnerable populations, particularly children and the elderly, at heightened risk.

Hirshabelle's infrastructure is highly susceptible to climate-induced hazards. Seasonal flooding often damages roads and bridges, isolating communities and disrupting trade and access to essential services. Urban centers, including Beledweyne, frequently experience severe flooding, which inundates homes, markets, and public infrastructure. Poorly maintained infrastructure and a lack of climate-resilient construction practices further exacerbate the region's vulnerability to extreme weather events.

Biodiversity and ecosystems in Hirshabelle are also under stress from climate change and human activities. Deforestation, overgrazing, and land degradation have reduced vegetation cover, accelerating desertification and diminishing the availability of resources for both human and animal populations. The loss of biodiversity threatens ecological balance and reduces the resilience of natural systems to climate impacts. Efforts to promote reforestation and sustainable land management are essential to mitigating these challenges.

To address the multifaceted climate vulnerabilities in Hirshabelle, targeted adaptation measures are essential. Investments in climate-smart agriculture, sustainable water management and enhanced livestock practices are critical to building resilience. Strengthening healthcare systems,

improving infrastructure, and promoting ecosystem restoration will further enhance the region's capacity to withstand climate shocks and ensure sustainable development for its communities.

South West State[60], encompassing the regions of Bay, Bakool, and Lower Shabelle, is among Somalia's most climate-vulnerable areas, reflecting its combination of arid to semi-arid landscapes and reliance on climate-sensitive livelihoods. The region experiences recurrent drought cycles every 3-4 years, interspersed with severe dry periods approximately every 7-9 years, compounded by erratic rainfall patterns and rising temperatures. These climatic stresses have profound implications for the region's socio-economic stability, particularly in critical sectors such as agriculture, livestock, water resources, and public health.

Agriculture in South West State is heavily reliant on seasonal rains, which have become increasingly unpredictable. The region's agricultural productivity is severely constrained by recurrent droughts, soil degradation, and water scarcity. During drought events, such as the 2016-2017 crisis, widespread crop failures led to significant food insecurity, affecting millions. Locust infestations have also exacerbated these challenges, decimating crops and undermining recovery efforts. The lack of irrigation infrastructure further limits the capacity for climate-resilient farming, leaving rural communities particularly exposed to climate-induced shocks.

Livestock in South West State has been severely impacted by recurrent droughts and diminishing grazing lands. The 2016-2017 drought resulted in livestock losses exceeding 60% in some areas, devastating household incomes and food security. Diseases such as RVF further strain pastoralist communities, reducing herd sizes and economic stability.

Water resources in South West State are under acute pressure due to declining rainfall and over-reliance on limited groundwater sources. Seasonal droughts frequently deplete these resources, leaving communities dependent on unsafe and unreliable water supplies. Conversely, intense rainfall events often lead to flash flooding, which damages critical water infrastructure and contaminates drinking water sources, exacerbating public health risks. Such events highlight the need for improved water management systems to address both scarcity and excess.

Public health in South West State is directly impacted by climate change, with rising temperatures and changing precipitation patterns increasing the prevalence of vector- and water-borne diseases. Malaria and cholera outbreaks are common during flood events, particularly in densely populated areas and IDP camps with inadequate sanitation facilities. Prolonged droughts also exacerbate malnutrition, especially among children, as food and water shortages persist.

Infrastructure in South West State is highly susceptible to climate-induced damage. Roads, bridges, and urban infrastructure are frequently damaged by floods, isolating communities and disrupting access to markets, healthcare, and education. Coastal areas are particularly at risk from sea level rise and coastal erosion, threatening critical infrastructure in urban hubs such as Barawe. Additionally, extreme weather events, such as cyclones, pose significant risks to both rural and urban areas, further hindering development efforts.

[60] South West State Climate Vulnerability Assessment, GCF/UNDP "Support for strengthening climate change adaptation planning for Somalia" Readiness Project, January 2024.

Addressing the vulnerabilities of South West State requires an integrated approach that prioritizes climate-resilient infrastructure, sustainable water resource management, and support for adaptive practices in agriculture and livestock sectors. Enhancing public health systems and investing in early warning systems for extreme weather events are also critical to mitigating the impacts of climate change on the region's communities and economy.

Galmudug[61], located in central Somalia, faces significant climate vulnerabilities that threaten its predominantly agro-pastoral livelihoods. The region is heavily impacted by recurrent droughts and erratic rainfall patterns, which significantly disrupt agricultural and pastoral activities. Crop failures are common due to unreliable rainfall, degraded soil quality, and the spread of pests such as locusts, which caused widespread devastation in 2020. Livestock losses during the 2016-2017 drought reached catastrophic levels, with over **60%** of herds perishing in certain areas. This has led to severe food insecurity, displacement, and a loss of income for many households.

Water scarcity is another pressing issue in Galmudug. Over **70%** of the population lacks access to safe drinking water, forcing reliance on contaminated sources. Seasonal droughts regularly dry up water reservoirs, while sporadic heavy rains result in flash floods that destroy water infrastructure and pollute limited water supplies. Groundwater resources, critical for both human and livestock consumption, are being rapidly depleted, worsening the situation.

Infrastructure in Galmudug is underdeveloped and highly vulnerable to climate-induced damage. Roads are frequently rendered impassable during floods, isolating communities and disrupting trade. Poorly maintained infrastructure amplifies the region's economic vulnerabilities, particularly in rural areas reliant on access to markets for their livelihoods.

Addressing these vulnerabilities requires coordinated efforts, including investments in climate-resilient infrastructure, sustainable water management systems, and improved healthcare services. Strengthening agricultural practices and supporting pastoral communities with adaptive measures will be critical for building long-term resilience in Galmudug.

Banadir , Somalia's capital and largest city, faces a unique set of climate vulnerabilities amplified by its coastal location and rapidly expanding population. Rising sea levels pose a significant threat to the city's infrastructure, including critical assets such as ports, roads, and residential areas. Coastal erosion has already begun to impact the city's shoreline, displacing communities and damaging infrastructure. Projections indicate that up to **3%** of Mogadishu's coastal areas could be inundated by 2050, exacerbating the challenges posed by storm surges and flooding.

Water scarcity is a persistent issue in Mogadishu, where over **60%** of residents lack access to safe drinking water. Many rely on shallow wells that are prone to contamination, particularly during flood events. Cholera outbreaks are a frequent occurrence, especially in overcrowded informal settlements where access to clean water and sanitation is limited. In 2021 alone, flooding in urban areas led to over 20,000 cases of cholera and other waterborne diseases.

[61] Galmudug State Climate Vulnerability Assessment, GCF/UNDP "Support for strengthening climate change adaptation planning for Somalia" Readiness Project, January 2024.

Public health risks are further compounded by rising temperatures and increased humidity, which contribute to the spread of vector-borne diseases such as malaria and dengue fever. Healthcare facilities in Mogadishu are overstretched and under-resourced, leaving vulnerable populations, particularly those in informal settlements, at heightened risk.

Infrastructure in Mogadishu is particularly susceptible to climate-related hazards. Frequent flooding damages roads, disrupts transportation networks, and isolates communities. The city's informal settlements are especially vulnerable due to poor construction and inadequate planning, which leave residents exposed to extreme weather events. Coastal infrastructure, including the city's port - a vital economic hub - is at significant risk from sea level rise and storm surges.

To enhance Mogadishu's resilience, it is imperative to prioritize investments in climate-resilient urban planning, robust water management systems, and public health services. The implementation of early warning systems and the development of adaptive infrastructure will be essential to protecting the city's residents and sustaining its economic activities in the face of escalating climate risks.

To complement the detailed regional analyses above and facilitate prioritization across FMSs, the table below presents a consolidated comparison of climate hazards, most affected systems, and proposed adaptation priorities. This summary aims to support decision-makers in targeting the most urgent and context-specific adaptation needs at the sub-national level.

Table 1. - Comparative vulnerability assessment across FMSs

N	Regional Administration/ Federal Member State	Key climate hazards and vulnerabilities	Most affected systems/ sectors	Adaptation priority focus
1.	Banadir (Mogadishu)	• coastal flooding • sea level rise • urban heat • water scarcity • overburdened drainage infrastructure • unregulated urban sprawl	• coastal protection systems • drainage • potable water • informal settlements	• strengthen coastal protection infrastructure *(e.g., sea walls, mangrove replanting)* to address sea-level rise and erosion • upgrade urban drainage systems and stormwater management networks to mitigate flash floods • expand access to climate-resilient water supply *(e.g., desalination, rainwater harvesting)* • introduce climate-informed urban land use planning and zoning • implement building codes for heat- and flood-resilient housing in informal settlements
2.	Galmudug	• water scarcity • rangeland degradation • loss of livestock • low rainfall • climate-driven displacement	• pastoral systems • shallow aquifers • migration-prone zones	• scale up drought-resilient rangeland and livestock management practices *(e.g., rotational grazing, fodder banks)* • construct and rehabilitate boreholes and water storage facilities adapted to pastoral mobility • support mobile services for health, education and veterinary care in remote areas • develop localized early warning systems • promote climate-smart income diversification *(e.g., small-scale solar pumps, agroforestry)*

3.	Jubaland	• flooding of Juba/ Shabelle rivers • coastal erosion • high exposure to water-borne and vector-borne diseases	• riverine agriculture • delta settlements • primary health services	• invest in integrated river basin flood protection infrastructure *(e.g., dykes, embankments, upstream catchment restoration)* • introduce salt-tolerant crops in flood-prone zones • strengthen disease surveillance and vector control capacity for climate-sensitive illnesses • rehabilitate degraded coastal zones through natural buffers *(e.g., mangroves)* • strengthen primary health care infrastructure in high-risk areas
4.	Hirshabelle	• river overflow • weak embankments • decline in irrigation potential • crop vulnerability	• irrigation infrastructure • high-value staple farming areas	• rehabilitate and upgrade irrigation canals, pumps, and diversion structures • expand access to water-saving irrigation technologies *(e.g., drip irrigation)* • implement watershed management measures to protect riverbanks and recharge water tables • improve floodplain zoning and land management • introduce institutional mechanisms for participatory water governance and farmer-led irrigation scheduling
5.	South West State	• drought-prone • degraded farmlands • climate-induced migration • health system under-prepared	• IDP settlements • dryland farming • under-resourced rural clinics	• strengthen adaptive social protection schemes *(e.g., cash-for-work, food assistance)* for climate-displaced households • rehabilitate degraded agricultural lands with soil conservation and agroecological practices • increase investment in rural climate-resilient health facilities

				• promote community-based drought preparedness and early warning dissemination • integrate climate change adaptation into return and reintegration strategies for IDPs
6.	Puntland	• prolonged drought • desertification • water stress • weak coordination on disaster response	• borehole infrastructure • early warning dissemination systems	• expand groundwater recharge initiatives *(e.g., sand dams, infiltration wells)* • support alternative livelihoods in arid zones *(e.g., drought-resistant horticulture, salt-tolerant fodder crops)* • build institutional capacity for disaster preparedness and local risk planning • upgrade drought forecasting systems and ensure data reaches end users • promote decentralized water management strategies through community water committees
7.	Somaliland	• desertification • low productivity drylands • food insecurity • weak institutional response	• cereal farming zones • land tenure regimes • ag extension systems	• restore degraded dryland farming systems using contour bunds, terraces, and farmer-managed natural regeneration *(FMNR)* • provide access to drought-resilient crop varieties and extension services • improve tenure security through inclusive land use planning • integrate climate data into regional agricultural development plans • build local institutional capacity for integrated land and water resource management

6.3 Social vulnerability and gender considerations

The intersection of social vulnerability and climate change in Somalia reveals profound disparities, deeply rooted in systemic inequalities and fragile social structures. These vulnerabilities are exacerbated by the absence of trusted public institutions, forcing communities to rely heavily on informal networks and traditional clan-based systems. Marginalized groups, including women, children, the elderly and minority clans, face compounded risks from both social exclusion and climate-induced shocks. Addressing these vulnerabilities requires an integrated, inclusive approach that considers the intersecting factors of social identity, geography, and livelihood dependencies.

Gender disparities: women in Somalia bear a disproportionate burden of climate change impacts due to their societal roles in food production, water collection and caregiving. Female-headed households, which constitute **40%** of the internally displaced population, are especially vulnerable. During prolonged droughts, women and girls are often tasked with walking long distances to fetch water, a responsibility that not only increases their exposure to physical harm and gender-based violence but also reduces their time for income-generating activities[62]. Women's limited access to financial resources, land ownership, and decision-making platforms further exacerbates their inability to adapt to climate shocks. Despite these challenges, Somali women have historically played critical roles as peacebuilders and community mobilizers, emphasizing the need to empower them in climate change adaptation strategies[63].

Children, youth and the elderly: children, who make up half of Somalia's population, face heightened risks of malnutrition and disease during climate-related disasters. The 2021-2023 drought left **2.6 million children** acutely malnourished, with long-term implications for their health and development[64]. Similarly, the elderly, often dependent on younger family members for support, are acutely vulnerable to heatwaves, reduced mobility during evacuations, and diminished access to healthcare. Youth, who represent the majority of Somalia's population and face one of the highest unemployment rates globally (estimated at 70%), are disproportionately affected by the lack of economic opportunities exacerbated by climate change. To address these intersecting vulnerabilities, the NAP prioritizes tailored interventions such as nutrition programs for children, accessible healthcare for the elderly, and targeted vocational training and green job creation initiatives for youth. These efforts are aligned with Somalia's National Climate Change Policy, which promotes employment incentives in green sectors and the expansion of programs like the National Youth Service in areas likely to experience climate-induced migration.

Marginalized groups:
Vulnerable groups such as agro-pastoralists, coastal populations, and occupational minorities are disproportionately affected by climate-related risks, largely due to historical exclusion and persistent systemic inequalities.These groups are frequently relegated to the most vulnerable areas, such as floodplains and drought-prone regions, where they face higher exposure to climate hazards. In addition, their limited access to resources, education, and political representation hinders their ability to recover from climate shocks. Historical land

[62] "Gender, Climate and Conflict Analysis in Somalia and Assessment of Opportunities for Climate Agriculture and Livelihood Opportunities for Crisis-Affected and At-Risk Women in Somalia", UN Women, 2022.
[63] "National Gender Profile of Agriculture and Rural Livelihoods" FAO, 2021
[64] ibid

expropriation and resource allocation inequities have further entrenched their vulnerabilities, underscoring the importance of equitable resource distribution and inclusion in adaptation planning[65].

Displaced populations and urban slums: Somalia's internal displacement crisis, with over **3.86 million people displaced by 2023[66]**, has created hotspots of vulnerability in informal settlements. These overcrowded urban slums lack essential services such as clean water, sanitation and healthcare, making them breeding grounds for disease outbreaks during climate events. Women and children in these settlements are disproportionately affected, with heightened risks of gender-based violence and limited access to support services[67]. The absence of adequate infrastructure and services highlights the critical need for targeted adaptation strategies to support displaced populations and reduce vulnerabilities in urban slums.

Addressing vulnerabilities: building climate resilience in Somalia necessitates an inclusive, multi-sectoral approach that prioritizes equity and social justice. Empowering women and marginalized groups through education, skill development, and representation in decision-making processes is essential. Investments in healthcare, social protection, and equitable resource distribution will not only mitigate vulnerabilities but also strengthen the adaptive capacities of communities. Integrating these measures into national climate change adaptation policies is imperative for fostering resilience and sustainable development[68].

Gender-disaggregated data and intersectional analysis have been instrumental in shaping the adaptation priorities outlined in this NAP. The design of interventions reflects evidence from participatory consultations, where women voiced distinct concerns related to access to water, healthcare, protection and livelihoods. Quantitative findings on the heightened burden faced by women during climate shocks - such as increased exposure to gender-based violence while collecting water and reduced time for income-generating activities - have guided the development of gender-responsive measures. These include decentralized water supply solutions, targeted cash-for-work schemes for women and nutrition support programmes for female-headed households. Further, gender-disaggregated indicators will be incorporated into the MEL framework to track the effectiveness of these actions in reducing gender-based vulnerability and enhancing adaptive capacity.

VII. Vision, goals and strategic objectives

7.1 Long-term Vision

The long-term vision for Somalia's National Adaptation Plan (NAP) is to create a climate-resilient nation where the most vulnerable populations, sectors, and ecosystems are protected from the adverse effects of climate change. By 2050, Somalia envisions a country where adaptive capacity is enhanced across all levels of government and society, ensuring that economic development, food security, and public health are not compromised by climate variability. This vision involves mainstreaming climate change adaptation into all sectors of

[65] "Drought, Displacement and Livelihoods in Somalia/Somaliland", Oxfam, 2018
[66] Data (as of end 2024) from International Displacement Monitoring Center
[67] "Gender, Climate and Conflict Analysis in Somalia and Assessment of Opportunities for Climate Agriculture and Livelihood Opportunities for Crisis-Affected and At-Risk Women in Somalia", UN Women, 2022.
[68] "Gender, Climate and Conflict Analysis in Somalia and Assessment of Opportunities for Climate Agriculture and Livelihood Opportunities for Crisis-Affected and At-Risk Women in Somalia", UN Women, 2022.

development, including agriculture, water resources, infrastructure, and public health, while ensuring sustainable resource management and ecosystem protection. The ultimate goal is to reduce Somalia's vulnerability to climate impacts, build resilience in both urban and rural communities, and promote sustainable growth that benefits future generations.

A key aspect of this vision is creating an inclusive adaptation strategy that prioritizes the needs of marginalized groups, including women, children, the elderly, and internally displaced persons (IDPs), who are disproportionately affected by climate-related disasters. By fostering local ownership of adaptation initiatives and empowering communities with climate-resilient practices, Somalia aims to transition towards a low-carbon, climate-resilient future.

7.2 Strategic goals

The strategic goals of Somalia's NAP are aligned with national development priorities and international climate agreements such as the Paris Agreement. These goals provide the framework for building a climate-resilient Somalia:

1. **Integrating climate resilience into national development planning**: one of the primary goals of the NAP is to incorporate climate change adaptation into national and sectoral development plans, ensuring that all policies and strategies consider long-term climate risks. This includes updating the National Development Plan to reflect climate risks in agriculture, water management, health, and infrastructure sectors;
2. **Protecting vulnerable populations**: the places a strong focus on safeguarding forcibly displaced populations, including IDPs and refugees, who are among the most vulnerable to climate-induced hazards. These communities face heightened exposure to extreme weather events, limited access to resources, and ongoing displacement pressures. Recognizing the unique needs of disability groups within these communities, the NAP incorporates inclusive adaptation measures that ensure accessible infrastructure and resources for individuals with disabilities, thereby enhancing their resilience to climate-related risks. The NAP seeks to bolster their resilience through targeted adaptation interventions that improve access to water, sanitation, and shelter, while also strengthening community-based disaster preparedness. Additionally, specific measures are designed to support pastoralists, agro-pastoralists, women, children, and the elderly, addressing the unique climate-related challenges each group faces and enhancing their capacity to adapt to evolving climate threats. This inclusive approach prioritizes collaboration with local and national agencies to ensure that adaptation strategies meet the needs of these displaced and vulnerable groups, reducing their exposure to climate-induced risks and enabling long-term resilience. The NAP also encourages the use of humanitarian caseload data, including displacement trends and sector-specific needs assessments, to inform the geographic and thematic prioritization of adaptation investments, particularly in areas with high concentrations of IDPs and other vulnerable groups.
3. **Promoting sustainable resource management**: climate change in Somalia is leading to the depletion of vital natural resources such as water and fertile land. The NAP aims to promote sustainable resource management practices, including improved water management systems, sustainable agricultural practices, and conservation of ecosystems such as forests and rangelands. Additionally, displacement significantly impacts Somalia's environment, as forcibly displaced communities often rely on unsustainable practices to meet immediate needs. These dynamics can also lead to tensions with host communities over access to already scarce natural resources, underscoring the need for conflict-sensitive approaches in adaptation planning. Increased waste generation and deforestation are

common in areas where displaced communities are concentrated, with many cutting trees for fuel, shelter, and cooking. These activities further degrade rangelands and contribute to soil erosion, exacerbating the loss of biodiversity and fertile land. To mitigate these impacts, the NAP promotes reforestation programs, alternative energy sources, and waste management systems tailored to displaced populations, reducing the pressure on natural resources while supporting sustainable livelihoods. By integrating these strategies, the NAP aims to build resilience within both settled and displaced communities, ensuring that resource management practices support long-term environmental stability and reduce the ecological footprint of growing populations in vulnerable regions. Where feasible, the NAP promotes complementarity with ongoing humanitarian programming, including the HNRP, particularly in food security, WASH and health sectors - areas where adaptation and humanitarian actions can deliver mutually reinforcing resilience outcomes. In parallel, the NAP recognizes that sustainable resource management can also serve as an entry point for **conflict prevention, mediation and peacebuilding**, particularly in fragile settings, by reducing competition over land, water, and forest resources and fostering more inclusive and cooperative community-based solutions.

4. **Enhancing infrastructure resilience**: infrastructure resilience is critical to ensuring that economic activities and essential services are not disrupted by climate-related hazards. The NAP aims to promote climate-resilient infrastructure planning and construction, particularly for delivering services to the most vulnerable, including children, and in flood-prone urban areas and coastal regions susceptible to sea level rise.
5. **Strengthening climate finance systems and access mechanisms**: a key strategic goal of the NAP is to enhance Somalia's institutional and technical capacities to mobilize, manage, and track climate finance in support of priority adaptation actions. The NAP aims to create enabling conditions for more efficient access to bilateral and multilateral funding sources, including the GCF, Adaptation Fund and GEF. Particular emphasis is placed on the necessity to develop Somalia's **NAP Investment Plan**, which will serve as the central instrument for translating adaptation priorities into bankable projects and guiding donor engagement. Efforts will also focus on strengthening national coordination systems, improving fiduciary capacity and integrating climate finance tracking into public financial management processes. In parallel, the NAP promotes the design of innovative mechanisms, such as diaspora bonds and climate bonds, and fosters stronger partnerships with the private sector to leverage additional financial resources for adaptation at scale.

7.3 Specific objectives

The following specific objectives will help Somalia achieve the strategic goals outlined in its NAP:

1. **Enhancing water resource management**: the NAP sets a target to increase access to clean water for **50%** of the population in arid and semi-arid regions by 2030 through the development of water harvesting systems and improved groundwater management. This will reduce vulnerability to droughts and water scarcity;
2. **Reducing climate-related risks in agriculture**: by 2030, Somalia aims to reduce crop failures due to droughts by **40%** through the implementation of climate-smart agricultural practices and drought-resistant crops. The goal includes expanding irrigation infrastructure to cover at least **15%** of agricultural land, reducing dependence on unreliable rainfall;
3. **Improving public health resilience**: one of the key objectives is to reduce the incidence of climate-related diseases such as malaria and cholera by **30%** by 2030 through the

expansion of climate-resilient health infrastructure and early warning systems for disease outbreaks;

4. **Building infrastructure resilience in coastal and urban areas**: by 2035, Somalia aims to ensure that at least **70%** of its critical infrastructure in coastal cities is climate-resilient, protecting against sea level rise and storm surges. This will involve upgrading drainage systems in urban areas and reinforcing key infrastructure in flood-prone regions developing tools and capacities for integration of climate resilience in key sectors
5. **Strengthening climate information systems**: a crucial objective is to develop and enhance Somalia's climate information systems by 2025, ensuring that climate data is available to all sectors. The NAP aims to establish early warning systems that can reach **80%** of the population, providing timely alerts on extreme weather events such as droughts and floods ;

These specific objectives will serve as measurable milestones in Somalia's journey toward a climate-resilient future. By focusing on sectoral and regional needs, the NAP will ensure that adaptation efforts are targeted, effective, and aligned with both national and international climate goals.

VIII. Priority adaptation programs and strategies

8.1 Adaptation options and development

Climate change adaptation in Somalia is closely tied to its economic development trajectory. With one of the lowest per capita GDPs globally and widespread poverty, addressing economic challenges is an urgent priority. However, these challenges are compounded by the impacts of climate change, which threaten existing assets and the sustainability of future production systems. A robust, climate-resilient development pathway is critical for Somalia to balance its adaptation needs with its growth aspirations.

Enhancing resilience to climate change involves addressing biophysical, socioeconomic, and systemic vulnerabilities. Measures such as constructing flood defenses, promoting drought-resistant crops, and restoring degraded lands can help reduce direct climate impacts. Additionally, investments in adaptive social safety nets, livelihood diversification, and accessible microinsurance can moderate socioeconomic consequences. Diversifying the economy into less climate-sensitive sectors, such as value-added urban manufacturing or sustainable trade, can further reduce the nation's reliance on climate-dependent activities.
Somalia's economy heavily relies on agricultural and rural production, which dominate rural livelihoods but are highly climate-sensitive. Overgrazing, deforestation, and limited water resources exacerbate vulnerabilities, reducing productivity and undermining food security. Simultaneously, rapid urbanization offers opportunities for economic diversification but amplifies climate risks in densely populated areas, such as water scarcity, flooding, and heatwaves.

The Somali diaspora and foreign assistance remain vital economic lifelines, but both face uncertainties. Remittances are expected to decline as first-generation diaspora communities age, while official development assistance may diminish with increased political stability. Thus, fostering domestic resilience and sustainable growth is imperative for long-term economic stability.

Climate-conflict nexus: The impacts of climate change in Somalia are deeply intertwined with social fragility and conflict. Climate-induced resource scarcity exacerbates disputes over land and water, heightening tensions and destabilizing communities. Displacement, driven by climate shocks, further strains resources and social cohesion, perpetuating cycles of vulnerability and conflict. Breaking these cycles requires integrating climate change adaptation with peacebuilding. Initiatives such as community-led rangeland management and equitable land reforms can strengthen local governance, foster trust, and enhance resilience. Empowering marginalized groups, particularly women and youth, in conflict-sensitive adaptation planning can address inequalities and reduce the risk of resource-based conflicts.

Priorities for climate change adaptation: Addressing Somalia's climate vulnerabilities demands targeted and integrated actions. Strengthening disaster preparedness systems, such as early warning mechanisms and emergency response networks, is crucial to reducing the impact of extreme weather events. Investments in water security, including irrigation infrastructure and drought-resilient water supply systems, are essential for stabilizing agriculture and meeting urban demand. Improving rural livelihoods through climate-smart agricultural practices, such as adopting resilient crop varieties and sustainable grazing techniques, can mitigate the impact of climate variability. Urban areas, which are rapidly expanding, require climate-informed planning to enhance infrastructure resilience and address vulnerabilities in housing, transportation, and public utilities. Ecosystem restoration plays a vital role in adaptation. Protecting and restoring mangroves, wetlands, and biodiversity hotspots can mitigate climate impacts, such as coastal flooding and soil erosion, while supporting livelihoods and enhancing carbon sequestration.

Strengthening policies and institutions: Effective climate change adaptation requires robust policy and institutional frameworks. National and local planning must integrate climate considerations across sectors, ensuring that adaptation measures align with development objectives. Building the capacity of institutions to enforce climate-smart regulations and monitor progress is essential for sustainable implementation. Inclusive planning processes that involve marginalized communities can enhance social equity and ensure the success of adaptation initiatives.

8.2 Sector-specific adaptation strategies

Agriculture: Somalia's agricultural sector is highly vulnerable to climate change, particularly due to increased droughts and erratic rainfall. To address this, the NAP prioritizes climate-smart agriculture, focusing on improving irrigation infrastructure and promoting drought-resistant crops. For instance, expanding irrigation coverage from the current **3%** to at least **15%** of arable land is a key target, aiming to stabilize food production. Additionally, promoting agroforestry and soil conservation practices is critical to preserving fertility and mitigating land degradation.

Livestock and fisheries[69]: Somalia's livestock and fisheries sectors are crucial for the livelihoods of millions and for the country's economy, yet they face critical challenges due to climate change. In the livestock sector, which supports over **60% of Somalia's population** and contributes approximately **80% of the country's exports** and **45% of GDP**, the impacts of drought, pasture depletion, and water scarcity have led to high mortality rates among livestock. Recent droughts have caused economic losses exceeding **USD 1.3 billion** due to reduced milk

[69] Somalia Moves Adaptation Strategies for its Livestock and Fisheries Sectors Forward, Article by NAP Global Network

production and declining livestock populations. To counter these vulnerabilities, the NAP promotes sustainable grazing practices, improved veterinary services to prevent disease outbreaks, and the development of water infrastructure, particularly in drought-prone regions, to stabilize livestock production and protect pastoral communities. For the fisheries sector, which employs around **30,000 people full-time and 60,000 part-time** along Somalia's extensive coastline, climate change poses threats like rising sea temperatures, coastal erosion, and acidification. These changes disrupt fish migration patterns and reduce fish stocks, jeopardizing food security and economic stability for fishing communities. The NAP addresses these challenges by promoting sustainable fishing practices, establishing co-management of fish stocks to curb overfishing, and investing in alternative livelihoods and infrastructure improvements for fishing communities. Together, these strategies aim to build resilience, reduce environmental pressures, and ensure sustainable productivity in both livestock and fisheries sector

Water resources: with less than **500 cubic meters** of water per capita annually, Somalia is already classified as water-scarce, and climate change is exacerbating this crisis. The NAP outlines the construction of water harvesting systems, including dams, boreholes, and water retention ponds, to ensure year-round availability of water in arid and semi-arid regions. Another crucial strategy is the rehabilitation of rivers like the Shabelle and Juba, which are vital for both irrigation and drinking water.

Given the competing demands on scarce water resources, especially in drought-prone and displacement-affected areas, the NAP emphasizes the importance of equitable and conflict-sensitive water governance. Ensuring inclusive access to water - particularly for marginalized groups such as women, pastoralists, and internally displaced persons - is central to reducing social tensions and promoting climate-resilient peacebuilding. Somalia's water resource challenges also have a transboundary dimension, particularly with the Juba and Shabelle rivers originating outside its borders. In this context, the NAP promotes regional cooperation and dialogue on shared watercourses to foster sustainable management and reduce upstream-downstream tensions. Strengthened data systems, including hydrological monitoring and climate-informed water planning, will also be vital to managing variability and supporting transparent, evidence-based decision-making at all levels.

Health: to address the health impacts of climate change, particularly the rise in waterborne and vector-borne diseases such as cholera and malaria, the NAP focuses on improving early warning systems and strengthening healthcare infrastructure. The plan includes expanding access to healthcare in vulnerable regions and enhancing disease surveillance to track climate-sensitive health issues.

Biodiversity: Somalia's biodiversity is under significant stress due to climate change, overgrazing, deforestation and the degradation of ecosystems critical to sustaining wildlife and rural livelihoods. The NAP underscores the importance of conserving Somalia's unique flora and fauna by protecting and rehabilitating key ecosystems, such as rangelands, mangrove forests and coastal habitats. Restoration initiatives focus on reforesting degraded areas and implementing community-led conservation practices to restore soil health and mitigate erosion. These efforts aim to support sustainable livelihoods and enhance natural climate resilience by using ecosystem-based approaches to adaptation. Projects like the National Biodiversity Strategy and Action Plan (NBSAP) guide these efforts, reinforcing biodiversity's role in climate change adaptation and resilience building.

Infrastructure: the NAP promotes climate-resilient infrastructure, particularly in coastal and urban areas prone to flooding and sea level rise. Coastal defenses, including sea walls and mangrove restoration, are highlighted as necessary interventions to protect key infrastructure like ports and roads. In urban areas, improved drainage systems and climate-proof construction materials are critical to preventing damage from flash floods.

Disaster Risk Reduction (DRR): Somalia's NAP highlights disaster risk reduction as essential for building resilience against frequent climate hazards such as droughts and floods. DRR strategies include early warning systems, emergency preparedness plans, and disaster control infrastructure, among others, that can withstand extreme weather events. The NAP emphasizes integrating DRR across all levels of government, particularly in flood-prone areas along the Shabelle River, to reduce the vulnerability of communities exposed to recurrent disasters. Investments in climate-smart infrastructure, flood barriers, and drought-resistant water sources are critical components of the DRR approach, aiming to reduce the loss of lives, livelihoods, and assets due to climate-related events. Risk reduction measures together with climate change adaptation provide a coherent approach to management of climate risks across timescales.

Green energy for increased adaptation resilience: transitioning to alternative energy sources is a priority in Somalia's NAP, particularly through the expansion of solar energy to strengthen resilience against climate-induced energy disruptions. Solar power offers an affordable and scalable energy solution, essential for providing off-grid power in rural and displaced communities where electricity access is limited. Solar energy infrastructure supports adaptation by powering water pumps, health clinics, and schools, reducing reliance on wood for fuel, which helps combat deforestation. The NAP targets increasing solar power installations in critical areas, supporting energy independence and reducing environmental degradation linked to traditional fuel sources. Developing green skills training programs for young people, for solar energy technologies, such as solar panel installation and maintenance will equip youth with the technical skills needed to participate in the green energy sector. This focus on solar energy aligns with Somalia's broader strategy to enhance rural resilience and reduce the environmental footprint of its energy sector.

Education: the NAP underscores the role of education in climate change adaptation by promoting awareness and capacity building across communities. Educational programs are designed to increase knowledge on sustainable practices, such as water conservation, climate-smart agriculture, and community-led conservation. Integrating climate education into school curricula aims to empower children and youth and build a new generation of climate-resilient citizens. Additionally, targeted training programs for farmers, pastoralists, and local leaders support the dissemination of adaptation practices that can be implemented at the community level, reinforcing sustainable management of resources and fostering greater resilience to climate impacts. The NAP will also focus on building climate resilient infrastructure for schools to adapt to floods, heatwaves and other extreme weather events.

To provide a clear and structured roadmap for operationalizing the sector-specific adaptation strategies, **Annex I** presents a consolidated implementation framework. This annex aligns each sector's strategic goals with specific objectives, identifies priority short- to mid-term actions, and designates responsible entities alongside indicative timelines. The framework builds directly upon the detailed costing and action breakdowns included in **Annex II**, transforming them into a more accessible and actionable planning tool. This structure enhances coherence

between strategic planning and implementation and serves as a practical reference for national and subnational actors involved in rolling out Somalia's climate change adaptation priorities.

8.3 State level adaptation strategies

Coastal areas: Somalia's coastal regions face significant risks from sea level rise and coastal erosion. The NAP recommends the establishment of natural buffers, such as mangroves, alongside engineered coastal defenses like sea walls to mitigate these risks. Fisheries are also prioritized, with plans to enhance sustainable fishing practices and reduce the impact of warming oceans on fish stocks.

Arid and semi-arid regions: in the central and southern regions, where drought is the primary concern, the NAP outlines strategies such as the introduction of drought-resistant crop varieties and water-efficient farming techniques. It also emphasizes the importance of building community water storage systems and rehabilitating grazing lands to support pastoralists who are heavily affected by both climate change and land degradation.

Riverine areas: regions along the Shabelle and Juba rivers, prone to both flooding and drought, require integrated water management strategies. The NAP focuses on rehabilitating these rivers to ensure a reliable water supply for agriculture while improving flood control mechanisms. It also includes flood early warning systems to protect communities from sudden water surges.

8.4 Cross-cutting adaptation measures

Climate data and early warning systems: Somalia's adaptation strategies rely heavily on improving climate data collection and dissemination. The NAP proposes establishing a nationwide early warning system that can provide timely alerts on extreme weather events such as droughts and floods. By 2025, the goal is to reach **80%** of the population with these alerts, reducing the human and economic toll of climate disasters.

Institutional capacity building: strengthening the capacity of government institutions to coordinate and implement climate change adaptation projects is a priority. This includes enhancing the MoECC's ability to lead cross-sectoral efforts and securing better coordination between national and regional governments. The NAP also encourages community-based adaptation initiatives to empower local populations to manage their own climate risks.

Sustainable resource management: as part of cross-cutting adaptation measures, the NAP focuses on sustainable resource management practices, such as reforestation and soil conservation, to protect ecosystems that are vital for both agriculture and water resources. The plan encourages a shift towards more sustainable agricultural practices and better management of natural resources, particularly in regions most vulnerable to desertification. Recognizing the environmental pressures from displaced communities, the NAP integrates specific measures to address the impact of increased waste generation and deforestation in these areas. These measures include promoting alternative energy sources to reduce reliance on wood for fuel and implementing community-based waste management practices to preserve surrounding ecosystems and prevent further degradation.

Gender and disability inclusivity: Somalia's NAP emphasizes the critical importance of inclusivity, ensuring that adaptation measures address the needs of all segments of society, particularly marginalized groups such as women, girls, and persons with disabilities. Women,

who are disproportionately impacted by climate change due to their roles in agriculture, water collection, and caregiving, are prioritized in community-based adaptation initiatives. The NAP integrates gender-responsive strategies, such as targeted training for women in sustainable resource management and increasing their representation in decision-making processes. Additionally, the plan acknowledges the heightened vulnerabilities of persons with disabilities, particularly during extreme weather events and displacement. To address these challenges, the NAP outlines measures such as accessible early warning systems, disability-inclusive infrastructure design, and tailored livelihood programs to ensure that adaptation efforts leave no one behind. By embedding gender and disability considerations across its framework, the NAP aims to create equitable and sustainable climate resilience for all.

These strategies, both sector-specific and cross-cutting, are designed to provide a comprehensive response to the varied and severe climate risks Somalia faces, ensuring resilience across all regions and communities.

IX. Institutional framework and coordination

9.1 Institutional roles and responsibilities

The successful implementation of Somalia's NAP requires clear roles and responsibilities across multiple government institutions to ensure coordinated and effective adaptation efforts. The Ministry of Environment and Climate Change leads national climate change adaptation, overseeing policy development, project implementation and cross-sectoral climate action. It works in close coordination with the MoECCs of each Federal Member State, which play an essential role in implementing adaptation strategies on the ground and fostering locally led adaptation initiatives. These state-level ministries ensure that adaptation measures are tailored to regional needs, supporting community-based approaches and facilitating resilience-building efforts that are responsive to local conditions. By aligning local adaptation efforts with national priorities, the federal and state MoECCs collaborate to create a unified response to climate challenges while engaging private sector partners and international stakeholders, including the GCF and UNDP, to bolster support and resource mobilization for Somalia’s NAP.

Key agencies involved in the NAP process include:

- **Ministry of Planning, Investment and Economic Development (MoPIED)** *and state-level MoPIEDs*, responsible for integrating climate change adaptation into national planning frameworks;
- **Ministry of Finance (MoF)**, tasked with coordinating climate finance, ensuring funding is effectively mobilized and allocated for adaptation projects;
- **Line ministries**, such as those responsible for agriculture, water, infrastructure and health, each have roles in sector-specific adaptation interventions;
- **Somali Disaster Management Agency (SoDMA)**, coordinating climate risk management and disaster risk reduction;
- **National Commission on Refugees and IDPs**: responsible addressing the needs of forcibly displaced populations and ensuring effective protection, service provision, and climate change adaptation strategies tailored to displaced communities;
- **National Disability Agency** required by law to be consulted on the key aspects of the climate change policies being implemented in Somalia;

- **Local governments and municipalities:** play a crucial role in Somalia's NAP process by implementing adaptation measures at the community level. They are responsible for localizing national climate strategies, building climate-resilient infrastructure, managing resources like water and waste and raising awareness among residents. Through close collaboration with federal and state ministries, municipalities ensure that adaptation efforts are tailored to local needs, fostering sustainable, community-centered resilience.

9.2 Logical framework approach for implementation

To ensure the structured implementation of the NAP, the Logical Framework Approach (LFA) is vital. This framework ties the NAP's strategic goals to clear, measurable objectives, activities, and outcomes, facilitating the coordination of institutional roles with the overall adaptation strategy. Given Somalia's unique challenges, such as weak institutional capacity and fragmented interagency coordination, the LFA will help ensure accountability and proper monitoring of resources. The framework will address gaps identified in the Institutional Review, such as the need for better coordination between ministries and the enhancement of technical and managerial capacities.

9.3 Coordination mechanisms

Coordination among various government ministries, non-governmental organizations, and international donors is critical for the NAP's success. The **IMTCC** is tasked with overseeing cross-sectoral collaboration, ensuring alignment between national and sub-national efforts. This committee ensures that federal ministries, member states, and relevant stakeholders work in unison to address climate vulnerabilities, particularly in high-risk sectors like agriculture and water management.

The report highlights existing gaps in coordination, such as the need for a centralized platform to streamline communication across federal and state levels. It recommends enhancing partnerships with CSOs, the private sector, and development agencies to foster multi-stakeholder collaboration.

9.4 Capacity building and institutional strengthening

One of the fundamental barriers to effective climate change adaptation in Somalia is the limited institutional capacity at both federal and state levels. The Institutional Review highlights critical gaps in technical expertise, knowledge of climate modeling, financial planning, and project implementation, which hinder the development and execution of coherent adaptation strategies. Addressing these gaps is vital for establishing a resilient framework for climate change adaptation.

To ensure that capacity-building efforts are not only impactful but also sustainable, the following strategies will be integrated into the plan:

1. **Local training programs and continuous learning:** Long-term sustainability of capacity-building efforts will rely on establishing a structured framework for continuous learning. Local training programs will be developed in partnership with universities, technical institutes, and regional training centers to provide government officials, technical experts, and local stakeholders with tailored skills in climate change adaptation, finance, project

management, and data systems. These programs will include refresher courses and certifications to ensure ongoing skill enhancement.

2. **Knowledge-sharing platforms:** Creating national and regional knowledge-sharing platforms will be a priority. These platforms will facilitate the exchange of best practices, research findings, and case studies among stakeholders, fostering collaboration and mutual learning. The platforms will also serve as repositories for climate-related data, tools, and resources, accessible to all relevant actors.
3. **Partnerships with regional and international organizations:** Building partnerships with international development partners and regional climate centers will provide technical support, access to global expertise, and opportunities for staff exchange programs. These collaborations will enable Somali institutions to benefit from global advancements in climate change adaptation while contextualizing solutions to the local environment.
4. **M&E framework for capacity building:** A robust monitoring and evaluation (M&E) framework will be established to assess the success and impact of capacity-building initiatives. Key performance indicators (KPIs) will be developed to measure outcomes such as the number of personnel trained, improved technical outputs, and the effectiveness of newly implemented adaptation projects. Regular evaluations will identify gaps and ensure the alignment of efforts with long-term goals. Feedback loops will enable iterative improvements in training content and delivery.
5. **Retention of trained personnel:** Retaining skilled personnel is crucial to ensuring the continuity of institutional capacity. Strategies to achieve this include offering competitive salaries, professional development opportunities, and career progression pathways to incentivize trained staff to remain within government institutions and local organizations.
6. **Institutionalizing capacity building within governance structures:** Embedding capacity-building initiatives into the mandates of relevant ministries and agencies will ensure their continuity. For example, establishing a dedicated unit within the MoECC to oversee and coordinate capacity building programs, partnerships and knowledge-sharing initiatives will institutionalize these efforts and reduce reliance on external interventions.

In addition, the plan includes the establishment of **early warning mechanisms** and a **national climate data system**, both of which will require skilled personnel and coordinated institutional efforts. Investments in these areas will focus on building capacity for data collection, analysis, and dissemination while leveraging local knowledge to enhance the effectiveness of adaptation strategies.

By incorporating these strategies, the plan ensures that capacity-building efforts are not only impactful in the short term but also embedded within Somalia's institutional framework for long-term resilience. This approach will create a robust foundation for climate change adaptation that supports sustainable development and strengthens Somalia's ability to address future challenges.

X. Costing and financing of adaptation

10.1 Costing of adaptation measures

The financial requirements for implementing Somalia's National Adaptation Plan (NAP) are significant, given the country's vulnerability to climate change. The **total estimated cost** for implementing priority adaptation measures across Somalia's six federal member states and

Banadir region amounts to **$2.4 billion** over a five-year period (2026-2030). This figure is derived from sectoral and regional cost analyses addressing immediate and long-term adaptation needs in agriculture, water resources, infrastructure, health, and biodiversity conservation. This list of adaptation measures per sector and FMS is provided in the Annex II.

10.2 Breakdown by sector:

- **Agriculture and livestock**: this sector, which is the backbone of Somalia's economy, is allocated approximately **$850 million** to address immediate needs such as promoting climate-smart agricultural practices, improving irrigation systems, and supporting pastoral livelihoods. A large portion of this funding will be directed to restoring degraded rangelands and introducing drought-resistant crops to mitigate the impacts of drought and desertification;
- **Water resource management**: with Somalia facing severe water scarcity, an estimated **$600 million** will be required to develop water harvesting systems, rehabilitate water infrastructure, and modernize irrigation systems. Investments in community-based water resource management and climate-resilient infrastructure will ensure sustainable access to clean water;
- **Health**: addressing climate-induced health risks such as malnutrition and the spread of waterborne diseases will require about **$300 million**. This investment will focus on expanding disease surveillance systems, improving sanitation infrastructure, and strengthening healthcare services to cope with climate impacts;
- **Infrastructure**: climate-resilient infrastructure, particularly in flood-prone urban areas and coastal regions, will require **$450 million**. Investments will focus on upgrading drainage systems, reinforcing coastal defenses, and developing resilient transport infrastructure to withstand climate-induced disasters such as floods and sea level rise;
- **Biodiversity conservation**: protecting Somalia's ecosystems and biodiversity will cost around **$150 million**, focusing on reforestation, protecting natural habitats, and enhancing sustainable land management practices;

Regional adaptation needs: the costs vary by region based on their unique vulnerabilities:

- **Southwest:** which relies heavily on the Shabelle River and surrounding ecosystems, is particularly vulnerable to both droughts and seasonal flooding, which impact agricultural productivity and water security. The region’s adaptation needs focus on flood management infrastructure, such as river embankments and retention basins, to protect farmlands and communities along flood-prone areas. To combat recurrent droughts, the NAP emphasizes improving irrigation systems and promoting drought-resistant crop varieties that can withstand dry spells. Additionally, sustainable grazing and pasture management practices are prioritized to maintain livestock health during extended dry periods, supporting the livelihoods of agro-pastoral communities that form the backbone of the region’s economy;
- **Hirshabelle**: with its dependence on the Shabelle River, FMS faces severe flood risks, which are exacerbated by limited infrastructure and frequent seasonal variations in rainfall. Flood management is a top priority, with the NAP focusing on embankment construction, levee reinforcements, and riverbank stabilization to protect both agricultural land and settlements from riverine flooding. Drought resilience is equally critical, as prolonged dry periods disrupt agricultural activities and strain water resources. The NAP promotes investment in rainwater harvesting, water storage systems, and soil conservation to reduce

drought vulnerability. This region also emphasizes sustainable agriculture and livestock practices, with an eye toward enhancing food security and supporting agro-pastoralist livelihoods in the face of shifting climate patterns

- **Puntland**: climate change in Puntland has impacted sectors across the board, affecting the environment, biodiversity, coastal areas, and infrastructure. Key challenges include severe land degradation, loss of biodiversity, the formation of sand dunes, and vulnerability to cyclones and flash floods. The NAP prioritizes combating these challenges through reforestation, soil conservation, coastal protection initiatives, and measures to mitigate the effects of cyclones. Improved water and infrastructure resilience are also critical to safeguard against flash floods and sustain agricultural activities in this semi-arid region;
- **Somaliland** prioritizes water management and livestock resilience to counter challenges like extreme drought, land degradation, and desertification. Adaptation efforts here focus on enhancing water infrastructure, such as boreholes and water storage, to support both agriculture and livestock in this arid landscape. Sustainable grazing practices and community-led soil conservation projects are also essential to maintaining the productivity of rangelands and supporting rural livelihoods;
- **Jubaland**: adaptation needs in Jubaland are driven by its vulnerability to both coastal and inland climate impacts. Along its coastline, rising sea levels and coastal erosion pose significant risks to infrastructure, fisheries, and ecosystems, prompting the NAP to prioritize coastal protection measures and coastal adaptation, including seawall construction and mangrove restoration to buffer against storm surges and support fish habitats, as well as sand dune stabilization and Coral Reef Restoration. Inland, Jubaland faces frequent droughts and flooding along riverine areas, which heavily impact agriculture and livestock-dependent communities. To address these challenges, the NAP emphasizes comprehensive flood and drought management strategies, including improved irrigation, water storage systems, and early warning systems to mitigate losses. By enhancing agricultural resilience through drought-resistant crops and sustainable livestock practices, Jubaland aims to stabilize food security and protect the livelihoods of its agro-pastoral and fishing communities;
- **Galmudug** will aim to attract investments towards water conservation measures and soil management to support agro-pastoral communities. Sustainable grazing and reforestation initiatives are emphasized as well to prevent further land degradation and maintain the productivity of rangelands;
- **Banadir** *(Mogadishu)*, requires substantial support for flood management, waste management, and climate-resilient urban planning. Rising urbanization and frequent floods necessitate improved drainage systems, sustainable waste practices and resilient infrastructure to protect against climate-induced disasters;

10.3 Financing strategy

To meet these financial requirements, Somalia will adopt a multi-faceted financing strategy, combining domestic and international resources. The key elements of the financing strategy include:

1. **Domestic funding**: the Somali government aims to allocate **20% of the total budget** for adaptation from national resources, including government budget allocations, private sector contributions, and community-based investments. This domestic investment will provide a foundation for long-term sustainability;

2. **International climate finance**: international donors and multilateral climate finance mechanisms, such as the **GCF** and the **Adaptation Fund (AF)**, will be essential for filling the financing gap. Somalia has already secured over **$158.1 million** from the GCF (through 1 single-country and 4 multi-country projects) for NAP implementation and plans to further engage with other global funding platforms such as the Global Environment Facility (GEF). These funds are expected to cover approximately **70%** of the total adaptation costs. Engaging with these funds is central to Somalia's strategy for ensuring long-term financing for large-scale projects, such as coastal defense systems, improved healthcare infrastructure, and modern irrigation systems(financing plan Final). In addition to these core mechanisms, Somalia also aims to explore other avenues of climate finance, including global initiatives such as the Biodiversity Finance Initiative (BIOFIN) and the Food Systems Integrated Programme, regional mechanisms like the African Cities Water Adaptation Fund (ACWA), and bilateral sources that can support targeted adaptation actions across priority sectors;
3. **Innovative financing mechanisms**: in addition to public-private partnerships, the strategy promotes the use of **climate bonds** and **carbon credits**. Climate bonds can attract investors focused on sustainability, while carbon credits could generate revenue from carbon-offsetting projects, such as reforestation and mangrove restoration. These mechanisms are particularly relevant for financing large-scale infrastructure projects;
4. **Diaspora funding**: Remittances from Somalia's diaspora play a crucial role in the country's economy, providing a significant source of income and stability. Somali diaspora remittances amount to approximately **$1.6 billion** in 2023, accounting for around **14.9% of the country's GDP**[70], which is essential for household income and resilience in the face of economic instability and climate-related challenges. To formalize and amplify diaspora contributions for climate change adaptation, Somalia could consider exploring the potential of **diaspora bonds**. These bonds would allow diaspora members to invest directly in sustainable, climate-focused projects within Somalia, fostering a direct channel for diaspora involvement in national resilience efforts. Diaspora bonds have proven effective in other contexts and could attract substantial support from Somali expatriates motivated to support their home country's adaptation goals;

To operationalize Somalia's NAP financing strategy effectively, the following detailed steps will be prioritized:

1. Establish a Climate Finance Coordination Framework

- **Create a National Climate Finance Taskforce**: Form a multi-sectoral taskforce under the MoECC to oversee financing activities, align efforts, and manage stakeholder engagements.
- **Develop operational guidelines**: Draft and disseminate clear guidelines for accessing, managing, and reporting on climate funds to government agencies, local institutions, and private sector partners.

2. Strengthen capacity for resource mobilization

- **Conduct training programs**: Organize workshops for government officials and NGOs on proposal development, donor requirements, and compliance with international climate finance mechanisms.

[70] World Bank Data

- **Build technical expertise**: Recruit and train experts in climate finance, carbon markets, and public-private partnerships to enhance institutional knowledge.
- **Establish a Climate Finance Helpdesk**: Set up a centralized support hub to assist stakeholders in developing high-quality funding proposals and navigating financial processes.

3. Develop and pilot innovative financing mechanisms

- **Diaspora bonds**: Design and launch a diaspora bond pilot project targeting Somali expatriates to fund key adaptation projects.
- **Climate bonds**: Collaborate with development partners to structure climate bonds aimed at attracting sustainability-focused investors.
- **Carbon credits**: Establish a carbon offset program, focusing on reforestation, mangrove restoration and renewable energy initiatives, and seek accreditation for participation in international carbon markets.

4. Strengthen engagement with international climate finance institutions

- **Submit funding proposals**: Prioritize high-impact proposals for submission to the GCF, AF and GEF aligned with NAP priorities.
- **Enhance partnerships with accredited entities**: Build long-term collaborations with international accredited entities to increase the success rate of funding applications.
- **Leverage multi-country initiatives**: Actively participate in regional programs to address transboundary climate challenges and secure larger-scale funding.

5. Enhance domestic resource mobilization

- **Reallocate budget for climate change adaptation**: Work with the Ministry of Finance to integrate adaptation funding into national and sub-national budgets.
- **Promote private sector investments**: Introduce incentives such as tax breaks or subsidies to encourage private companies to invest in climate-resilient infrastructure and practices.
- **Engage local governments**: Encourage regional administrations to allocate resources for community-level adaptation projects.

6. Develop robust monitoring and reporting mechanisms

- **Establish a Monitoring, Reporting and Verification (MRV) system**: Create a centralized MRV framework to track the utilization and impact of climate finance.
- **Conduct independent audits**: Partner with reputable audit firms to ensure transparency and accountability in fund management.
- **Prepare annual climate finance reports**: Publish detailed reports to share progress, challenges, and outcomes with stakeholders and donors.

7. Enhance transparency and community engagement

- **Host annual climate finance forums**: Bring together key donors and stakeholders to review progress, address gaps, and update the financing strategy as needed.
- **Strengthen community involvement**: Implement participatory budgeting processes to align local needs with national adaptation financing priorities.
- **Foster public awareness**: Launch communication campaigns to inform citizens about available funding opportunities and the benefits of adaptation initiatives.

8. Foster regional and international cooperation

- **Strengthen regional collaboration**: Work with neighboring countries on joint adaptation projects, particularly in river basin management and desertification control.
- **Seek technical assistance**: Engage with global climate networks to access best practices and technical support for financing mechanisms.

9. Launch priority projects

- **Pilot water resource management initiatives**: Begin investments in water storage, flood defenses, and climate-resilient WASH infrastructure.
- **Kickstart rural adaptation programs**: Implement pilot projects for agroforestry, sustainable livestock practices, and community-based natural resource management.
- **Support urban resilience**: Fund initial projects addressing urban heat stress, infrastructure retrofitting, and sustainable energy systems.

To ensure the successful implementation of Somalia's prioritized adaptation measures, it is essential to establish a clear and coordinated financial pathway that connects each strategic action with appropriate funding sources. While the adaptation measures are costed in detail (see Annex II), their execution will require a targeted and structured investment framework. As a critical next step following the adoption of this NAP, Somalia shall develop a dedicated NAP Investment Plan. This Plan will serve as the central coordination and operational tool to convert adaptation priorities into a sequenced portfolio of fundable interventions.

Building on the financial strategy outlined above, the NAP Investment Plan will map out sector-specific investment pipelines, prioritize high-impact interventions, and match them with the most suitable financing instruments - including domestic budget allocations, donor support, concessional loans and private sector co-financing. It will also define delivery channels and implementation responsibilities, facilitating engagement with climate finance institutions such as the GCF, AF, AfDB and GEF. The Investment Plan will be developed in partnership with relevant line ministries, accredited entities, and stakeholders, ensuring alignment with national development priorities and donor expectations. In doing so, it will enhance transparency, strengthen Somalia's financing position, and provide a practical roadmap for resource mobilization over the short, medium and long term.

10.4 Resource mobilization plan

Somalia's resource mobilization plan is structured to secure funding through a phased approach, engaging with donors, international financial institutions, and private investors. The plan involves a multi-tier strategy:

1. **Short-term actions (1-2 years)**: immediate mobilization will focus on engaging existing donors, including the GCF and UNDP, to secure early-stage funding for urgent projects like water resource management and agricultural support. **Key milestones** include finalizing grant applications for priority projects and conducting stakeholder consultations to align domestic resources;
2. **Medium-term actions (3-5 years)**: Somalia will seek to diversify its funding base by exploring **new partnerships** with multilateral donors like the **World Bank** and **African Development Bank (AfDB)**. Strengthening institutional capacity for project management and financial tracking will be essential for meeting donor requirements and securing ongoing support;

3. **Long-term actions (6-10 years)**: over the long term, the plan includes strategies for **increasing private sector engagement** and exploring options for issuing climate bonds. Long-term resource mobilization efforts will be tied to **results-based financing**, ensuring that project impacts are monitored and linked to continued funding;

XI. Monitoring, evaluation and reporting

11.1 Objectives and significance of monitoring and evaluation

The Monitoring, Evaluation and Learning (MEL) framework for Somalia's NAP is designed to track progress towards key adaptation goals, identify challenges, and measure the effectiveness of interventions. Its primary objectives are to:

- **Track progress**: measure the achievement of adaptation goals by assessing implementation milestones and outcomes in various sectors, such as agriculture, water, and infrastructure;
- **Identify challenges and opportunities**: ensure timely detection of obstacles to implementation and capture emerging opportunities for enhancing adaptation measures.
- **Provide accountability**: strengthen transparency, especially concerning the utilization of international climate finance, while ensuring that stakeholders and the international community are informed of results.
- **Inform decision-making**: generate real-time data to refine the NAP, ensuring flexibility and responsiveness to changing conditions.

The significance of a robust M&E system is evident in its ability to inform adjustments to strategies based on on-ground realities, thus improving the NAP's effectiveness and ensuring that adaptation actions remain relevant under evolving climatic conditions.

11.2 Roles and responsibilities

The success of the M&E framework depends on well-defined roles and responsibilities across key institutions. The **MoECC** will lead the coordination of M&E efforts, ensuring alignment with national and international climate commitments. Other key agencies include:

- **Ministry of Planning, Investment, and Economic Development**: integrates adaptation data into national planning and development frameworks.
- **Other line ministries and agencies** including those responsible for agriculture, water, infrastructure and health, each have roles in sector-specific adaptation interventions and National Commission on Refugees and IDPs.
- **Federal Member States**: state governments will implement region-specific adaptation measures and provide data for national reporting.
- **Non-Governmental Organizations (NGOs) and civil society**: assist in monitoring activities at the community level and act as watchdogs to ensure transparency.
- **Private sector**: contribute data on adaptation investments and infrastructure resilience.
- **International partners**: provide technical support and capacity-building for data collection and reporting, ensuring alignment with global frameworks like the Paris Agreement;

11.3 Resources and capacities required

Effective M&E requires substantial investments in technical, financial, and human resources. Key resources include:

- **Financial resources**: dedicated funding for M&E activities, including data collection, training, and capacity-building, which could be supported by international climate finance mechanisms such as the GCF.
- **Technical expertise**: strengthening the technical capacity of government agencies through training in climate data analysis, monitoring tools and reporting systems.
- **Human resources**: building a skilled workforce at both national and regional levels to manage and oversee M&E activities, including the use of Geographic Information Systems (GIS) and climate modeling tools.

Existing gaps in Somalia's capacity, particularly in data collection and technical skills, need to be addressed through targeted capacity-building programs.

11.4 Methodology for monitoring and evaluation

The M&E methodology for the NAP will be based on a comprehensive set of **indicators** that track both **output** and **outcome** levels. The key elements include:

- **Indicators**: sector-specific and cross-cutting indicators that measure progress in areas like agricultural resilience, water resource management, and infrastructure adaptation. For instance, indicators for agriculture may include the percentage increase in the adoption of climate-smart farming practices;
- **Data collection frequency**: a combination of **annual progress reviews** and **mid-term evaluations** will ensure regular monitoring. Real-time climate data collection using remote sensing and satellite technologies will enhance the accuracy of reporting;
- **Reporting**: reports will be generated annually, feeding into national climate reports such as the Biennial Transparency Reports required under the Paris Agreement. These will also be shared with development partners and the wider international community.

11.5 Process for revising and updating the NAP

Revisions to the NAP will be based on the data and insights generated from M&E activities. The plan will undergo periodic reviews every **five years**, coinciding with the national strategic planning frameworks and updates to Somalia's climate action commitments under international frameworks. New data on climate vulnerabilities, emerging adaptation technologies, and changing socio-economic conditions will inform these updates, ensuring the NAP remains relevant and forward-looking.

11.6 External evaluation

Independent external evaluations will be conducted every **five years** to assess the effectiveness, efficiency, and impact of the NAP. These evaluations will provide an objective assessment of adaptation progress, highlight areas for improvement, and ensure that Somalia remains accountable to its international commitments. Engaging external evaluators will also build trust with donors and international partners, ensuring continued financial and technical support.

XII. Mainstreaming climate change adaptation

12.1 Policy Integration

Integrating climate change adaptation into national policies is critical to ensuring that Somalia's development is resilient to the impacts of climate change. The NAP provides a strategic framework for embedding climate resilience across various policy domains. Key policy areas include:

- **Agriculture**: given the significant role that agriculture plays in Somalia's economy, integrating climate change adaptation into agricultural policies is paramount. This includes updating policies on water management, land use, and crop diversification to support climate-smart agriculture. For instance, promoting drought-resistant crops and sustainable irrigation techniques will be essential in drought-prone areas;
- **Water resources**: Effective water resource management is fundamental to Somalia's climate adaptation efforts, ensuring the sustainable use, protection, and equitable allocation of water across domestic, agricultural, and industrial sectors. With rainfall becoming increasingly erratic and prolonged droughts more frequent, the NAP highlights the urgency of updating national water policies to embed climate resilience principles. This includes strengthening governance frameworks, institutional coordination, and the implementation of integrated water resources management (IWRM) at both national and subnational levels. Beyond sustainable resource use, Somalia must also prioritize the development of **climate-resilient water supply and sanitation services** - systems that can anticipate, absorb, and recover from climate shocks while continuing to deliver safe water and sanitation to all communities. These services must be robust enough to handle long-term trends, such as drought and rainfall variability, as well as short-term disruptions like flood-related contamination. Integrating climate adaptation into Somalia's water sector policies and planning frameworks is critical not only for water security, but also for public health protection and climate-resilient development.
- **Health**: Climate change is already affecting public health in Somalia through increased exposure to heat stress, vector-borne diseases (e.g., malaria), waterborne illnesses (e.g., cholera), and respiratory infections. The NAP calls for the integration of climate adaptation into health policies and systems, including climate-informed disease surveillance, early warning mechanisms, and climate-resilient health infrastructure. Critically, the health sector's adaptation strategy must also account for the availability and quality of WASH services. Disruptions to WASH systems during droughts or floods directly increase health risks, particularly in displacement-affected and underserved areas. Strengthening the WASH-health nexus is essential to prevent disease outbreaks, safeguard vulnerable populations, and build a more climate-resilient health system;
- **Urban planning and infrastructure**: urban centers in Somalia are vulnerable to climate impacts such as flooding and heatwaves. Mainstreaming climate change adaptation into urban planning policies involves ensuring that new infrastructure is climate-resilient and that urban expansion takes into account future climate risks. Planning policies should incorporate guidelines for flood risk management, sustainable building materials, and green infrastructure;
- **Displaced populations and refugee commitments**: recognizing the heightened vulnerability of displaced populations to climate impacts, the NAP should be aligned with Somalia's commitments made under the Global Refugee Forum (GRF). This alignment

would enhance efforts to protect, include and empower refugees and IDPs in climate change adaptation initiatives. By interlinking climate resilience strategies with GRF pledges, Somalia aims to address both environmental and displacement-related challenges cohesively. Adaptation measures would include the development of climate-resilient shelters, livelihood programs tailored to displaced communities, and access to climate-adapted healthcare and educational resources, ensuring that displaced populations are actively included in resilience planning and benefit from protective adaptation efforts.

The integration of these policies ensures that adaptation becomes a core component of Somalia's development agenda, guiding national and sectoral policies to be proactive rather than reactive in addressing climate challenges.

12.2 Sectoral mainstreaming

Sectoral mainstreaming of climate change adaptation involves revising sector-specific strategies and plans to incorporate climate resilience measures. This process ensures that adaptation considerations are embedded within key sectors, allowing for a more targeted and efficient approach to building resilience.

- **Agriculture and food security**: the agricultural sector is highly vulnerable to climate variability, and mainstreaming adaptation in this sector involves revising policies on crop management, livestock, and land use. Sectoral plans will prioritize actions like soil conservation, agroforestry, and sustainable farming practices. Capacity-building initiatives within the Ministry of Agriculture will focus on equipping personnel with the skills to implement climate-smart agriculture.
- **Water sector**: Somalia's water management plans will be revised to ensure greater resilience against droughts, floods, and increasing rainfall variability. This includes updating water allocation frameworks to promote equitable access, enhancing rainwater harvesting systems, improving irrigation efficiency, and strengthening groundwater governance to address over-extraction and salinization. In addition, the integration of **climate-resilient water supply and sanitation services** will be prioritized to ensure communities - especially those in rural, displacement-affected, and underserved areas - maintain access to safe water and sanitation despite climate-related shocks. Capacity-building within national and subnational water authorities will reinforce institutional capabilities to monitor, manage, and safeguard water resources effectively. These reforms will align IWRM principles and ensure that adaptation measures address both long-term water security and the continuity of essential water services under a changing climate.
- **Public health**: in the health sector, adaptation measures will include improving early warning systems for climate-sensitive diseases and strengthening healthcare infrastructure to withstand climate-induced stresses. Mainstreaming in the health sector will also require training healthcare workers in climate risk management and ensuring that health policies include adaptation provisions.
- **Infrastructure development**: in sectors related to transport, energy, and housing, climate resilience will be integrated into planning and construction standards. This may involve the development of climate-proof infrastructure that can withstand extreme weather events, particularly in flood-prone regions like the Shabelle River basin. Sector-specific training in sustainable infrastructure development will be key to building institutional capacity.

12.3 Cross-Sectoral Coordination

Cross-sectoral coordination is vital to ensuring that climate change adaptation measures are coherent across different policy areas and levels of government. Effective coordination mechanisms will include:

- **Inter-ministerial committees**: an inter-ministerial climate change adaptation committee will be established to ensure that ministries, such as those responsible for agriculture, water, health, and infrastructure, collaborate and align their sectoral plans. This committee will oversee the implementation of adaptation strategies across all sectors, facilitating information sharing and joint decision-making;
- **Working groups**: specialized working groups will be created to focus on specific climate risks, such as droughts and floods, that cut across multiple sectors. These groups will be responsible for designing integrated responses that address both the sectoral and regional dimensions of climate change adaptation. For example, a working group on water management may involve experts from agriculture, health, and infrastructure to ensure a comprehensive approach to water security;
- **Local and national coordination**: ensuring alignment between national and regional governments is critical to addressing the localized impacts of climate change. Federal member states will be encouraged to align their adaptation plans with the national NAP framework. Coordination between local governments and national authorities will also ensure that adaptation strategies reflect local priorities and that resources are distributed effectively.

This cross-sectoral collaboration will ensure that adaptation measures are implemented holistically, preventing overlaps and inefficiencies in the use of resources and improving resilience across all sectors. Building institutional capacity, promoting knowledge-sharing platforms, and engaging multiple stakeholders will be critical to mainstreaming climate change adaptation across Somalia's development policies.

XIII. Communication and stakeholder engagement

13.1 Stakeholder mapping and engagement plan

A successful NAP for Somalia requires not only identifying key stakeholders but also establishing a framework for their meaningful and sustained participation throughout the entire adaptation process. To address the unique challenges posed by Somalia's diverse social and environmental landscape, the stakeholder engagement strategy has been designed to be inclusive, participatory and iterative.

The process begins with comprehensive stakeholder mapping, identifying actors across various sectors, including **government agencies, NGOs, private sector entities, local communities, and international development partners.** Special emphasis is placed on ensuring the inclusion of marginalized and vulnerable groups, such as women, pastoralists, and IDPs, who are often disproportionately affected by climate change. Their unique perspectives and priorities will inform the design and implementation of adaptation actions.

The stakeholder engagement strategy prioritizes mechanisms that enable consistent and meaningful participation over the entire lifecycle of the NAP. These mechanisms include:

1. **Multi-stakeholder platforms**: These platforms will bring together community representatives, local authorities, and national policymakers in periodic consultations. This allows for the integration of local insights into national adaptation policies and ensures a two-way dialogue.
2. **Localized community consultations**: Specific efforts are being made to engage remote and marginalized populations through targeted workshops, focus group discussions, and mobile-based surveys. These consultations provide a channel for capturing local adaptation needs and climate vulnerabilities.
3. **Feedback mechanisms**: Continuous feedback loops will be established, allowing stakeholders to regularly evaluate adaptation initiatives and propose adjustments as required. For example, feedback from community groups during pilot projects will be used to refine strategies before scaling up.
4. **Decentralized engagement**: Recognizing Somalia's diverse geographic and cultural landscape, local councils and community-based organizations will play a pivotal role in facilitating consultations at the grassroots level. These decentralized efforts ensure that adaptation actions are tailored to local contexts.

Special attention is being given to marginalized groups to ensure that their voices are not only heard but also acted upon. For example:

- **Women**: Dedicated forums and capacity-building initiatives are being introduced to empower women in adaptation planning. Women's groups will also be engaged to address gender-specific vulnerabilities, such as water access and food security challenges.
- **Pastoralists and IDPs**: Mobile engagement teams will work with pastoralist communities and IDPs to address their unique vulnerabilities, including climate-induced displacement and loss of livelihoods.
- **Children**: Special initiatives will be implemented to ensure that children and youth are actively involved in climate adaptation programs and activities, in an age-appropriate manner (i.e. child-friendly workshops and activities, games, etc). Safe spaces will be created where children and young people can discuss climate change and the effects of climate change on their demographics.

These efforts are designed to bridge the gap between local realities and national planning, ensuring that adaptation measures resonate with community needs.

Building the capacity of stakeholders is critical to ensuring their meaningful participation in the NAP process. The government is committed to providing training and resources tailored to the needs of different stakeholder groups. Local leaders will be trained in climate change adaptation tools and participatory planning techniques, enabling them to effectively communicate community priorities. Community-based organizations will receive guidance on facilitating consultations, monitoring projects, and collecting feedback from grassroots populations. Government officials, meanwhile, will be equipped with knowledge and resources to incorporate local inputs into broader adaptation policies. These initiatives aim to empower all stakeholders, particularly those from vulnerable communities, to actively contribute to the adaptation process.

Transparency and accountability will be embedded throughout the NAP's lifecycle to foster trust and ensure all stakeholders feel their contributions are valued. The government will

implement a multi-tiered system of transparency that prioritizes accessibility and inclusiveness. Regular updates on the progress of adaptation measures will be shared through multiple channels, including community meetings, local radio broadcasts, and printed materials in regional languages to reach even the most remote populations. A dedicated digital platform will provide real-time updates, allowing stakeholders to monitor progress, access project documents, and submit feedback.

To maintain accountability, independent monitoring committees will be established to oversee NAP implementation and evaluate outcomes against stated objectives. These committees will include representatives from civil society, academia, and local communities, ensuring diverse perspectives and impartial evaluations. Feedback from these evaluations will be incorporated into adaptive management processes to refine and improve ongoing adaptation initiatives. The government will also facilitate public discussions, such as town hall meetings and open forums, to address community concerns and adjust strategies in response to evolving needs. These measures aim to create a transparent and accountable adaptation framework that aligns with Somalia's broader governance and development objectives.

The NAP's stakeholder engagement strategy is designed to ensure that adaptation measures reflect the needs and priorities of Somalia's diverse communities. By fostering continuous participation, promoting transparency, and building the capacity of stakeholders, the NAP aims to create climate change adaptation solutions that are inclusive, effective, and sustainable. This approach not only strengthens community resilience but also contributes to Somalia's long-term development goals.

13.2 Communication Strategy

A clear and strategic communication plan is crucial for sharing information about the NAP's goals, progress, and outcomes. The communication strategy will ensure that key messages are conveyed to different target audiences—ranging from government officials and international donors to local communities—using appropriate channels and tailored messages.

Key elements of the communication strategy include:

- **Defining clear goals**: The primary goal is to raise awareness about the importance of climate change adaptation, mobilize public support, and maintain transparency throughout the implementation process. The strategy will also aim to build high-level political support for adaptation actions.
- **Audience segmentation**: Different audiences will require different communication methods. For instance, local communities might be best reached through community radio programs and town hall meetings, while policymakers and donors will receive more formal reports and briefings;
- **Use of digital platforms**: social media, websites, and digital newsletters will be used to engage a broader audience, particularly youth, and to ensure real-time updates on the NAP's progress.
- **Transparency and accountability**: The strategy emphasizes the need for transparent communication, ensuring that stakeholders are regularly informed about challenges, achievements, and any adjustments made during the NAP's implementation.

13.3 Public Awareness and Education

Raising public awareness about climate change and the importance of adaptation is critical to building long-term resilience in Somalia. The NAP will incorporate an extensive public awareness campaign aimed at educating the general population on the impacts of climate change and the specific actions individuals and communities can take to adapt.

This campaign will include:

- **Climate education programs**: schools, universities, and local education initiatives will integrate climate change adaptation into curricula to equip younger generations especially children with knowledge on climate resilience. These programs will include interactive and age-appropriate activities that engage children in learning about sustainable practices, and the impacts of climate change. By fostering a sense of responsibility and awareness from an early age, children will be empowered to become climate change advocates within their schools and their communities. Additionally, children in vulnerable and marginalized communities will be given special attention to ensure their inclusion and their access to educational resources.
- **Community-based awareness**: local events, workshops, and public forums will be organized to raise awareness in communities, particularly in vulnerable regions like drought-prone areas and coastal zones. These initiatives will include child-friendly activities and education sessions designed to engage children and youth in learning about climate change and its impacts. These initiatives will emphasize practical adaptation strategies that local populations can adopt, such as water conservation and sustainable agriculture practices;
- **Media engagement**: national media outlets will be engaged to broadcast informative programs on climate change adaptation, ensuring that the NAP reaches a wide audience across different demographics. Special segments will be dedicated to children, featuring age-appropriate content that explains the impacts of climate change and its importance of adaptation in a way that is engaging and understandable for young audiences, including children in remote and marginalized communities;

The communication and stakeholder engagement strategy ensures that the NAP remains inclusive, transparent, and accountable to all involved stakeholders, enhancing the plan's effectiveness and fostering widespread public support for adaptation efforts.

XIV. Conclusion

Somalia’s NAP represents a comprehensive framework to build climate resilience, focusing on addressing the country's vulnerabilities across key sectors like agriculture, water, health, and infrastructure. The NAP outlines **specific actions** that will significantly enhance Somalia's adaptive capacity:

- **Agriculture**: The plan prioritizes the promotion of climate-smart agriculture, including the introduction of drought-resistant crops, enhanced irrigation systems, and sustainable land-use practices. These actions will not only protect food security but also stabilize rural livelihoods that are highly dependent on rain-fed agriculture;
- **Water Resources**: With Somalia experiencing frequent droughts and worsening water scarcity, the NAP emphasizes improving water management systems through sustainable water harvesting, groundwater recharge, and the rehabilitation of key river systems such as

the Shabelle and Juba. In parallel, ensuring climate-resilient water supply and sanitation services is essential to protect public health and support livelihoods. Strengthening infrastructure, enhancing service delivery, and embedding climate resilience into water governance will help maintain safe and reliable access, particularly under conditions of increasing climate variability;

- **Infrastructure**: The NAP's infrastructure component aims to enhance resilience to climate impacts by climate-proofing roads, bridges, and other key facilities, particularly in urban areas and flood-prone regions;
- **Health**: The health sector will be strengthened through improved early warning systems for climate-related diseases, infrastructure upgrades, and health worker training to manage the growing risks from vector-borne diseases and heat-related illnesses;

These actions are pivotal not only for reducing vulnerability to climate risks but also for contributing to **sustainable development**. The integration of adaptation measures into key sectors supports Somalia's broader national development goals, ensuring economic stability and protecting critical livelihoods in the face of increasing climate variability.

14.1 Next steps

The immediate next steps following the approval of the NAP will focus on **initiating priority projects**, engaging stakeholders further, and securing adequate funding:

- **Priority project initiation**: the immediate priority is to launch projects related to water management and agricultural resilience, especially in the drought-prone regions of **Southwest State, Hirshabelle and Galmudug**. These initial steps are crucial for demonstrating early progress and building momentum for the broader implementation of the NAP;
- **Continued stakeholder engagement**: ongoing stakeholder engagement remains a top priority. Federal and state governments will continue to collaborate with **local communities**, **NGOs**, and **international partners** to ensure that adaptation measures are responsive to local needs and that feedback is integrated continuously. This engagement will ensure that adaptation measures remain inclusive and participatory;
- **Securing financing**: mobilizing financial resources is critical for the NAP's success. Somalia will focus on tapping into international climate finance, such as the **GCF** and **AF**, while exploring innovative financing mechanisms like **public-private partnerships** and **climate bonds** to supplement government funding;
- **Monitoring and evaluation**: a robust **MEL** system will be established to track progress, ensure accountability, and make adjustments based on real-time data. This system will be central to ensuring that adaptation actions remain effective and adaptable to evolving climate risks.

14.2 Conclusion

Somalia's NAP reflects a bold, collaborative effort to tackle climate change, bringing together diverse stakeholders to create a unified approach to building resilience. By integrating climate

change adaptation into national development priorities, Somalia is positioning itself to safeguard its population, economy, and ecosystems against the adverse effects of climate change. The NAP sets the groundwork for **sustainable growth** in a changing climate, and with strong implementation and continued engagement, it will help Somalia move toward a **more resilient and secure future**.

Annex I. – Sectoral Adaptation Implementation Roadmap: Strategic objectives, priority actions, timelines and institutional responsibilities

N	Sector	Strategic goal	Specific objective	Short- to mid-term actions	Timeline	Lead entity
1.	Agriculture	Enhance climate-resilient agriculture and food security	Promote climate-smart agriculture and resilient food systems	• promote drought-tolerant crop varieties • expand use of efficient irrigation techniques including drip and shallow groundwater systems • support farmer field schools on CSA • strengthen extension services on soil conservation and agroforestry • improve post-harvest storage infrastructure	2025-2030	Ministry of agriculture and irrigation
2.	Livestock	Improve climate resilience of livestock systems	Reduce climate-related mortality and productivity losses in pastoralist areas	• expand mobile veterinary units in drought-prone areas • establish livestock water points and troughs • rehabilitate traditional grazing routes • deliver training on pasture management and disease surveillance • integrate animal health into early warning systems	2025-2030	Ministry of livestock, forestry and range
3.	Fisheries	Strengthen adaptive capacity of coastal and marine fisheries	Ensure sustainable management and livelihood diversification for coastal communities	• establish community-based fisheries co-management bodies	2025-2030	Ministry of fisheries and blue economy

N	Sector	Strategic goal	Specific objective	Short- to mid-term actions	Timeline	Lead entity
				• provide training on sustainable fishing and processing • construct cold storage facilities • support alternative income sources (e.g., seaweed farming) • strengthen fishery surveillance and coastal protectionmeasures		

4.	Water resources	Secure sustainable access to water under climate stress	Expand water access and rehabilitate strategic sources	• construct and rehabilitate boreholes and rainwater harvesting systems • de-silt and rehabilitate water reservoirs • promote household water treatment technologies • rehabilitate and manage Juba and Shabelle riverbanks to reduce flood risk and ensure irrigation flow	2025–2030	Ministry of energy and water resources
5.	Health	Enhance resilience of public health systems to climate risks	Improve surveillance, early warning, and access to climate-sensitive healthcare	• train health workers on climate-sensitive diseases • expand disease surveillance and reporting systems • integrate climate alerts into public health messaging • support mobile clinics and local health infrastructure in hotspot regions	2025–2029	Ministry of health and human services
6.	Biodiversity and ecosystems	Protect and restore ecosystems critical to climate resilience	Rehabilitate rangelands, mangroves and forest ecosystems	• undertake large-scale reforestation of degraded rangelands • restore mangrove forests in coastal zones • support community forestry schemes • train local stakeholders on ecosystem-based adaptation • implement erosion control and anti-desertification measures	2025–2030	Ministry of environment and climate change
7.	Infrastructure	Promote climate-resilient infrastructure in vulnerable areas	Reduce climate damage to transport, housing, and public assets	• rehabilitate stormwater drainage systems in flood-prone urban areas • construct coastal protection structures in vulnerable municipalities	2025–2029	Ministry of public works

				• apply resilient design standards in new public infrastructure projects • conduct urban climate risk mapping		
8.	Disaster Risk Reduction (DRR)	Strengthen national and local capacity for disaster preparedness and risk reduction	Operationalize early warning systems and integrate DRR in planning	• Develop and disseminate flood and drought early warning protocols • provide DRR kits to vulnerable households • train local DRM committees • mainstream DRR into local development plans and contingency budgets	2025–2027	Somali Disaster Management Agency
9.	Energy	Promote renewable energy to reduce vulnerability and environmental degradation	Support solar energy for rural health, water, and education services	• Install solar power systems in health posts, schools, and community water pumps • train technicians in solar maintenance • provide awareness programs on clean energy benefits and environmental impact	2025–2029	Ministry of energy and water resources
10.	Education and Awareness	Increase awareness and knowledge on climate change adaptation across all sectors	Integrate climate change adaptation in education and community practices	• integrate climate change adaptation into formal school curricula • conduct community outreach campaigns on adaptation practices • deliver specialized training to farmers, pastoralists and youth groups on locally-led adaptation	2025–2028	Ministry of education

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