ADAPTATION FUND

SINGLE COUNTRY/ REGIONAL INNOVATION PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Enhancing Adaptation and Resilience through Nature-based Solutions (EARNSS) in Somalia
Country/ Countries:	Somalia
Thematic Focal Area[1]:	Nature-based Solutions and ecosystem-based adaptation.
Type of Implementing Entity:	Multilateral Implementing Entity (MIE)
Implementing Entity:	United Nations Environment Programme (UNEP)
Executing Entities:	Sadar Development and Resilience Institute (Sadar)
Amount of Financing Requested:	5,000,000 (in U.S Dollars Equivalent)

[1] Thematic areas are: Agriculture, Coastal Zone Management, Disaster risk reduction, Food security, Forests, Human health, Innovative climate finance , Marine and Fisheries, Nature-based solutions and ecosystem based adaptation, Protection and enhancement of cultural heritage, Social innovation, Rural development, Urban adaptation, Water management, Wildfire Management.

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List of Acronyms

AF	Adaptation Fund
BRCiS	Building Resilient Communities in Somalia
CBD	Convention on Biological Diversity
CRCs	Community Resilience Committees
CSO	Civil Society Organizations
DRR	Disaster Risk Reduction
FAO	UN Food and Agricultural Organization
FCDO	Foreign, Commonwealth and Development Office
FGS	Federal Government of Somalia
FRRIMS	Flood Risk and Response Information Management System
GASHPP	Gender and Stakeholder Participation Plan
IDP	Internally Displaced Persons
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
JPLG	Joint Programme on Local Governance
KM	Knowledge Management
LDN	Land Degradation Neutrality
LG	Local Government
LoCAL	Local Climate Adaptive Living Facility
MECC	Ministry of Environment and Climate Change
MOEWR	Ministry of Energy and Water Resources
MS	Member State (Federal Member States)
NAPA	National Adaptation Plan of Action
NAPs	National Adaptation Plans
NbS	Nature Based Solutions
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Governmental Organization
NWRS	Somalia National Water Resource Strategy
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PBCRGs	Performance-Based Climate Resilience Grants
PET	Potential Evapotranspiration
SDG	Sustainable Development Goal
SomRIL	Somali Response Innovation Lab
SRRF	Somalia Resilience and Resilience Framework
SWALIM	Somalia Water and Land Information Management
UK	United Kingdom
UN	United Nations
UNCCD	UN Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP-DHI	United Nations Environment Programme Centre on Water and Environment
UNFCCC	UN Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
US	United States (of America)
WASH	Water, Sanitation and Hygiene
WB	World Bank

PART I: PROJECT INFORMATION

A. PROJECT BACKGROUND AND CONTEXT

GEOGRAPHIC AND SOCIO-ECONOMIC CONTEXT OF THE PROJECT AREA

1. The Federal Republic of Somalia is located in the Horn of Africa, at the extreme end of the Sahel[2]. Covering a total land area of 637,657 km^2, the country is bordered by the Gulf of Aden to the north, Djibouti to the northwest, Ethiopia to the west, the Guardafui Channel and Somali Sea to the east, and Kenya to the South West (Fig. 1). Somalia was disrupted by internal conflicts for over two decades, following the fall of the government in 1991. The country is now in recovery mode following the October 2012 adoption of a new provisional constitution and inauguration of a new parliament, which ushered in the Federal Government of Somalia (FGS), the first permanent central government in the country since 1991. As emphasized in the country's National Adaptation Plan of Action (NAPA)[3], the new government is acutely aware of the risks that climate change represents to progress on key development indicators and maintaining peace and security and is committed to tackling these challenges.

Figure 1: Map of the Federal Republic of Somalia

2. The project will be implemented in the Shabelle River watersheds in the southern part of the country. The Shabelle River, one of two permanent rivers in the country, rises in the Ethiopian highlands and flows southeast into Somalia, passing through Hirshabelle and the South West State before flowing south into the Indian Ocean around Jubba. The Shabelle basin is one of the most fertile agricultural lands and Somalia's food basket, making the region the country's economic engine and food source. Yet it's highly prone to floods and droughts. The area is home to many agro-pastoralists, as well as a large population of IDPs in camps (e.g., along the Afgooye corridor), Somali Bantus, and other historically marginalized groups. The project will target communities in three districts: i) Beledweyne District in the upper watershed, ii) Jowhar District in the middle of the watershed, and iii) Afgooye District in the Lower Shabelle Region. These districts are selected due to their importance in food production and high vulnerability to climate hazards for urban and rural populations. In addition to being more accessible than

[2] Sahel is the sub-Saharan semi-arid zone which traverses the African continent from Senegal to Somalia
[3] Federal Republic of Somalia, 2021: Climate Change Adaptation Baseline Report; Somalia

most other districts, they present an opportunity to demonstrate the effectiveness of Nabs and hybrid measures to tackle climate hazards along the entire watershed (upper, middle and lower Shabelle).

3. The total population of the three districts is shown in Table 1.

Table 1: Projected population for the three target districts by 2029

	2014 Population Estimates (UNDP)				Population projection at the end of the project (2029) using an average annual growth rate of 3.49% (World Bank)			
District	Total	Total urban	Total rural	Total IDP	Total	Total urban	Total rural	Total IDP
Beledweyne	235,214	31,874	170,930	32,410	331,472	44,918	240,881	45,673
Jowhar	179,097	63,090	89,637	26,370	252,390	88,909	126,320	37,162
Afgooye	238,655	61,604	152,241	24,810	336,321	86,815	214,544	34,963
Total	**652,966**	**156,568**	**412,808**	**83,590**	**920,183**	**220,641**	**581,744**	**117,798**

Land use, livelihoods and profile of communities in the target districts

4. The Shabelle basin, characterized by an arid to semi-arid climate, features diverse landscapes including drylands, riverine vegetation, crop fields (both rainfed and irrigated), dunes, bare lands, natural water bodies, and a few urban areas. The rural population primarily consists of sedentary farmers engaged in small-scale mixed farming, integrating livestock with crop production). According to by SWALIM[4], land use is dominated by pastoralism, agro-pastoralism, and crop farming, with sedentary crop farmers also practicing animal husbandry. Lactating cattle, sheep, and goats are kept near homes, while non-lactating animals are herded further away. Rainfed and irrigation farmers maintain relatively small livestock numbers, primarily cattle and ruminants.

CURRENT AND PROJECTED CLIMATE

5. The country's climate is influenced by a number of factors, including the Inter-Tropical Convergence Zone, monsoonal winds and ocean currents, jet-streams including the Somali Jetstream or Somalia Current, easterly waves, tropical cyclones, and neighbouring Indian Ocean and Red Sea conditions[5]. Nationally, the median daily maximum temperature ranges from 30°C to 40°C, while the average annual daytime temperature is 27°C, which is among the world`s highest mean annual temperatures[6]. The three districts targeted by the project have slightly lower mean annual temperatures ranging from 23°-30°C. Although predictions of change in climate factors are uncertain, the temperature is projected to very likely rise between 1.4 – 1.9 °C by 2030, 1.5 – 2.3 °C by 2050 and 1.4 – 3.4 °C by 2080, with coastal regions being less affected than the rest of the country[7]. The annual number of very hot days (with daily maximum temperature above 35 °C) is projected to increase with high certainty all over Somalia, with central Somalia being particularly affected (ibid).

[4] Oduori, S., Vargas, R. and Alim, M. 2007b. Land Use Characterisation of the Juba and Shabelle riverine areas in Southern Somalia. FAO-SWALIM. Project Report No. L-07. Nairobi, Kenya. https://www.faoswalim.org/resources/site_files/L-07%20Land%20Use%20Characterization%20of%20the%20Juba%20and%20Shabelle_0.pdf

[5] Ogallo, L.A., Omondi, P., Ouma, G. and Wayumba, G. (2018) Climate Change Projections and the Associated Potential Impacts for Somalia. American Journal of Climate Change, 7, 153-170. https://doi.org/10.4236/ajcc.2018.72011

[6] Ogallo, L.A., Omondi, P., Ouma, G. and Wayumba, G. (2018) Climate Change Projections and the Associated Potential Impacts for Somalia. American Journal of Climate Change, 7, 153-170. https://doi.org/10.4236/ajcc.2018.72011

[7] Binder, Lisa; Barbora Šedová, Lukas Rüttinger, Julia Tomalka, Stephanie Gleixner 2022: Climate Risk Profile: Somalia. Berlin: PIK/adelphi

6. Indeed, the median annual temperature has risen by between 1°C to 1.5°C since 1991[8]. Projected changes in temperatures are likely to increase heat-related mortality to between 2.7 and 3.3 deaths per 100 000 people/year until 2030 and then drastically increase to between 3.6 and 11.4 deaths per 100 000 people/year until 2080; these changes are very likely to strongly increase the pressure on GDP from 8.3% in 2000 to 17.1% in 2030, 19.4% in 2050 and 22.7% in 2080[9].

7. The average annual rainfall is generally low (200mm) and erratic across the country, with inter-annual and intra-seasonal variability[10]. The annual average rainfall is higher in the south at approximately 400 mm, is highest in the South West with around 600 mm and is lowest in the northern coastline at significantly less than 50 mm (ibid). Like the rest of the country, rainfall in the three districts in the Shabelle basin falls in two distinguishable rainy seasons alternating with two marked dry seasons, as follows (Fig. 3): i) Gu: April to June, the main rainy season all over the country, delivering over 60% of the rainfall in the Shabelle basin; ii) Xagaa: July to September, littoral showers, but dry and cool in the hinterland; iii) Deyr: October to December, second rainy season all over the country; iv) Jilaal: January to March, longer dry season all over the country[11]. With an average annual rainfall of 400 mm, the three districts experience high inter-annual variation with recurrent drought every 3-4 years and more severe dry periods every 7-9 years (ibid).

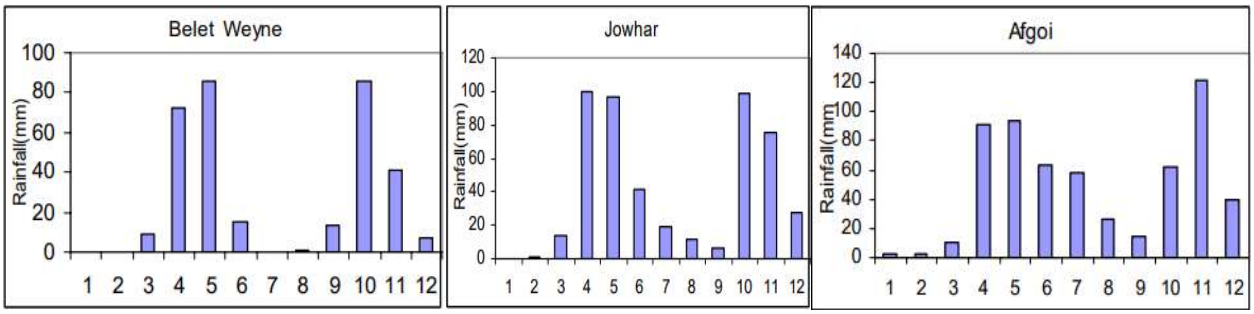


Figure 2: Mean Monthly Rainfall Patterns in the Target Areas (1963-2001)[12]

8. The low rainfall is made worse by high Potential Evapotranspiration (PET). The national average annual PET exceeds 2000 mm, rising to 3000 mm along the coastal areas[13]. With an average PET of 1,500 and 2,000 mm/year, the three districts experience significant moisture deficit for most of the year. Relative humidity is high in areas close to the river, ranging from about 70-80%, declining sharply away from the river, where the air is much drier (ibid). The rainfall and PET are projected to change in line with future global climate change patterns. Although the models show high variability, precipitation is projected to show a decreasing trend leading up to 2030 followed by an increase in the 2050 and 2070 scenarios[14]. By 2050 it is projected to increase by about three %, especially during the rainy season, with increasing seasonal variability. At the same time, PET rates are projected to slightly increase all over the country,

[8] Federal Republic of Somalia, 2021. Climate Change Adaptation Baseline Report; Somalia
[9] World Bank, 2020: Diagnostic study on trends and threats for environmental and natural resources challenges
[10] Ogallo, L.A., Omondi, P., Ouma, G. and Wayumba, G. (2018) Climate Change Projections and the Associated Potential Impacts for Somalia. American Journal of Climate Change, 7, 153-170. https://doi.org/10.4236/ajcc.2018.72011
[11] Oduori, S., Vargas, R. and Alim, M. 2007b. Land Use Characterisation of the Juba and Shabelle riverine areas in Southern Somalia. FAO-SWALIM. Project Report No. L-07. Nairobi, Kenya
[12] Source: Oduori, S., Vargas, R. and Alim, M. 2007b. Land Use Characterisation of the Juba and Shabelle riverine areas in Southern Somalia. FAO-SWALIM. Project Report No. L-07. Nairobi, Kenya.
[13] Oduori, S., Vargas, R. and Alim, M. 2007b. Land Use Characterisation of the Juba and Shabelle riverine areas in Southern Somalia. FAO-SWALIM. Project Report No. L-07. Nairobi, Kenya
[14] Ogallo, L.A., Omondi, P., Ouma, G. and Wayumba, G. (2018) Climate Change Projections and the Associated Potential Impacts for Somalia. American Journal of Climate Change, 7, 153-170. https://doi.org/10.4236/ajcc.2018.72011

with comparatively stronger increases in northern Somalia, and relatively substantial increases in northern and southern Somalia[15].

IMPACTS OF CLIMATE HAZARDS ON THE SOCIO-ECONOMIC CONTEXT OF THE COUNTRY AND PROJECT AREA

9. **Impacts of climate hazards on water:** Although Somalia is a water-deficit country, water resources in all the country's nine water basins are particularly threatened by projected changes in annual groundwater runoff, which is greater than annual groundwater recharge[16].

10. Both processes are challenged by the nature of the land and the terrain, exacerbated by the impacts of climate change and the negative feedback loops that link poor land management and declining water resources, particularly evident in the Shabelle basin and the three target districts. Removal of vegetation due to the combined effects of overgrazing, tree felling and burning, exacerbated by climate change-induced droughts reduces ground cover, resulting in bare ground across the country. Under these circumstances, climate- driven intense rainfall amplifies water run-off, leading to higher peak floods which increase erosive capacity, incise river channels and damage riparian vegetation. These processes reduce water infiltration and recharge of the aquifers. Combined with the consequent concentration of fast moving floods, flood waters no longer inundate valleys and fertile sediments are transported downstream, causing high sediment loads in the portable water intake points instead of on the farms where they are required to grow crops. There are, however, many NbS and hybrid measures that can disrupt the negative feedback loops of degradation, including agroforestry, reforestation, terracing, implementation of sand dams in combination with weirs (especially the V-shaped weir, also referred to as a notch weir), and gully protection.

Impacts of climate hazards on agriculture and food systems:

11. The major agricultural areas along the Shabelle and Jubba Rivers are considered Somalia's food basket due to their superior soils. However, agriculture in these districts is threatened by increasingly erratic weather phenomena, particularly droughts and floods, which significantly impact food security. Since 2016, the intensity and frequency of droughts have escalated, with minimal recovery intervals. The 2016-2017/18 drought caused severe food shortages and extensive environmental damage, resulting in the loss of 68% of vegetation and environmental destruction valued at approximately around 1175.5 million USD[17].

12. Since 2019, Somalia has faced continuous droughts, a desert locust invasion in 2020 that destroyed about 20% of national crop yields, and failed rains in 2021 and 2022. These climate hazards, exacerbated by the COVID-19 pandemic, ongoing insecurities, and the impact of the war in Ukraine reducing grain exports, have culminated in a food insecurity crisis. Nearly 5 million people are facing food shortages, and thousands have been displaced, with women, children, youth, and IDPs being the most affected[18].

13. The three districts are highly prone to flash flooding. The intensity and frequency of floods have increased since 2000, as evidenced by flooding events in 1946, 1961, 1977, 1981, 1997-98, 2005, 2006, 2009, 2011, 2013, 2015, 2016, 2018, 2019, and 2020. According to UNHCR[19], flash floods and riverine flooding displaced over 450,000 people before June 2020. The WFP warns that 4.3 million people, or 25% of Somalia's population, could face crisis-level hunger by the end of 2023 due to extreme weather (ibid). The

[15] Source: Binder, Lisa; Barbora Šedová, Lukas Rüttinger, Julia Tomalka, Stephanie Gleixner 2022: Climate Risk Profile: Somalia. Berlin: PIK/adelphi
[16] Source: Binder, Lisa; Barbora Šedová, Lukas Rüttinger, Julia Tomalka, Stephanie Gleixner 2022: Climate Risk Profile: Somalia. Berlin: PIK/adelphi
[17] World Bank, 2020: Diagnostic study on trends and threats for environmental and natural resources challenges
[18] Save the Children - https://www.savethechildren.net/news/somalia-s-worst-drought-crisis-decade-leaves-millions-hungry-lives-risk and CONCERN world-wide - https://www.concernusa.org/story/somalia-drought-timeline=Somalia
[19] https://www.unhcr.org/news/briefing/2020/8/5f2cf86c4/floods-drive-650000-somalis-homes-2020.html

FGS declared emergencies in the most-affected states, including Hirshabelle, Southwest, Jubbaland, and Galmudug.

14. Cereal crops, which account for one-third to half of the Somali diet by calories, are significantly impacted, with cereal production per capita declining by 66% between 1966 and 2012[20], and is believed to have declined even further by 2023 and continuing to decline. Local crop production meets only 22% of per capita cereal needs, leading to an 18-fold increase in agricultural imports from $82 million in the late 1980s to $1.5 billion annually by 2015 (ibid). Somalia relies heavily on maize and sorghum, while wheat and rice are largely imported.

15. Somalia is among the ten countries with the highest malnutrition rates globally, and third highest in eastern and southern Africa. It has a Global Acute Malnutrition rate of 17.42% among children under five, with 3.2% severely malnourished[21]. Over 8.3 million Somalis, or 49% of the population, were projected to face acute food insecurity between April and June 2023 due to prolonged drought[22].

16. Livestock production, primarily rainfed nomadic pastoralism, also suffers from drought and flooding cycles, with one-third of livestock in the worst-affected areas dying between mid-2021 and the end of 2022. This highlights the severe impacts of climate hazards on agriculture and livelihoods in Somalia..

Impacts of climate hazards in urban areas, especially for the poor:

17. Climate hazards pose even greater risks to the urban populations, especially in the riverine areas of Beledweyne, Jowhar and Afgooye. These urban areas concentrate potential impacts from climate hazards due to the aggregation of people, infrastructure and assets. Indeed, urban areas tend to create local micro-climates that exacerbate the level and impacts of climate hazards.

18. Somalia is urbanizing rapidly; in 2018, Mogadishu was the second-fastest growing city in the world, with a 4 % annual rate of urbanization growth[23]. The built-up area in Beledweyne has grown steadily at an average rate of 5% per year over the last fifteen years[24]. According to the WB25, the population of Somalia grew by 13.1 million people between 1960 and 2020 (from 2,755,967 to 15,893,219), a 477% growth. The population is projected to continue growing steadily into 2050 when it is expected to reach 35 million. The proportion of the urban population rose from 17.3% in 1960 to the current 46.1% (in 2022), projected to reach 68.3% by 2050.

19. Beledweyne, Jowhar and Afgooye cities are expected to continue a high growth rate over the next years due to both natural growth and influx of IDPs. The three districts currently host large numbers of IDPs and are still receiving people displaced by drought and conflict, therefore constant growth, often unplanned settlements. By September 2023, Beledweyne had 91 IDP sites hosting 9,110 households or 53,840

[20] Gavin, R. et al, 2019: The Relative Contributions of Cereal Production, Imports, And Aid to Somali Food Security. Afr. J. Food Agric. Nutr. Dev. 2019; 19(3): 14587-14601

[21] World Bank, 2022: Somalia Drought Impact & Needs Assessment: VOLUME I Synthesis Report - https://documents1.worldbank.org/curated/en/901031516986381462/pdf/122991-v1-GSURR-Somalia-DINA-Report-Volume-I-180116-Digital.pdf

[22] OCHA, 2022: Somalia Humanitarian Needs Overview 2023 (February 2023) – Relief Web; https://reliefweb.int/report/somalia/somalia-humanitarian-needs-overview-2023 -february-2023

[23] Bonnet and Bryld, 2018: The challenge of finding money to build shelter in Mogadishu's informal settlements. https://www.iied.org/challenge-finding-money-build-shelter-mogadishus-informal-settlements accessed on 10th Oct 2022

[24] Pablo Fernández Maestre, et al, 2020. Beledweyne Urban Profile Working Paper and Spatial Analyses for Urban Planning Consultations and Durable Solutions for Displacement Crises November 2020. UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME, Somalia

[25] World Bank, online: Population Growth and Projections: https://databank.worldbank.org/reports.aspx?source=Health%20Nutrition%20and%20Population%20Statistics:%20Population%20estimates%20and%20projections#

individuals[26], Jowhar had 21 IDP sites hosting 11,100 households or 76,960 individuals, while Afgooye had 52 IDP sites hosting 10,105 households or 57,753 individuals[27].

20. Urbanization in the Shabelle watershed and throughout Somalia occurs in poorly planned areas with weak regulations and institutions, endangering investments and livelihoods. Land degradation and water management issues create negative feedback loops on flooding, compounded by inadequate waste management and poor urban infrastructure, turning even minor natural hazards into disasters.

21. Beledweyne has experienced major floods in 1961, 1977, 1981, 1997, 2005, 2006, and recently in 2016, 2018, and 2019. Jowhar, lacking river management, suffers from 30 years of silt and rubbish build-up, causing frequent bank over-topping and farmland damage. Floods often relocate Beledweyne's livestock market and disrupt communication with Mogadishu by flooding the main road. These urban floods result in crop loss and hinder access to external markets and specialized health facilities, disrupting livelihoods. In July 2023, Beledweyne faced severe floods, displacing over 240,000 people.

VULNERABLE GROUPS

22. While acknowledging that the entire population of Somalia is vulnerable to the impacts of climate change, the NAPA[28] identified women, youth, IDPs and the rural populations, particularly the pastoralists, as highly vulnerable. The populations, including women and children are the most affected by climate driven poverty and food and nutrition insecurity. According to the preliminary gender assessment[29], Somalia has extremely high maternal mortality, rape, female genital mutilation and child marriage rates, and violence against women and girls is common, though statistics are difficult to find. Women's involvement in politics and decision-making remains minimal, exacerbating gender inequalities. Customary law often supersedes state judiciary, leaving sexual and gender-based violence unaddressed due to societal taboo. Early marriage affects 45% of women. Women's wage employment is highest in Puntland (40%), followed by Somaliland (36%) and South Central states (33%).

23. There has been a commitment to reserve 30% of parliamentary seats for women. A total of 24% of parliamentary seats are now held by women in the FGS (increasing from 14 % in 2012). Conflict has weakened women's land and property ownership rights, impacting their social support systems and access to resources. About 55% of women lack education compared to 40% of men, and women's laborforce participation is only 19% compared to 74% for men[30]. Gender-based violence is pervasive due to societal norms, weak law enforcement, and evolving gender roles. Internally displaced women face heightened risks of sexual violence by armed groups. Pastoralists, dependent on rain-fed pastures, lack fixed assets, making them vulnerable to climate risks.

24. IDPs, fleeing conflict or climate hazards, strain natural resources in settlements and urban fringes, often unable to return home.

25. **Youth.** The country has a very young population: about 60 percent is under 35 years with a high age dependency ratio (value of 95.7 %, against a global average of 58.64 – in 2021)[31]. This ratio rose from 83.68 % in 1960, increasing the burden on the economically active segment of the population. The NAPA recognized that many young people are trapped in an environment of violence, fear, unemployment and

[26] CCCM Cluster SOMALIA, 2023: file:///C:/Users/Admin/Downloads/Belet%20Weyne%20IDP%20Site%20Verification%20-%20Sep%202023.pdf

[27] https://reliefweb.int/report/somalia/somalia-verified-idp-sites-afgooye-october-2023

[28] Federal Republic of Somalia Ministry of National Resources, 2023. National Adaptation Action Plan

[29] UNEP, unpublished. Preliminary Gender Assessment - Produce to support mainstreaming gender issues in the project

30 IFAD 2021, Country Strategy Note (2022-2023). Report No: 6032-SO Near East, North Africa and Europe Division Programme Management Department

[31] Age dependency ratio by country, around the world | TheGlobalEconomy.com

poverty[32]. Jobless youth, lacking economic opportunities, often become recruits for extremist groups like Al Shabaab. This exacerbates instability, particularly in the Shabelle basin, where climate change is escalating conflicts.

26. **Minority groups.** The three largest groups of minorities are the Bantu, Benadiri as well as the Asharaf and Bravanese, all three found in the South of the country.

BASELINE SITUATION

National Policy Initiatives

27. Somalia has developed several key national policy initiatives to address climate change adaptation, disaster risk reduction, and sustainable development:

- National Adaptation Plan of Action (NAPA): Formulated in 2013, the NAPA identifies critical adaptation actions such as rangeland restoration, disaster risk reduction, sustainable land management, agroforestry, afforestation, and clean energy investments. It aims to enhance resilience to climate change, acknowledging Somalia's high vulnerability due to its dependence on natural resources.

- Intended Nationally Determined Contribution (INDC) and NDC: Somalia developed its INDC in 2015 and updated it to an NDC in 2021. Both documents prioritize sustainable development, peace-building, and climate adaptation as national priorities across federal, member state, and local government levels.

- National Development Plan – 2020 – 2024 (NDP-9): NDP-9 recognizes climate disasters as a major driver of poverty in Somalia. It emphasizes better management of environmental and natural resources and building resilience among households, communities, and government as key imperatives.

- National Disaster Management Policy: Established in 2018, this policy guides disaster management efforts in Somalia. It is supported by the National Disaster Risk Reduction (DRR) Strategy, focusing on addressing underlying disaster risk drivers including unsustainable use of natural resources, environmental degradation, conflict, poverty, and rapid urbanization. NbS are recognized as effective tools for flood and drought mitigation.

- Somalia Resilience and Recovery Framework (RRF) (2018): This framework aims to transition Somalia from early drought recovery to long-term resilience and disaster risk mitigation. It focuses on efficient financial responses, prioritizing sectors like agriculture, food security, water, sanitation, hygiene (WASH), education, transportation, environment, social protection, gender, governance, and disaster management.

Current and Past Programmes and Projects at the FGS, MS and LG Levels

28. Sustainable Flood Management and Risk Reduction Action: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia (August 2021 to March 2022): This project was funded by the Foreign, Commonwealth and Development Office (FCDO), and was implemented by the Ministry of Energy and Water Resources (MOEWR) in collaboration with the UN Food and Agricultural Organisation (FAO) and UNEP, including UNEP-DHI. The project objective was to support the implementation of the Somalia National Water Resource Strategy (NWRS) 2021- 2025, launched by MOEWR in April 2021, and particularly to build the capacity of institutions to coordinate inter-ministerial responses to droughts and floods. UNEP's role included providing data and tools for assessing flash flood risks and conducting

[32] Federal Republic of Somalia Ministry of National Resources, 2023. National Adaptation Action Plan

research on Nature-based Solutions (NbS). Deliverables included a catalogue of NbS measures, modelling of effective options, and indicators for prioritizing NbS with flood mitigation potential.

The NbS catalogue

29. The NbS catalogue, developed via desk research, contains a record of past and present documented NbS primarily for flood and drought management in Somalia and similar climates. It draws from research articles, reports, and evaluation documents of projects, covering Somalia and other locations with a comparable climate. Many NbS in the catalogue have been historically to address drought, focusing on water capture and storage for human and livestock consumption. Traditional methods like berkhads, gabions, earth dams, and soil bunds are prevalent. These structures are often blended with "hard" construction materials such as stones and cement with green measures like revegetation and reforestation, classifying them as hybrid NbS. They utilize local materials and traditional knowledge, enhancing scalability and local relevance. Despite their hybrid nature, these NbS have proven long-term effectiveness and resilience. They are vital for expanding NbS applications, leveraging their historical use and adaptation to local conditions.

NbS and hybrid measures with the highest potential for mitigating floods

30. UNEP-DHI and MOEWR conducted an assessment of the efficiency of the NbS and hybrid measures using models to simulate catchment response to heavy rainfall in terms of reducing peak flows for four *wadis;* two in Beledweyne and two in Qardho districts. Modeling results showed that a combination of V-shaped weirs and sand dams is most effective for reducing peak flow and enhancing aquifer recharge (Fig 4). Sand dams, reinforced cement walls across river channels, increased infiltration by over 200% in areas like Beledweyne but only reduced peak flow by 1% (Table 2). V-shaped weirs, with a V-shaped opening that widens from the riverbed, increased infiltration by 23% and reduced peak flow by 30%. The combined use of sand dams and V-shaped weirs yielded the best results: increasing infiltration by 118% and 156% at depths of 1.5 and 2 meters, respectively, and reducing peak flow by 21% and 8% at the same depths. This combination potentially reduces floods by up to 60% in Qardho and 38% in Beledweyne, although effectiveness varies by event size, season, and location. Other tested NbS like agricultural terracing and replanting trees on 5% of the catchment area, were less effective in reducing flash floods but more beneficial for mitigating drought impacts on agriculture.

Table 2: The Estimated Daily Infiltration Along the Xarargagabaale River in the Different Scenarios, and the Reduction of Maximum Discharge During the Event of 28-10- 2009[33]

Scenario	Average infiltration [m^3/d]	Infiltration increase from baseline [%]	Flood peak reduction from baseline [%]
Baseline	240	0	0
V-shape	295	23	30
Sand dam	727	203	1
Combined 1.5 m	522	118	21
Combined 2 m	614	156	8

[33] Source: Ministry of Energy and Water Resources of the Government of Somalia, 2022: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia.

Figure 3: V-Shaped/Notched Weirs[34] (Left) and Sand dam (Right)[35]

Proposed indicators to guide the prioritizing NbS interventions

31. The project proposed a framework of indicators to guide stakeholders (government, development community, local communities, etc.) when planning and prioritizing NbS interventions. The key overall recommendation crucial for the success of NbS implementation is to collect information on metrics about e.g., discharge, volume of water stored, soil erosion rates, sediment deposition, discharge volume and velocity. This is essential for measuring individual project success, but also provides vital insights into the scope for upscaling NbS at basin and country scale.

32. Providing long-term durable solutions to displacement affected communities in a participatory and inclusive, people-cantered, government-led, context-specific, gender and resilience-oriented process in Hirshabelle Region (2018-2021): Funded by the UN Peacebuilding Fund and implemented by UNDP in collaboration with IOM and UN-Habitat, this project is part of broader efforts to provide durable solutions to displaced communities in Galmuduug and Hirshabelle (cities of Jowhar, Balcad, and Beledweyne). It aims to strengthen government and community capacities to address challenges through accountable and transparent approaches. Building on the UN Joint Programme on Local Governance (JPLG), it focuses on expanding state/district authority, enhancing livelihoods, and promoting community cohesion, with gender considerations integrated across four main components: Community Empowerment, Urban Resilience, Livelihoods and Employment, and Gender and Women's Empowerment..

33. Under the Urban Resilience component, the project developed various working papers, tool kits, urban profiles, base maps and city resilient plans for Jowhar[36] to build the capacity of government and its partners in securing resilient urban development[37]. A similar exercise for Afgooye is expected to take place in 2024 (ibid). The Somalia Disaster Management Agency has also developed a resilience plan for Jowhar district, with technical assistance of Sadar[38]. Many identified measures to mitigate floods and droughts fall under nature-based solutions (delimitation in Box1) categories, to be implemented at varying scales and detail.

[34] Source: Ministry of Energy and Water Resources of the Government of Somalia, 2022: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia. *Photo: Aaron Volkening*

[35] Lopez-Rey, 2019; "An appraisal of the effectiveness and sustainability of sand dams to improve water security and resilience in rural Somaliland", MSc Research dissertation Water, Engineering and Development Centre (WEDC), Loughborough University

[36] https://reliefweb.int/report/somalia/jowhar-resilience-plan) and Beledweyen (https://UNhabitat.org/sites/default/files/2020/09/Beledweyne_resilience_final.pdf

[37] Pablo Fernández Maestre and UNHABITAT, 2020: Beledweyne Urban Profile Working Paper and Spatial Analyses for Urban Planning Consultations and Durable Solutions for Displacement Crises

[38] Sadar (https://so.linkedin.com/company/Sadarso) is an international development research institute specializing in complex research in all aspects of sustainable development, disaster and climate resilience and humanitarian crisis in Somalia and Horn of Africa.

Box 1: Nature-Based Solutions definition

> United Nations Environment Assembly defined NbS as "actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal, and marine ecosystems, which address social, economic, and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience, and biodiversity benefits"[39]

34. **Somalia Water and Land Information Management (SWALIM) - on-going since 2001):** Administered by the FAO, SWALIM is funded by the European Union, with contributions from the WB, the United Kingdom (UK) Department for International Development, and the United States Agency for International Development (USAID). The project focuses on monitoring and preserving water and land resources to support livelihoods throughout Somalia. It provides information on water and land resources, to inform planning and management, filling a critical gap[40].

35. **Building Resilient Communities in Somalia (BRCiS) (on-going since 2013):** Funded by UK, the consortium was established in 2013 and constitutes of eight national and international organizations: Norwegian Refugee Council (Consortium lead agency), Concern Worldwide, GREDO (National NGO), Action Against Hunger (USA), Save the Children, International Rescue Committee, CESVI (Italian NGO), KAALO Aid and Development (National NGO).

36. The BRCiS consortium has focused on a bottom-up decision-making model, working through community structures to ensure programs meet the needs of vulnerable populations. By the end of Phase II in 2022, it had established 194 Community Resilience Committees (CRCs) in 34 districts. These CRCs form volunteer committees that enable community-driven decision-making, making the program adaptable and responsive. The consortium has also developed community-based early warning systems for climate hazards, supported diverse income-generating options, and engaged with the private sector for long-term resilience. The program is about to enter Phase III which will focus on five areas: 1) Health, Food Security, and Nutrition, 2) Nutritious Food Production, 3) Market-Based Livelihoods, 4) Financial Assets and Resilience, 5) Community engagement.

37. **Building capacity for local governance in Somalia (on-going since 2008):** The UN Joint Programme on Local Governance and Decentralized Service Delivery in Somalia (UN JPLG) is a multi-donor, multi-partner capacity building programme that builds the capacity of LGs in Somalia. Initiated in 2008, the program aims to improve the performance of local governments (LGs) in Somalia, enhancing local governance and service delivery for the Somali people. It supports three main outcomes: Policy Reform, Capacity Development, Inclusion. A key element is forming District Councils, establishing local governance structures, and strengthening their capacity for democratic and accountable governance to ensure better basic services and stability. In 2023, the UN Joint Programme on Local Governance (JPLG) developed an adaptation plan for LGs, focusing on Nature-based Solutions (NbS) to mitigate climate hazards like floods and droughts (Fig. 4 in Annex of Figures). JPLG is funded by Denmark, the EU, Norway, Switzerland, Sweden, USAID, the UK, and the UN Peacebuilding Fund, and is implemented by five UN agencies: UNCDF, UNDP, UN-Habitat, UNICEF, and the ILO.

38. Improving adaptive capacity via improved natural resources management and conservation (2023-2027):

    IFAD and Sadar are launching a project to restore land, conserve biodiversity, and improve the resilience of vulnerable smallholder households through sustainable natural resource management. Targeting five districts with degraded resources, the project focuses on water, farm, and pastureland management, eco-agriculture, forest restoration, and improved governance. Sadar also runs the Somalia Resilience

[39] Nature-Based Solutions Initiative | United Nations Environment Assembly agrees Nature-based Solutions definition (naturebasedsolutionsinitiative.org)

[40] FAO-SWALIM Recognised For Partnership With Banadir University.

Innovation Hub (Somali RIHUB), part of the Global Response Innovation Lab (SomRIL), enhancing Somali resilience through innovative interventions. Additionally, Sadar is implementing capacity-building projects in Hirshabelle and South West States.

39. **Programme for Sustainable Charcoal Reduction and Alternative Livelihoods (PROSCAL)[41] (2016-2023)**: PROSCAL was funded by the European Union, Swedish and Italian cooperation; it was implemented by three UN agencies (UNDP, FAO, and UNEP). The PROSCAL programme promoted energy security and resilient livelihoods by reducing unsustainable charcoal production, trade, and use. It developed alternative energy sources, rehabilitated degraded land, and created sustainable jobs. Objectives included mobilizing stakeholders, building government capacities, developing alternative energy, transitioning to sustainable livelihoods, reforestation, and forming Regional Economic Partnerships to curb charcoal use.

40. **Enhancing Climate Resilience of Vulnerable Communities and Ecosystems in Somalia (2014-2019):** Funded by the Global Environment Facility (GEF) and administered by UNDP, the project aimed to enhance the capacity of stakeholders and institutional frameworks for climate change adaptation. It piloted ecosystems-based adaptation to increase the adaptive capacity and resilience of vulnerable rural communities.

41. **UNCDF Local Climate Adaptive Living Facility (LoCAL) Somalia (established in 2022):** The LoCAL Facility is a global programme managed by the UNCDF. It supports the implementation of NDCs and NAPs through decentralization and local-level implementation strategies, thereby contributing to the local-level implementation of the Paris Agreement and the climate-related Sustainable Development Goals (SDGs). LoCAL combines performance-based climate resilience grants (PBCRGs) – to programme and verify climate change expenditures at the local level while offering strong incentives for improvements in enhanced resilience – with technical and capacity-building support.

PROBLEM TO BE ADDRESSED BY THE PROJECT

42. The problem to be addressed by the project is the limited and ineffective uptake and utilization of readily available and much needed NbS and hybrid measures, despite the high potential of these measures to reduce the vulnerability of people, productive assets and livelihoods to climate-intensified floods and drought risks in the Shabelle basin (Fig. 9 shows the problem tree). The ineffective use of these measures has left the communities in the Shabelle basin, and indeed the country, highly vulnerable to the negative impacts of climate change, worsening their abilities to cope with projected climate driven hazards, such as more intense and more frequent floods and droughts, and climate variability.

43. Despite the strong and growing baseline of policy, programmes and project initiatives, the effective upscaling and replication of readily available NbS and hybrid measures for climate change adaptation is hampered by many challenges, chief among them: (i) inadequate technical capacities to support knowledge/scientific-based planning, implementation and maintenance of NbS measures; (ii) inadequate policies, governance and incentives for effective use of the NbS at all levels; and, (iii) inadequate finance for broader replication and upscaling of proven measures. These challenges are exacerbated by the gradual breakdown of traditional natural resources management governance systems and practices since the onset of the partial colonisation of the country, accelerated by the large-scale breakdown of government services in 1991, and the consequent conflicts and insecurities in many parts of the country. Detailed below, these challenges were identified through review of the baseline and other reports on NbS and adaptation, complemented by stakeholder consultations conducted during the preparation of this concept.

[41] Programme for Sustainable Charcoal Reduction and Alternative Livelihoods (PROSCAL)

Barrier 1: Inadequate technical capacities to support knowledge-based planning, implementation and maintenance of NbS measures

44. Somalia is still hindered by inadequate technical capacities (skills, experience) across all sectors and among all levels of stakeholders (communities, technical institutions, civil society, academia and the private sector). The country is slowly rebuilding technical capacities in many areas as it recovers from the 1991 state collapse and the consequent civil war and political unrest. Following the 2022 general elections, the Directorate of Climate Change has been elevated to the Ministry of Environment and Climate Change (MECC). However, this is still a new ministry that requires much capacity enhancement. Like all other Ministries, MECC is still under-staffed at the FGS and Member States (MS) and district levels and lacks adequate budgetary allocation and/or disbursement. The institutions therefore lack resources to enable the few staff members in position to execute their mandates and support adaptation, including mainstreaming the use of NbS to mitigate climate risks in economic development and livelihood activities.

45. Newer states, Hirshabelle and SouthWest, have even lower capacities. Existing programs, like SWALIM and UNEP-DHI, highlight gaps in adaptation and NbS use. For example, Jowhar and Beledweyne only receive light touch approach[42] support from the JPLG, while Afgooye is not yet a beneficiary. Although JPLG developed an adaptation strategy plan for LGs, it has no financial or technical resources to support the implementation of the strategy. Information remains limited to a few institutions, leading to low awareness and practical knowledge among policymakers and local authorities. This knowledge gap hampers effective NbS design and implementation, compounded by a lack of skilled staff trained in ecosystem management.

Barrier 2: Inadequate data and poor planning make it difficult to integrate landscape/ecosystem measures with farm/household level measures and benefits

46. Landscape/ecosystems and community-level planning for NbS in Somalia is challenging due to the lack of information and capacities for generating and utilizing information for planning, at the national and local levels. SWALIM and its local partners have undertaken many soil and water assessments, like the 2014 mapping of breakage points along both Juba and Shabelle rivers, which is updated regularly and used to monitor flood risks[43]. Furthermore, the MOEWR produced a Shabelle Basin Diagnostic Report[44] in 2021, which has started to address the data/information challenges in the country; however, the report acknowledged that the management of water resources is still seriously challenged by lack of up to date data and information, insecurity in some parts of the system, and inadequate capacities (individual, institutional and systemic) for water resources management at all levels.

47. The development of a catalogue of NbS measures for managing drought and floods and the modelling of NbS and hybrid measures for flood control have significantly contributed to addressing the data gaps. Many NbS measures currently in use in the country are based on traditional knowledge. The government acknowledges that lack of data is still a key challenge that affects quality of research. This has led to insufficient site assessments, and evaluation and management of sediment and silt processes. Inadequate catchment-level NbS planning, also leads to land use conflicts.

48. Many strategic planning documents, e.g., the NAPA and the National Biodiversity Strategy and Action Plan (NBSAP) acknowledge that due to the country's history, there is limited scientific knowledge and paucity of research specific to Somalia, making it difficult to undertake comprehensive planning in any sector. The NbS modelling report recommended that the accuracy and efficiency of the selected

[42] Under the light touch approach, support towards the establishment of functional structures and systems for good local governance planning and programming is limited to training on local government laws and Public Expenditure Management (PEM) cycle, the development of human resources and local leadership management, financial management (including procurement), urban planning as well as rehabilitation of existing office and market infrastructure.
[43] http://frrims.faoswalim.org/rivers/breakages
[44] Government of Somalia, 2021: Shabelle River Diagnostic and Strategic Action Plan, Somalia

NbS/hybrid measures (especially the combined v-shaped weir and sand dams) was likely affected by lack of data and recommended that more data be collected and provided to refine the modelling at each wadi where the measures are expected to be implemented.

49. In Jowhar and Beledweyne, district profiles and urban resilience plans face challenges due to outdated data. Wetlands show potential in flood control and ecosystem services, yet their effectiveness lacks sufficient research.

Barrier 3: Inadequate policies and incentive packages for the adoption and maintenance of NbS at all levels

50. Enabling policies are critical for the effective implementation of NbS measures. Somalia lacks policies and incentives to promote NbS due to decades of instability (1991–2012) that eroded and weakened governance structures. Although the country is recovering and formulating new policies, weak institutional capacities and low awareness of NbS benefits hinder their integration. Formal education has neglected NbS's role in adaptation and natural resource management, compounding the loss of traditional knowledge vital for agriculture, livestock, urban development, and economic activities. Consequently, the potential of NbS to mitigate climate hazards remains underutilized, and efforts to implement these solutions are limited by insufficient technical and institutional support.

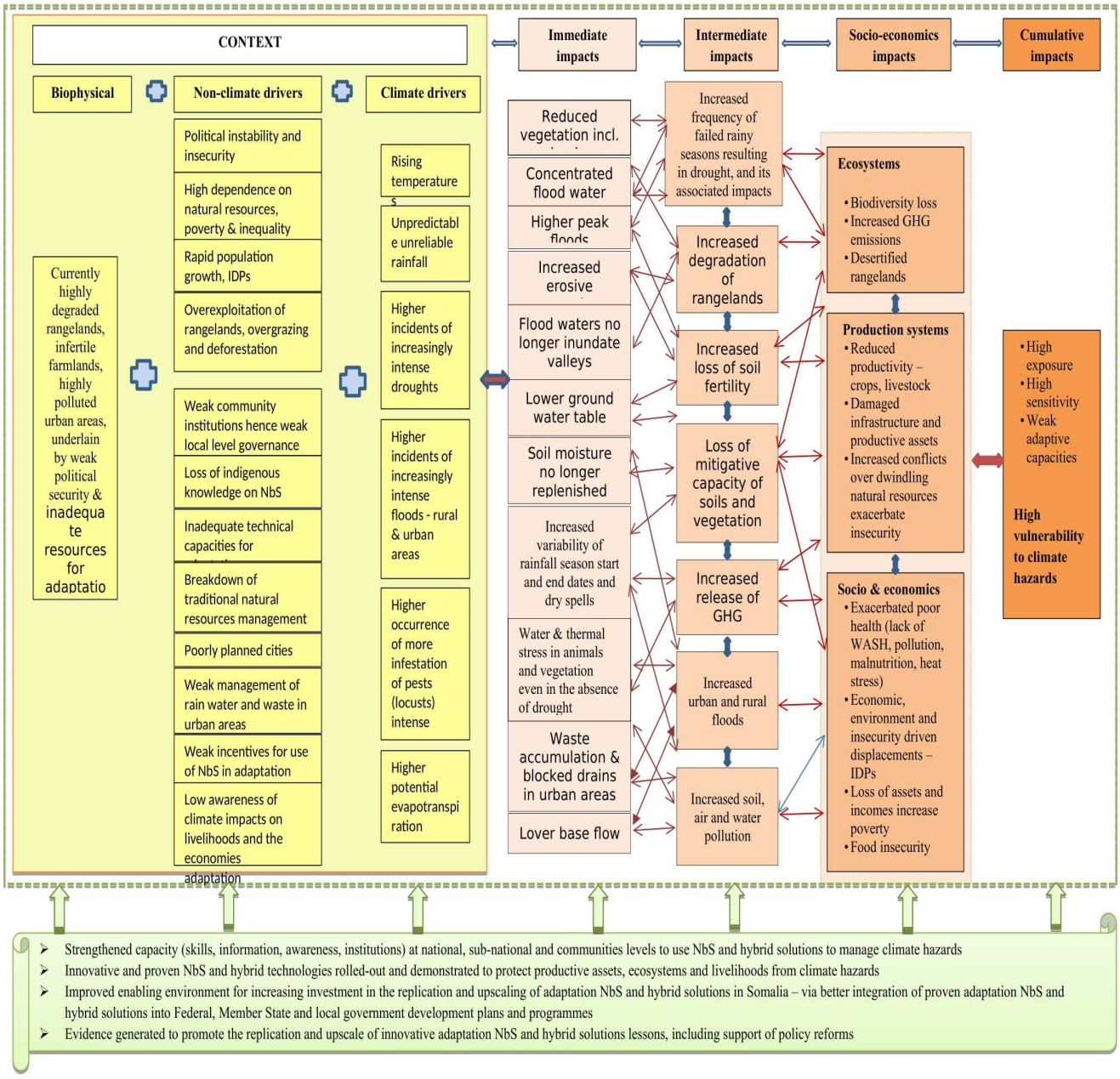
51. Despite global recognition of NbS benefits, their implementation remains limited in Somalia's urban areas. Recent efforts include resilience plans for cities like Jowhar and Beledweyne under programs such as MIDINIMO II and initiatives by Sadar with partners like the United Nations DRR and Ministry of Humanitarian Affairs. However, realizing their potential hinges on effective implementation, which demands adequate funding and governmental capacity.

52. Challenges persist in newly established states such as Hirshabelle and South West due to financial constraints and capacity gaps. Limited awareness, inter-sectoral collaboration, political will, and technical skills further impede NbS integration into adaptation strategies. These challenges are compounded by socio-economic factors in informal settlements and IDP camps, where high poverty levels and marginalization hinder resilience-building efforts. Addressing these issues requires comprehensive policies, enhanced collaboration across sectors, and targeted capacity-building.

Barrier 4: Inadequate financial resources for upscaling and replicating proven and innovative NbS and hybrid measures in adaptation.

53. Somalia, a least developed country, faces significant financial, technical, and capacity constraints in addressing climate change. According to the NDC, Somalia requires $58.5 billion to implement its adaptation priorities for 2021-2030. Limited government revenues restrict funding for long-term adaptation, often redirecting resources to short-term measures for immediate disasters like droughts and floods. Existing climate policies frequently lack implementation plans and funding. Most government institutions struggle to access multilateral and bilateral climate funding and to attract private sector investment. NbS and hybrid measures to mitigate climate hazards are not prioritized within adaptation programs, receiving minimal budgetary resources. The mainstreaming of NbS in relevant sectors is inadequate, further limiting financial support. Planning documents, such as the resilient plans for Jowhar and Beledweyne and the JPLG Adaptation Plans for local governments, remain largely unimplemented due to financial constraints.

Figure 4: Problem Tree



B. PROJECT OBJECTIVES

54. The objective of the project is to enhance the adaptive capacity of rural and urban communities in the Shabelle river basin through the effective replication and upscaling of proven NbS and hybrid measures, innovative in the context of Somalia, that reduce the vulnerability of people, productive assets and livelihoods to floods and droughts. The achieve this objective the project proposes to roll-out proven and innovative NbS/hybrid solutions, develop capacity and generate evidence to address the four identified barriers that limit the uptake and scale up of innovative NbS/Hybrid solutions for flood and drought risk reduction in the target vulnerable areas of Somalia (described in the Section on Barriers).

55. Direct beneficiaries will be approximately 26,250 highly vulnerable men, women and children in Jowhar, Beledweyne and Afgooye, including approximately 15,750 in three rural sub-catchments and 10,500 people in selected urban neighbourhoods of the three cities. The total beneficiaries represent just below 3% of the total population of the three districts[45], who will benefit equitably along gender and social groups. Indirect beneficiaries include the entire population of three districts (projected at 920,183 people by the end of the project in 2029), through improved enabling environment (planning and policy) measures to mitigate impacts of droughts and floods. Sections C (Economic, Social and Environmental Benefits) and K (Justification for Funding) provide a detailed account of the specific benefits.

Theory of Change

56. The theory of change (Fig. 5) for the project is that resilience of livelihoods, productive assets and the economy can be significantly improved in urban and rural areas in the Shabelle basin by rolling out readily available innovative and proven NbS and hybrid measures and ensuring that they are effectively used to manage climate hazards, particularly droughts and floods. This can be achieved if communities and local authorities in the target areas (3 rural catchments/watersheds and 3 urban areas) are empowered with relevant skills, information and strong participatory processes to plan and implement NbS/hybrid solutions in an integrated watershed/catchment approach to reduce the vulnerability to droughts and floods. Furthermore, with technical and financial support from Sadar and UNEP, the communities can use the capacities acquired to implement concrete innovative NbS and hybrid measures (Outcome 2) benefiting about 26,250 people. Moreover, resources for further replication and sustaining of the use of NbS in adaptation can be increased through mainstreaming of NbS consideration in decision-making at all levels, across all sectors, via the provision of policy, awareness and financial incentives that provide the enabling environment for leverage financial resources for upscaling and replicating NbS widely (Outcome 3). Indeed, they can generate and share widely evidence of the benefits and effectiveness of NbS in adaptation, thereby contributing to bridging the evidence gap in-country and globally (Outcome 4).

57. The project will therefore implement a set of proven NbS interventions that mitigate impacts of both drought and floods to increase the resilience of communities living in three rural catchments/watersheds (one per district) and three urban intervention sites (one per city). The approach will be one of:

58. **Providing an integrated landscape approach to control run-off, soil erosion, improved infiltration**, soil moisture and more resilient grazing lands in the rural catchments, covering a minimum of 4,000 ha, and benefitting at least 26,250 people, 50% men, 50% women, at least 30% youth and includes minority groups). The project will develop knowledge informed watershed level plans for optimizing the use of the combined v-shaped weir and sand dams (Fig. 8) which reduces peak flow (reducing incidents and intensity of flooding) while promoting water storage and aquifer recharge considerably. This will be complemented by: (a) introduction of solar energy (hence renewable energy and climate hydrology infrastructure integration) for water provision for micro-irrigation, fodder production, livestock watering and domestic use; (b) a programme of grazing management to promote natural regeneration of rangelands, which will include, as necessary, pastoralist/farmer managed regeneration, controlled grazing (with rotation), farmer-led regeneration of desirable fodder species of grasses, shrubs and trees, including enrichment planting, in a silvopasture system.

59. **Supporting the implementation of innovative green infrastructure in both rural and urban places**. In urban areas, this will be in line with the recommendations of the Beledweyne, Jowhar and (yet to be completed) Afgooye cities' resilient plans and the JPLG LG Adaptation Plans (in the Annex of Figures: Fig. 4 (JPLG Plan) and Fig. 5 (Beledweyne Plan) and Fig. 6 (Jowhar Plan), benefiting about 10,500 people. The project will refine the resilience plans, in line with the recommendations by the developers of the plans

[45] The 2017 population of the three districts was estimated at: 397,761; 482,223; and 175,900 for Beledweyne, Afgooye and Jowhar, respectively (https://en.wikipedia.org/wiki/List_of_cities_in_Somalia_by_population). Effort is being made to find more recent figures which will be reported at full project proposal.

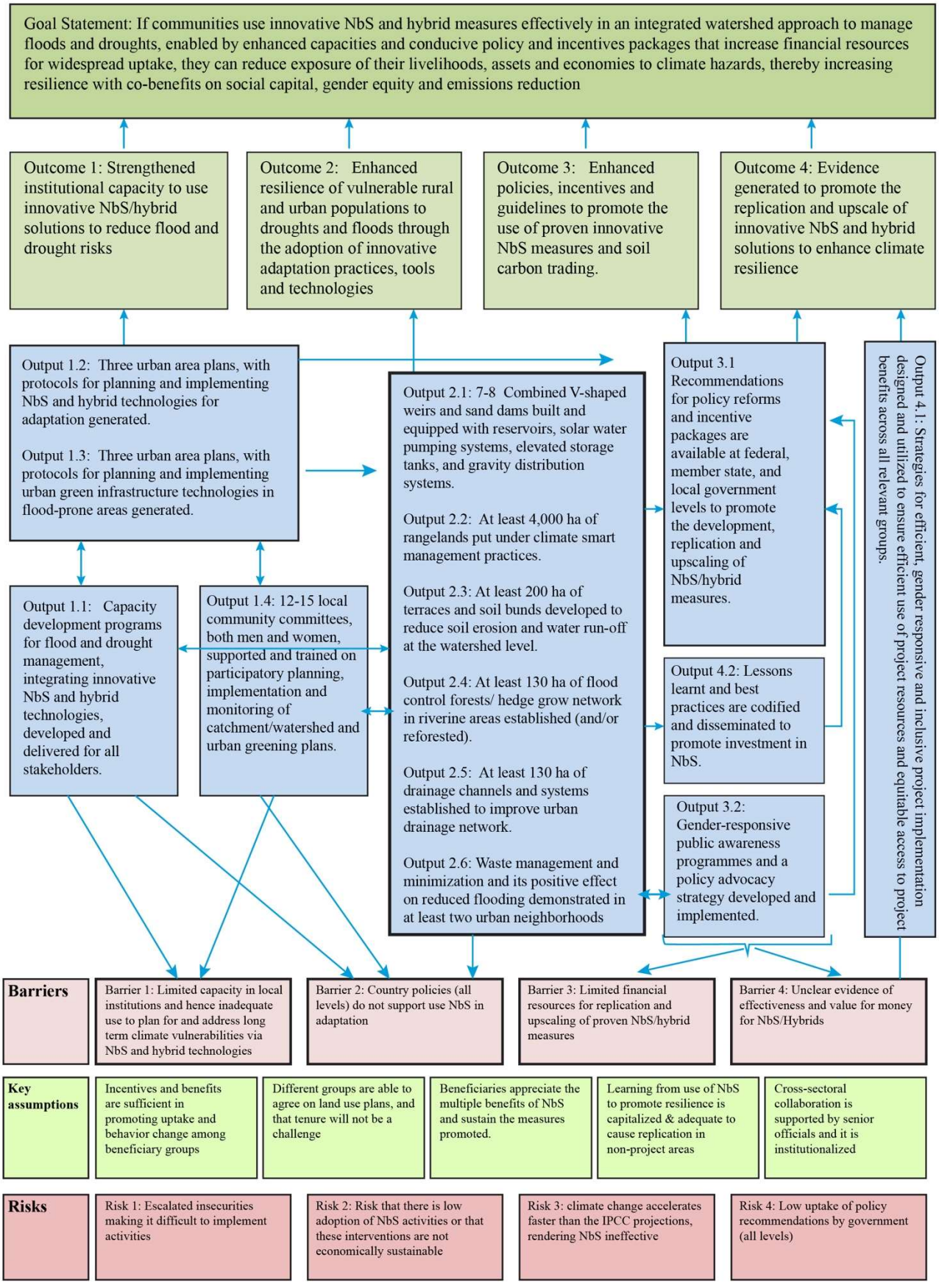
and implement selected green measures such as establish riparian forest buffers, enhancing hedgerow network on the borders of agricultural crop lands near the cities; establishing urban "green" areas by planting trees in strategic spaces; encourage by piloting on a small scale (selected neighbourhood, preferably for IDPs) sustainable urban drainage network and waste minimization - ditches, detention basins, retention ponds, water tanks for roof runoff water harvesting, promoting the 5 Rs in waste management and minimization (rethink, reduce, reuse, recycle and refuse the use of single-use items, to derive maximum value from waste). In the rural areas, it will establish measures to reduce soil erosion and run-off such as terraces and soil bunds in strategic areas in the three watersheds benefitting approximately 15,750 people. This will benefit the communities by reducing flood risks while simultaneously increasing water supply during Jilaal (dry season), improving access to water all year round, and reducing dependency on expensive water trucking.

60. In particular, the project will **create awareness and identify and lobby for incentives package and policy reforms** to encourage greater replication of the proven NbS measures, supported by evidence of cost-effectiveness and benefits of these measures, generated via the KM process (Outcome 4). In this regard, it will mainstream NbS considerations in relevant sectors to increase funding and replicate a soil carbon credits scheme tested under similar rangeland conditions in Kenya[46] as one potential financial incentive package. The piloting will provide an opportunity to the Ministry of environment and climate change to interrogate and identify relevant policy measures to regulate carbon credits and trading in the country.

61. These activities will be supported by measures to **build the capacity of local communities and the relevant technical institutions (CSO, staff of line ministries)** to plan, implement, and monitor, learn from and share the lessons with others to promote sustainability of the project results and further replication of these innovative measures in the country. Furthermore, project activities will be based on the best available knowledge and will collaborate closely with all relevant baseline projects to avoid duplication while maximizing synergies. These interventions will contribute to the achievement of the project objective - to enhance resilience of rural and urban communities in the Hirshabelle watershed through the effective replication and upscaling of proven NbS and hybrid measures, innovative in the context of Somalia, that reduce of productive assets and livelihoods to floods and droughts. The project is expected to provide direct benefits to at least 26,250 people (about 3% of the population of the three districts), equitably along gender and social groups), It provide indirect benefits to about 920,183 people (total population of 3 districts), through improved enabling environment (planning and policy).

Figure 5: Theory of Change

[46] (https://native.eco/project/northern-kenya-rangelands-project/, https://www.zawya.com/en/press-release/companies-news/worlds-largest-soil-carbon-project-in-kenya-receives-award-during-cop27-dic30pc7 , https://www.nrt-kenya.org/carbon-project. Awarded the Triple Gold status for complying with Vera's Verified Carbon Standard in 2022, it is noted that Vera suspended the approval to trade these credits in March 2023, and was reported to be carrying out further investigations. NRT welcomed the investigation, arguing that this provided an opportunity to improve on the scheme. https://s3-eu-west-1.amazonaws.com/s3.sourceafrica.net/documents/121277/Survival-International-Blood-Carbon-how-a-carbon.pdf


Goal Statement: If communities use innovative NbS and hybrid measures effectively in an integrated watershed approach to manage floods and droughts, enabled by enhanced capacities and conducive policy and incentives packages that increase financial resources for widespread uptake, they can reduce exposure of their livelihoods, assets and economies to climate hazards, thereby increasing resilience with co-benefits on social capital, gender equity and emissions reduction
Outcome 1: Strengthened institutional capacity to use innovative NbS/hybrid solutions to reduce flood and drought risks
Outcome 2: Enhanced resilience of vulnerable rural and urban populations to droughts and floods through the adoption of innovative adaptation practices, tools and technologies
Outcome 3: Enhanced policies, incentives and guidelines to promote the use of proven innovative NbS measures and soil carbon trading.
Outcome 4: Evidence generated to promote the replication and upscale of innovative NbS and hybrid solutions to enhance climate resilience
Output 1.2: Three urban area plans, with protocols for planning and implementing NbS and hybrid technologies for adaptation generated.
Output 1.3: Three urban area plans, with protocols for planning and implementing urban green infrastructure technologies in flood-prone areas generated.
Output 2.1: 7-8 Combined V-shaped weirs and sand dams built and equipped with reservoirs, solar water pumping systems, elevated storage tanks, and gravity distribution systems.
Output 2.2: At least 4,000 ha of rangelands put under climate smart management practices.
Output 2.3: At least 200 ha of terraces and soil bunds developed to reduce soil erosion and water run-off at the watershed level.
Output 2.4: At least 130 ha of flood control forests/ hedge grow network in riverine areas established (and/or reforested).
Output 2.5: At least 130 ha of drainage channels and systems established to improve urban drainage network.
Output 2.6: Waste management and minimization and its positive effect on reduced flooding demonstrated in at least two urban neighborhoods
Output 3.1 Recommendations for policy reforms and incentive packages are available at federal, member state, and local government levels to promote the development, replication and upscaling of NbS/hybrid measures.
Output 4.2: Lessons learnt and best practices are codified and disseminated to promote investment in NbS.
Output 3.2: Gender-responsive public awareness programmes and a policy advocacy strategy developed and implemented.
Output 4.1: Strategies for efficient, gender responsive and inclusive project implementation designed and utilized to ensure efficient use of project resources and equitable access to project benefits across all relevant groups.
Output 1.1: Capacity development programs for flood and drought management, integrating innovative NbS and hybrid technologies, developed and delivered for all stakeholders.
Output 1.4: 12-15 local community committees, both men and women, supported and trained on participatory planning, implementation and monitoring of catchment/watershed and urban greening plans.
Barriers
Barrier 1: Limited capacity in local institutions and hence inadequate use to plan for and address long term climate vulnerabilities via NbS and hybrid technologies
Barrier 2: Country policies (all levels) do not support use NbS in adaptation
Barrier 3: Limited financial resources for replication and upscaling of proven NbS/hybrid measures
Barrier 4: Unclear evidence of effectiveness and value for money for NbS/Hybrids
Key assumptions
Incentives and benefits are sufficient in promoting uptake and behavior change among beneficiary groups
Different groups are able to agree on land use plans, and that tenure will not be a challenge
Beneficiaries appreciate the multiple benefits of NbS and sustain the measures promoted.
Learning from use of NbS to promote resilience is capitalized & adequate to cause replication in non-project areas
Cross-sectoral collaboration is supported by senior officials and it is institutionalized
Risks
Risk 1: Escalated insecurities making it difficult to implement activities
Risk 2: Risk that there is low adoption of NbS activities or that these interventions are not economically sustainable
Risk 3: climate change accelerates faster than the IPCC projections, rendering NbS ineffective
Risk 4: Low uptake of policy recommendations by government (all levels)

62. UNEP, Sadar, and the Somali government collectively advocate for gender responsiveness and equitable access to project benefits, including for marginalized and minority groups. Project implementation will be guided by a Gender and Stakeholder Participation Plan (GASHPP) to ensure the inclusion of women, youth, the disabled, and other marginalized groups in decisions about NbS and related interventions. Additionally, an Environmental and Social Impacts Management Plan will be developed to identify and manage potential risks. These plans will be designed during the full project development phase to ensure that project results contribute equitably to national development priorities, the Paris Agreement, and sustainable development goals.

63. Table 3 describes the project Components, Outcomes, and Outputs.

C. PROJECT COMPONENTS AND FINANCING

Table 3: Project Components, Outcomes and Outputs by Budget

Project Components	Expected Outcomes	Expected Outputs	Budget – US$
Component 1: Capacity building for the replication and upscaling of innovative NbS and hybrid technologies in Somalia	Outcome 1: Strengthened institutional capacity to use innovative NbS/hybrid solutions to reduce flood and drought risks	Output 1.1: Capacity development programs for flood and drought management, integrating innovative NbS and hybrid technologies, developed and delivered for all stakeholders.	200,000
		Output 1.2: Three urban area plans, with protocols for planning and implementing NbS and hybrid technologies for adaptation generated.	170,000
		Output 1.3: Three urban area plans, with protocols for planning and implementing urban green infrastructure technologies in flood-prone areas generated.	105,000
		Output 1.4: 12-15 local community committees, both men and women, supported and trained on participatory planning, implementation and monitoring of catchment/watershed and urban greening plans.	150,000
		Total component 1	**625,000**
Component 2: Protection of productive assets and livelihoods by innovative and proven adaptation NbS and	Outcome 2: Enhanced resilience of vulnerable rural and urban populations to droughts and floods through the adoption of innovative adaptation	Output 2.1: 7-8 Combined V-shaped weirs and sand dams built and equipped with reservoirs, solar water pumping systems, elevated storage tanks, and gravity distribution systems.	1,000,000[47]
		Output 2.2: At least 4,000 ha of rangelands put under climate smart management practices.	400,000[48]

[47] Estimated cost of a medium-sized combo of sand dams and notch weirs fitted with a water reticulation system is about US$ 125,000 – including the cost of designing the structures to meet the specificities of each selected site.

[48] It is estimated that Farmer managed regeneration in Niger cost about US$ 14/ha (https://www.google.com/search?q=FMNR+on+one+hectare+of+land+in+Niger+cost+~%2414+in+labour+equivalent.&oq) Cost likely to be higher in Somalia. Also the cost includes extension services and labour on other related practices, totaling US$ 100/ha.

hybrid technologies	practices, tools and technologies	Output 2.3: At least 200 ha of terraces and soil bunds developed to reduce soil erosion and water run-off at the watershed level.	200,000[49]
		Output 2.4: At least 130 ha of flood control forests/ hedge grow network in riverine areas established (and/or reforested).	300,000[50]
		Output 2.5: At least 130 ha of drainage channels and systems established to improve urban drainage network.	500,000[51]
		Output 2.6: Waste management and minimization and its positive effect on reduced flooding demonstrated in at least two urban neighborhoods	300,000[52]
		Total component 2	**2,700,000**
Component 3: Improved enabling environment for investment in the replication and upscaling of adaptation NbS and hybrid solutions in Somalia	Outcome 3: Enhanced policies, incentives and guidelines to promote the use of proven innovative NbS measures and soil carbon trading.	Output 3.1 Recommendations for policy reforms and incentive packages are available at federal, member state, and local government levels to promote the development, replication and upscaling of NbS/hybrid measures.	250,000
		Output 3.2: Gender-responsive public awareness programmes and a policy advocacy strategy developed and implemented.	250,000
		Total component 3	**500,000**
Component 4: M&E and knowledge management	Outcome 4: Evidence generated to promote the replication and upscale of innovative NbS and hybrid solutions to enhance climate resilience	Output 4.1: Strategies for efficient, gender responsive and inclusive project implementation designed and utilized to ensure efficient use of project resources and equitable access to project benefits across all relevant groups.	150,000
		Output 4.2: Lessons learnt and best practices are codified and disseminated to promote investment in NbS.	200,342
		Total component 4	**345,507**
Project/Programme Execution cost			437,788
Total Project/Programme Cost			4,608,295
Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			391,705
Amount of Financing Requested			**5,000,000**

[49] The cost of terracing under similar conditions in Kenya was estimated to be US$ 465/ha (https://doi.org/10.1016/j.sciaf.2021.e00779). Costs in Somalia are estimated at US$ 600/ha for establishment and US$ 200/ha/yr for maintenance for 2 years

[50] The cost of reforestation in the Sahel was estimated at US$ 640/ha in the first year and US$250 in subsequent years.(Mirzabaev, A., Sacande, M., Motlagh, F., Shyrokaya, A., and Martucci, A. (2022). Economic efficiency and targeting of the African Great green Wall. Nat. Sustain. 5 (1), 17–25 Costs are higher in Somalia hence estimated US$800/ha in the first year and US$ 300/ha for subsequent years.

[51] Estimated cost of establishing sustainable drainage structures is US$ 4,000/km and maintenance cost of US$ 1,000/km per year for two years

[52] Estimated cost of waste minimization is US$ 100,000 per neighborhood of 500-700 households

D. PROJECTED CALENDAR

Milestone	Expected Date
Start of Project/Programme Implementation	**September 2024**
Mid-term Review (if planned)	**March 2027**
Project/Programme Closing	**September 2028**
Terminal Evaluation	**May 2029**

PART II: PROJECT JUSTIFICATION

Describe the project / programme components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience.

A. PROJECT COMPONENTS

64. The project has four Components each with one Outcome (listed below).

    Component 1: Capacity building for the replication and upscaling of innovative NbS and hybrid technologies in Somalia

    Component 2: Protection of productive assets and livelihoods by innovative and proven adaptation NbS and hybrid technologies

    Component 3: Improved enabling environment for investment in the replication and upscaling of adaptation NbS and hybrid solutions in Somalia

    Component 4**:** Evidence generated to promote the replication and upscale of NbS and hybrid solutions to climate hazards.

Outcome 1: Strengthened institutional capacity to use NbS to reduce risks associated with climate-induced socioeconomic and environmental losses

65. Under output 1.1 the project will assess the capacities related to: (i) planning, implementation, monitoring, learning and disseminating lessons for integrated landscape approach to control run-off, soil erosion, improved infiltration, soil moisture and more resilient grazing lands in the rural catchments; (ii) the use of urban green infrastructure to mitigate impacts of floods in urban areas. The assessment will be done in a gender responsive and inclusive process, guided by the stakeholder participatory plan and the gender strategy.

66. The assessment will identify gaps in skills, levels of awareness of the importance of NbS and hybrid measures in mitigating impacts of floods and droughts, data/information preventing/challenging effective utilization and/or innovation of NbS measures and technologies. The project will design a capacity building program to respond to the identified gaps, including production of protocols to guide implementation of various interventions.

67. Under outputs 1.2 and 1.3, the project will facilitate access to data and information to inform the development of 3 community-led, science-informed watershed/catchment level plans (1,2) and 3 urban area plans (1.3) for guiding the effective planning and implementation of NbS and hybrid measures to reduce the vulnerability of people, productive assets and livelihoods to the climate-intensified floods and droughts (and other relevant climate hazards). Resilience and NRM community structures will be empowered to play a leading role in the participatory planning, implementation and monitoring of catchment/watershed and urban greening plans (output 1.4).

68. The project will support implementation of selected NbS measures modelled and/or prioritized in the three critical baseline projects (Ministry of Water Resources and Energy (MWRE) with technical support from UNEP-DHI, the two city resilient plans for Jowhar and Beledweyne[53] produced by the United Nations Human Settlements Programme (UN Habitat)[54], and the adaptation action plan for LGs produced by the JPLG).

69. To ensure broad and inclusive participation in the community-based climate smart rangelands rehabilitation, the project will use a participatory rangeland management and planning approach using both the gender and

[53] Afgooye's resilience plan is set to be produced in 2024

[54][54] Pablo Fernández Maestre and UNHABITAT, 2020: Beledweyne Urban Profile Working Paper and Spatial Analyses for Urban Planning Consultations and Durable Solutions for Displacement Crises

community participation strategies to ensure that the needs and interests of women, youth, the disabled, and other marginalized stakeholders are fully understood and inform project decisions.

70. It will be particularly important to identify, through this planning process, any trade-offs, externalities and/or leakages[55], which might require special incentives and policy support. These will inform the formulation of incentives and policy measures to support wide scale uptake of NbS/hybrid measures, as well as the messaging (content) of the awareness raising/communications strategies (Outcome 3).

Outcome 2: Enhanced resilience of vulnerable rural and urban populations to droughts and floods through the adoption of innovative adaptation practices, tools and technologies

71. Innovative and proven NbS and hybrid technologies will be rolled-out and demonstrated in 3 rural catchments or watersheds per district, totalling 9 communities with 15,750[56] direct beneficiaries and 3 urban areas, selecting 1 neighbourhood per city—Jowhar, Beledweyne, and Afgooye- reaching an estimated total of 10,500[57] direct beneficiaries. We anticipate the deployment of these innovative technologies to directly benefit a cumulative total of 26,250 people across rural and urban areas.

72. Under this outcome, the project will provide financial resources and technical assistance to implement NbS and hybrid measures prioritized in community NbS plans from Outcome 1. Specific measures will be selected during the assessment and planning process, drawn from the catalogue for managing floods and droughts in Somalia and the resilience plans for Jowhar, Beledweyne, and Afgooye. These plans recommend green infrastructure to mitigate floods and droughts while enhancing biodiversity, food security, and income generation.

73. Green infrastructure will be implemented at the watershed level to protect rangelands, urban areas, and increase productivity. Under output 2.1, the project will establish 7-8 combined V-shaped weirs and sand dams equipped with solar pumping systems, elevated water storage tanks, shallow protected wells, and gravity-based water distribution systems for livestock and irrigation. The v-shaped weir and sand dams are described in the Baseline Section and shown on Fig. 3. The enhanced alluvial aquifer will improve water access for irrigation, livestock, and domestic use during dry seasons, mitigating drought impacts. The project will support water supply systems, including solar pumps and livestock watering troughs. Farmers will be encouraged to adopt climate-smart farming practices including drought-tolerant crops. Technical experts from the project management unit and relevant LG, FMS and the FGS will be engaged in community mobilization to provide technical inputs and help communities make informed decisions about NbS .

74. Under Output 2.2, the project will support agro-pastoralists and pastoralists in adopting climate-smart rangeland management practices on 4,000 hectares of rangelands through a learn-by-doing approach. Practices will include pastoralist/farmer-managed natural regeneration, optimal grazing intensity, silvopasture for animal nutrition, selective enrichment planting, and legumes planting to improve pasture quality. The project will promote the natural regeneration of indigenous grasses, shrubs, and trees by supporting the restoration of multi-purpose indigenous tree species in farmlands, pasturelands, and community-managed forests. This will involve protecting regrowth from the stumps of felled trees and new recruits of grass and shrubs from seedbeds. Regrown trees and shrubs will help restore soil structure and fertility, inhibit erosion and evaporation, rehabilitate springs and the water table, and increase biodiversity. Selection of grasses, legumes, and trees will follow protocols developed under Output 1.1. The project will collaborate with other initiatives in the target areas to leverage synergies.

75. Under output 2.3, the project will establish NbS structures in at least 130 ha58 to combat water erosion and protect land surfaces. These structures, including terraces, soil bunds, grass strips, and infiltration trenches, will follow protocols developed under output 1.1. Terraces convert steep slopes into flatter surfaces,

[55] Refers to a situation where securing adaptive capacity and resilience in one area weakens the same in another area of the unit of operation such as community, landscape, watershed, or region.

56 9 communities with an average 250 households per community and an average of 7 people per household = 15,750 people

57 3 urban communities with an average of 500 households per neighborhood and average of 7 people per household = 10,500 people

[58] To be confirmed during the development of the full project proposal

reducing slope length and gradient, thereby significantly decreasing sediment yield and runoff. They also alter hydrological paths, reduce connectivity, and increase catchment surface area, enhancing rain interception and flood peak discharge mitigation[59].

76. Under output 2.4, the project will establish at least 130 ha of flood control forests and hedge grow network in riverine areas, in line with the plan and protocols developed under activity 1.1. This will include riverine buffer forests, trees in open areas/streets, hedge grow fences around cropping areas, all of which will be strategically located to maximise reduction of floods. The SWALIM guidelines for selecting appropriate tree species will be applied and sustainability strategy will be formulated to ensure that seedlings planted survive beyond at least three years.

77. Under output 2.5, the project will demonstrate the effectiveness of sustainable urban drainage network in reducing incidents and intensity of floods. The project will therefore establish at least 100 km of strategically placed ditches, detention basins, retention ponds, water tanks for roof runoff and urban water harvesting structures, in line with the urban area plans and protocols developed under Outcome 1.

78. Under output 2.6, the project will raise awareness and demonstrate the effectiveness of waste management in reducing incidents and intensity of floods in urban areas. This initiative will require a specific sustainability strategy to ensure continuity after the project ends.

79. Construction of NbS and hybrid structures will leverage Cash for Work (CfW) approaches, building on successful models like those from the Somalia Cash Consortium and FAO[60]. Gender mainstreaming efforts under Outcome 4 will ensure equitable benefits from CfW, including women, men, the physically challenged, marginalized groups, and IDPs. Rigorous monitoring will address security risks associated with fund transfers and safeguard against corruption within the CfW framework.

Outcome 3: Enhanced policies, incentives and recommendations to promote the use of proven innovative NbS measures and soil carbon trading.

80. Output 3.1 aims to deliver recommendations on incentive packages and policy reforms at the FGS, FMS, and LG levels. A participatory, gender-responsive review of relevant policies in areas such as Environment and Climate Change, Public Works, Agriculture, Water, and Education will identify gaps and opportunities for integrating NbS and hybrid measures into development plans. Existing policies will be assessed to identify synergies or conflicts that impact the uptake and effectiveness of NbS measures. Incentive mechanisms will also be identified and evaluated in consultation with local communities and key stakeholders. The project will explore the potential of a soil carbon credit scheme in Somalia. This exploratory effort will include stakeholder consultations, awareness creation, feasibility studies, financial and economic assessments, cost-benefit analyses, site evaluations and an assessment of risks and barriers. Feasibility studies will examine the practicality and viability of the scheme in Somalia.

81. Under Output 3.2, the project will implement awareness-raising and advocacy strategies to mobilize public support and influence decision-makers. These strategies will be tailored to overcome specific barriers identified in Somalia, utilizing educational resources, events, media engagement, and digital platforms. The messages on recommendations will be informed by the evidence gathered to demonstrate the benefits of NbS in all relevant sectors (produced in conjunction with knowledge management activities under Outcome 4).

82. Overall, these outputs aim to foster an environment conducive to the replication and upscaling of NbS and hybrid solutions in Somalia. It is expected that the demonstration of such benefits will provide positive incentives for policy reforms for the betterment of mainstreaming NbS and strengthening disaster risk reduction, contributing to adaptive capacities and resilience. Ongoing monitoring and evaluation will ensure

[59] Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf
[60] https://www.calpnetwork.org/wp-content/uploads/2020/01/mercy-corps-guide-to-ctp.pdf (accessed on 27th Sept 2023).

the effectiveness of these efforts, supporting adaptive management and continuous improvement of the strategies implemented.

Outcome 4: Evidence generated to promote the replication and upscale of innovative adaptation NbS and hybrid solutions lessons M&E and Knowledge Management

83. For the successful execution of the project, it is crucial to adopt a participatory, gender-responsive, and inclusive approach, managing it adaptively and drawing insights from lessons learned in prior relevant projects and programs. To achieve this, the project will develop and implement a comprehensive stakeholder participation plan, aimed at identifying various stakeholder groups and addressing their specific needs. Additionally, a gender action plan will be devised to ensure the active involvement of diverse societal groups, with a special focus on marginalized communities, and to ensure the equitable distribution of project benefits. Furthermore, the project will create and employ a robust project monitoring and evaluation plan, as detailed in Part III-D, alongside a Knowledge Management (KM) plan outlined in Part II-H. These plans (Output 4.1) will contribute to the project's overall effectiveness and impact.

84. The knowledge products generated by the project (Output 4.2) will focus on deriving lessons learned and evidence through analysis and modelling. Specifically, the emphasis will be on assessing the cost-effectiveness and value for money of the innovative Nature-based Solutions (NbS) and hybrid measures. These knowledge products will be targeted towards national and sub-national governments as well as development partners, with the aim of advocating for the broader integration of NbS measures into development, resilience, and Disaster Risk Reduction (DRR) planning instruments. Additionally, they seek to encourage investments in NbS measures as a sustainable strategy for mitigating the impacts of recurrent flood and drought events in the Shabelle basin. By enhancing climate resilience, the project aims to contribute to the reduction of climate-driven population displacement and decrease the reliance on humanitarian assistance.

B. PROMOTING INNOVATIVE SOLUTIONS TO CLIMATE CHANGE ADAPTATION

Describe how the project /programme would promote new and innovative solutions to climate change adaptation, such as new approaches, technologies, and mechanisms.

85. The proposed project will promote the adoption, replication and scale up of innovative and proven NbS and hybrid solutions to support extremely vulnerable communities in Somalia adapt to the impacts of climate change, thus contributing to the Innovation Pillars of the AF MTS (2018- 2022 and 2023-2027). More specifically the project contributes to three of the Innovation Pillar results:

Result 2 - Successful innovation replicated and scaled-up

86. Innovative adaptation practices, tools and technologies that have demonstrated success in other areas of Somalia or other countries in the region will be replicated in the target area and scaled-up in a watershed/landscape approach in both rural and urban areas (Component 2). These includes the following innovative adaptation NbS and hybrid solutions:

a. Combined V-shaped weir and sand dams for controlling floods

87. The V-shaped weir, a long-standing tool for measuring small flows in open channels, is now utilized an efficient technology for flood peak reduction in Somalia, along with sand dams and sub-surface dams, which have been used for rainwater harvesting. This combination aims to control floods and enhance water availability, thus increasing resilience to climate change. Results indicate potential flood reduction of up to 60% in Qardho and 38% in Beledweyne. Efficiency varies based on event size, season, and area, with greater effectiveness in flashy flood areas. Trade-offs exist between infiltration and flood control, influencing design decisions based on local preferences and flash flood potential.

88. Additionally, alluvial aquifers upstream of sand dams will be equipped with protected wells, solar pumping systems, elevated tanks, and gravity distribution systems to improve community access to water throughout the year. Integration of renewable energy and climate-resilient hydrology infrastructure will mitigate flash flooding while increasing alluvial reservoir capacity during dry seasons. Enhanced water access will reduce reliance on expensive water trucking during droughts, improving household income and resilience

b. Community-based and climate smart rangeland management practices

89. Community-based management systems integrate local institutions, traditional practices, and knowledge into biodiversity and natural resource management. Although commonly used for conservation, its application as an adaptation tool, particularly in Somalia, is less common. In this project, it will be part of an integrated watershed approach to address floods and droughts, incorporating participatory planning and pastoralist-led rangeland regeneration. It will be one of several tools in an integrated watershed/catchment approach to address floods and droughts. The approach includes two innovative aspects: the use of a participatory approach to planning and management, and pastoralist-led rangeland regeneration.

90. The participatory approach empowers communities in rangelands to manage natural resources sustainably, reinforcing customary practices and promoting good governance. It enhances opportunities for women and minority groups to contribute to decision-making. Pastoralist-led rangeland regeneration employs proven methods of range re-vegetation, utilizing native species' adaptation to dryland conditions. It catalyzes the reestablishment of indigenous trees and shrubs, enhancing soil structure, fertility, erosion control, water retention, and biodiversity..

c. Green infrastructure in urban areas

91. Green infrastructure, such as waterways, wetlands, and woodlands, supports native species and ecological processes while mitigating disasters, particularly in urban areas. Despite its global success, Somalia has yet to widely adopt these measures. City Resilience Plans for Beledweyne and Jowhar cities identified NbS measures like riverine buffer forests, green parks, and sustainable drainage systems to enhance resilience against floods and improve environmental quality. Along with terraces and soil bunds on the rangelands, these innovative measures not only protect rural and urban populations and their assets from recurrent flooding but also offer additional benefits such as cleaner air, improved water quality, and habitats for biodiversity. Integrating green infrastructure in Somalia could significantly bolster resilience and quality of life while promoting sustainable development in both rural and urban settings.

d. Initiative to explore the potential of a soil carbon credit scheme in Somalia

92. This initiative will explore the potential for establishing a soil carbon credit scheme in Somalia, a country where no such project has yet been implemented. Given its exploratory nature, the activity will focus on generating feasibility studies and assessments, identifying risks and gaps, and ultimately helping the Somali government strategically position itself to benefit from carbon trading. The initiative will encompass the following key elements:

- **Stakeholder Engagement and Education**: Initial discussions with the Government of Somalia, Iroko Analytics, the United Nations Environment Programme (UNEP), and the International Organization for Migration (IOM) underscored the necessity of thorough stakeholder consultations with local organizations in Mogadishu. This engagement process is crucial for building trust, managing expectations, and securing buy-in for the project. Following these consultations, a comprehensive educational program will be implemented. This program will cover various aspects of carbon offset project management, including market dynamics, investor engagement, certification processes, and monitoring mechanisms.
- **Feasibility Studies and Business Models**: Following the educational phase, detailed feasibility studies will be conducted to assess the viability of the project. Based on the study findings, tailored business models will be developed to attract potential investors. These models will provide a structured approach to investment, highlighting the economic benefits and potential returns of the carbon credit scheme.

- **Farm Assessments**: In collaboration with local government authorities and communities, potential sites for the soil carbon credit projects will be identified. Initial farm assessments will involve the collection of baseline data on crop history, farming practices, and soil health. This data will be critical in formulating recommendations for agronomic practices that enhance soil health and promote carbon sequestration. The insights gained from these assessments will inform the overall strategy and implementation of the carbon credit scheme.

HOW THE PROJECT AIMS TO ROLL OUT SUCCESSFUL INNOVATIVE ADAPTATION PRACTICES, TOOLS, AND TECHNOLOGIES

Describe how the project/programme aims to roll out successful innovative adaptation practices, tools, and technologies and/or describe how the project aims to scale up viable innovative adaptation practices, tools, and technologies.

93. Innovative adaptation nature-based and hybrid solutions that have demonstrated success in other areas of Somalia or other countries in the region will be replicated in the target area and scaled-up in a watershed/landscape approach in both rural and urban areas. The innovative solutions (described in the section above) have been selected on the basis of their proven effectiveness to reduce flood risk and enhance water infiltration for improved resilience, water and food security in other similar contexts or at smaller scales. The proposed innovative solutions build on the learning and recommendations generated by previous programmes and are part of government-led planning frameworks designed with the participation of many relevant stakeholders, using the latest information available, thereby presenting the largely agreed programmes of work in adaptation. This provides legitimacy and great interest in the results of this project, hence increasing opportunities for further replication and scale -up.

94. Outcomes 2, 3 and 4 will provide the critical enabling conditions for scaling up through: (i) strengthening institutions, providing training, and building the capacity of communities, Civil Society Organizations (CSO), academia, and other authorities, as outlined in the stakeholder participation plan; (ii) incorporating NbS considerations into existing mechanisms, programs, and committees related to natural resources management, disaster risk reduction, adaptation, water resources management, planning, economic development, agriculture and livestock sectors; (iii) implementing an awareness and advocacy; and (iv) demonstrating the cost-effectiveness of NbS to create policy and investment incentives for their widespread adoption.

95. This will be complemented by a deliberate coordination of project interventions with existing programmes – particularly those on-going initiatives outlined in the baseline section – to avoid duplication, maximise synergies and sharing of experiences. The project steering committee and the project management unit will actively facilitate collaboration, coordination, and leveraging financial resources from other relevant programs and projects for mutual benefit.

C. ECONOMIC, SOCIAL, AND ENVIRONMENTAL BENEFITS TO BE DELIVERED BY THE PROJECT

Describe how the project / programme would provide economic, social, and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme would avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

Environmental benefits

96. Water management structures such as V-weirs, sand dams, terraces, and soil bunds play a crucial role in mitigating environmental challenges in Somalia. For instance, the combination of notch weirs and sand dams has demonstrated significant results: reducing floods by up to 60% in Qardho and up to 38% in Beledweyne, while enhancing infiltration rates by up to 118% at depths of 1.5 meters and 156% at 2 meters. These

measures will benefit approximately 15,750 people across targeted watersheds, ensuring improved water availability and reduced soil erosion. Sand dams, specifically, increase watershed water storage capacity, supporting vegetation growth and bolstering ecosystem resilience during drought periods.

97. Terraces have been shown to reduce both rate of run-off and sediment load by up to 30% in drylands[61]. They transform steep slopes into manageable flat surfaces, thereby increasing water and nutrient retention in terraced fields. This approach will not only enhances soil fertility but also facilitate revegetation efforts crucial for maintaining biodiversity in degraded environments. Biomass production on terraced fields has been shown to surpass that of non-terraced lands by 30% to 68%, underscoring the efficacy of these techniques in enhancing agricultural productivity and ecosystem health.

98. Furthermore, initiatives such as establishing riverine buffer forests, sustainable urban drainage networks, and waste minimization efforts will benefit approximately 10,500 people by regulating water supply, mitigating riverine floods, purifying water, reducing erosion, and creating habitats for biodiversity. These measures intercept rainfall, improve infiltration, and mitigate runoff, safeguarding water quality through sediment and pollutant filtration. Overall, community-based rangeland regeneration and soil carbon initiatives across 4,000 hectares will enhance ecosystem services for 17,250 community members, promoting denser vegetation, increased soil organic matter, and improved water regulation and erosion control. These efforts will contribute significantly to climate resilience and carbon sequestration, offering sustainable solutions to environmental challenges in Somalia.

Economic benefits

99. The implementation of NbS and green infrastructure projects will bring substantial economic benefits to vulnerable populations and urban residents. For the 26,250 vulnerable individuals and the technical institutions serving them, the economic advantages include preserving assets from destruction by floods and droughts, reducing costs associated with purchasing water, and improving health outcomes due to better access to water. Additionally, these communities will benefit from wages earned through work-for-cash programs used in constructing NbS measures and increased productivity of rangelands and agriculture. In the three target catchments, 15,750 people will benefit from increased quantities of accessible water, which enhances household health. For instance, properly maintained sand dams in Somaliland can cover 100% of the minimum domestic water needs (20 liters per person per day) during the 5-month dry season. Introducing mini-water supply systems with solar pumps, water storage, and reticulation for livestock and domestic use will reduce reliance on expensive trucked water and save labor, particularly for girls and women who typically collect water. Furthermore, this group of people will benefit from increased crop yields increased fodder from improved pastures, higher livestock productivity and survival, faster recovery from droughts.

100. An increase of one tonne of soil carbon in degraded cropland soils increase crop yield by 10 to 20 kg ha-1 for maize[62]. Adoption of terraces in Kenya increased yields by approximately 50%[63] in drylands while adoption of a broader set of sustainable land management practices increased yields by 242.09% in the considerably wetter district of Wundanyi[64]. Intercropping legumes with grasses improves soil fertility and forage quality, with crude protein content increasing from 7.1% to up to 14.3%[65]. This practice will enhance the digestibility of grasses and reduces production costs within 3 to 5 years due to increased organic matter and nitrogen-fixing bacteria, saving farmers between $20 to $48 per hectare, and up to $200 for specific legumes like Leucaena leucocephala.

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[61] Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf

[62] Sodhi and Ehrlich: Conservation Biology for All. http://ukcatalogue.oup.com/product/9780199554249.do

[63] Steenbergen, F. van, Tuinhof A., and L. Knoop. 2011. Transforming Lives Transforming Landscapes. The Business of Sustainable Water Buffer Management. Wageningen, The Netherlands: 3R Water Secretariat

[64] Mwamburi Mcharo, Marianne Maghenda, 2021: Cost-benefit analysis of sustainable land and water management practices in selected highland water catchments of Kenya. Scientific African, Volume 12, 2021, e00779, ISSN 2468-2276, https://doi.org/10.1016/j.sciaf.2021.e00779

[65] Macharia, P. N, et al, 2011: Innovations as Key to the Green Revolution in Africa 2011, pp 309-316: http://erepository.uonbi.ac.ke/handle/11295/45555

101. Urban populations, particularly the approximately 10,500 people targeted for green infrastructure projects, will also gain economically. Utilizing previously developed, underused, or neglected land for green infrastructure promotes job creation across various stages, including planning, design, improvement, development, and management. The rehabilitation, and restoration of urban forests and wetlands will stimulate economic activities like agriculture and forestry, creating livelihood opportunities for the urban poor. Moreover, green infrastructure will save resources by reducing the need for repairing damaged assets and rehabilitating infrastructure, offering a more sustainable approach to urban development.

The social benefits

102. The project in Somalia aims to reduce flood and drought vulnerability, increase year-round water availability, enhance food production and security, and improve health through better nutrition and water access. Key benefits include reduced displacement from climate impacts and improved water supply and sanitation, contributing to poverty alleviation and gender equality. Women and children, traditionally responsible for water collection, will significantly benefit, with improved water access reducing their time and effort spent on this task. This change enhances personal security, health, and economic productivity. Additionally, water availability can support small-scale vegetable gardening, boosting land productivity and food security.

103. The green infrastructure will benefit approximately 10,500 residents by creating safer residential areas, improving neighbourhood aesthetics, and providing cleaner air and water. These improvements are expected to decrease the incidence of waterborne diseases such as cholera, malaria, Rift Valley fever, and diarrhea. All 26,250 project beneficiaries will receive training and capacity building to engage effectively with local, regional, and national governments and regulators. The project will empower local committees and strengthen women's rights, enhancing their participation in decision-making and leadership roles. This empowerment is expected to lead to sustainable gender equality outcomes and better governance of rangelands. Additionally, inclusive participation of pastoralists in land-related decisions will improve rangeland productivity.

104.

Benefits of the AF project interventions to communities outside the intervention areas include:

105. Increased adoption of Nature-based Solutions (NbS) adaptation measures by communities beyond project sites through the integration of NbS considerations into all relevant policies and programs, accompanied by increased funding for NbS initiatives. Improved water quantity and quality for downstream users by implementing interventions that reduce soil erosion and enhance soil infiltration.

106. Significant cost savings at the FMS and FGS levels by preventing losses from droughts and floods. The destruction caused by the 2016-2018 drought was estimated at $1,175.5 million USD, excluding human and asset losses and food distribution costs[66]. The 2019 floods led to over $260 million in damages, requiring $350 million for recovery[67]. Reducing flood and drought impacts would redirect these savings to other development priorities, enhancing economic resilience and sustainability.

107. **Equitable access to project benefits:** The project will address climate change impacts on men, women, through a gender-responsive approach. Guided by the gender and social inclusion action plan developed under outcome 4, the project will ensure equitable access to project benefits. This includes marginalized groups like women, ethnic minorities and IDPs. Strategies will mitigate biases and historical disadvantages, promoting fair treatment. Efforts to shift gendered power dynamics will target societal norms and practices. Potential actions include quotas (e.g., 50% women, 30% youth, with 50% girls) in leadership and inclusive training approaches to enhance participation of underrepresented groups. Detailed strategies

[66] World Bank, 2020: Diagnostic study on trends and threats for environmental and natural resources challenges
[67] Word Bank, 2020: Somalia 2019 Floods Impact and Needs Assessment: https://documents1.worldbank.org/curated/en/764681585029507635/pdf/Somalia-2019-Floods-Impact-and-Needs-Assessment.pdf

will be outlined in the GASHPP.

D. COST-EFFECTIVENESS OF THE PROPOSED PROJECT

Describe or provide an analysis of the cost-effectiveness of the proposed project / programme

108. The project design and implementation arrangements were chosen to increase cost-effectiveness; in particular, four strategies will promote cost effectiveness: (i) building on NbS measures that have been tested and proven to deliver on mitigating droughts and floods; (ii) building on extensive lessons generated by similar projects to incorporate lessons to enhance successful implementation with assured results; (iii) choosing implementation arrangements that create partnerships that demonstrate comparative advantage, capacities and experience to deliver results cost-effectively; (iv) selecting project initiatives that deliver results at less cost than alternatives (in the absence of the project). These are described below.

109. The project's cost-effectiveness measured against project alternative is presented in the Table 5.

Table 4: Costs and Benefits of the AF Project and Alternative Interventions

AF Project interventions	AF Project cost	Tangible Adaptation Benefits	Loss averted	Alternative interventions & trade-offs
Controlling flash floods in the 3 catchments/waterrsheds while simultaneously increasing water availability (for domestic, livestock and mini irrigation) – construction of notch weirs with sand dams fitted with water reticulation systems including solar pumps (output 2.1)	US$ 1,000,000 for building combined notch weir and sand dams and water reticulation, solar pumps @ about US$ 125,000[68] for a medium sized combined structure fitted with solar pups and water reticulation systems. Benefits to about 15,750 people @ about US$ 63.5 per person (output 2.1);	Reduction in floods and soil erosion: (i) Peak flow reduction of 38% - 60%; Increased water availability for 15,750 people, livestock and agriculture: (i) Increased infiltration by up to 118% (at 1.5 meter) and 156% (at 2 meters); (ii) the maximum extractable volume of water at the beginning of the dry season in professionally constructed sand dams is theoretically sufficient to cover 100% of the minimum domestic water needs (20 l/p/d) during the 5-month dry season (150 days);	Loss will be averted associated with the costs of destruction of assets, infrastructure and livelihoods by repeat cycles of floods and droughts, at the household, community, regional and national levels (in both urban and rural areas). Per the WB[69], the following losses were expected to be averted via improving access to water in rural areas of Somalia - accrued over 15 years by a target population of 250,000 people; the AF project will avert similar costs at the project site, regional and national levels as follows: (i) Saving in labor and time to collect water, mostly by women with total discounted estimate of value of US$37; (ii) Savings	Build gray human-engineered solutions and infrastructure to control floods, such flood control dams and reservoirs, channel modifications, floodwalls, and levees **Trade off:** Cost – grey infrastructure is highly expensive and would require financial resources and expertise to build and maintain that the country does not yet have (since government is working hard to restore capacities lost during the many years of insecurity). Besides, many parts of the country still face insecurity, which may affect any build infrastructure. Furthermore, such grey infrastructure has limits and is being challenged by increased impacts of climate change. It is widely recognized that at the very least, a combination of grey, blue and green infrastructure provides optimum option for managing floods. On droughts and inadequate water, the alternative is a combination of continued drilling of bore holes, continued reliance on expensive tracking water for households and/or
Increasing resilience of 3 cities via	US$ 1,100,000 for establishing riverine buffer zones, tree	10,500 people in target urban areas will experience reduced flooding and therefore less		

[68] Sadar Engineers estimates the cost of a medium sized combo of sand dams and notch weirs fitted with water reticulation system is about US$ 125,000 – including the cost of designing the structures to meet specificities of each selected site.

[69] World Bank 2019: Somalia - Water for Agro-pastoral Productivity and Resilience - https://www.worldbank.org/en/news/loans-credits/2019/07/01/somalia-water-for-agro-pastoral-productivity-and-resilience-biyoole-project

implementation of NbS measures (riverine buffer zones, sustainable drainage and waste disposal piloted) (outputs 2.4, 2.5 and 2.6)	planting in strategic urban spaces, piloting sustainable drainage and waste minimization systems to reduce flooding- benefits about 10,500 people @ about US$ 105 per person (outputs 2.4, 2.5 and 2.6)	cost of damaged assets and reduced displacements of households due to climate hazards. They will have safer residential places secure from floods, improved aesthetic of neighborhoods, cleaner air and safer water, contributing to reduction in incidents of water borne diseases such as cholera, malaria, rift valley fever, diarrhea. Although data on benefits of green infrastructure for Somalia and indeed Africa are limited, according to the Coalitions for Urban Transitions[73] : (i) By 2050, investment in urban climate interventions in major cities in Ethiopia, Kenya and South Africa could deliver US$240 billion, US$140 billion and US$700 billion in benefits, respectively—equivalent to 250% of annual GDP (2020) in Ethiopia, 150% in Kenya and 200% in South Africa Soak-away gardens in Diepsloot (South Africa) have addressed challenges and risks from standing water and flooding by absorbing excess surface water[74]. The area was	from improved health due to WASH services, expressed in disability-adjusted life year with a total discounted value of up to US$32 million per year; (iii) Savings by the emergency response teams of up to US$918,000 by preventing instead of having to treat cholera and diarrhea in the target population (iv) Savings from avoided death of livestock - total discounted avoided loss of livestock value of up to US$92.7 million, using a conservative estimate of 20 animals lost per pastoral household per drought; (v) Considerable savings at FMS and FGS levels from avoided loss due to droughts and floods (for context, the 2016-2017/18 drought cost the economy an estimated1175.5 million USD, the 2019 floods cost the	building large dams for domestic, livestock and irrigation purposes. Trade-off – all the options are high cost. Furthermore, according to SWALIM[71], ground water is under heavy challenge from unregulated drilling of boreholes, berkads and other underground storage structures. A 2019 assessment of 1,270 sites in Somaliland and Puntland where over half the water sources are shallow wells showed that unregulated borehole drilling has led to groundwater sources becoming polluted - as well as over-exploited (ibid). Somalia has no large dams and the limited potential is likely to diminish if Ethiopia develops dams upstream of the Juba River (the challenge is that about 90% of the catchment for the only two permanent rivers lies outside the country's borders and the country is not engaged in cross-border catchment management programmes. Indeed the country Somalia does not have any large dams either for irrigation, hydro-electricity or water supply. There had been plans to build a dam on Juba River (Baardheere), which were abandoned in 2003 due to Somalia's internal problems.

[73] Coalition for Urban Transitions, 2023? - Financing Africa's Urban Opportunity - the 'Why, What and How' of Financing Africa's Green Cities

[74] Lombardía, A., Gómez-Villarino, M.T. Green infrastructure in cities for the achievement of the un sustainable development goals: a systematic review. *Urban Ecosyst* **26**, 1693–1707 (2023). https://doi.org/10.1007/s11252-023-01401-4

[71] Chen, C.; Noble, I.; Hellmann, J.; Coffee, J.; Murillo, M.; Chawla, N; 2021. University of Notre Dame Global Adaptation Index Country Index Technical Report

		prone to flooding due to the absence of formalised stormwater infrastructure. In Chicago, green infrastructure approaches diverted over 70 million gallons of stormwater from the central sewer system in 2009 (ibid)	economy more than US$260 million [70]). Additional loss will be averted by avoiding loss of assets and lives from floods, in both rural and urban areas; this cuts down the migration to the cities by rural people who lose their assets, becoming IDPs.	Intensify agricultural production through increased inputs of irrigation, pesticide, herbicide and fertilizer (crops) and veterinary drugs and store-bought processed feeds for livestock. Trade-offs: As stated above, the country has limited opportunities for large dams to support irrigation, other agricultural inputs of pesticides, herbicides and fertilizer, drugs and store-bought processed feeds are high cost. Effective use of these inputs requires intensive technical supervision and support from extension services, currently not available in the country, and which would have a huge cost implication for government if availed. Furthermore, very few households would afford these extensive options. Moreover, these options are increasingly portraying negative environmental impacts; and droughts and floods can still lead to failed crops and wipe off large numbers of livestock and assets. Common to all the above is the fact that the current level of economic development in the country, with huge
Restoration of rangelands increase productivity while controlling soil erosion – community based rangeland management, farmer/pastoralist managed regeneration, design of the soil carbon scheme that involves agreed improved management to	US$ 400,000 over 4,000 ha @ US$ 25 per ha (output 2.2). The cost of establishing terraces is about US$ 445 per ha in Kenya[75]. However, it is likely to be much more expensive in Somalia. Placing the terraces in strategic places, supported by extension work and the community based and farmer/pastoralist led regeneration will have an overall restorative effect on	Reduced soil erosion and consequent enhancement in soil fertility; (i) Up to 30% reduction in sediment load in the run-off on terraced fields76; (ii) 30% to 68% higher biomass on terraced fields[77] Increased productivity due to more fertile soils: (i) increased soil organic matter and carbon where an increase of one ton of soil carbon in degraded cropland soils may increase crop yield by 10 to 20 kg ha-1 for maize78;	Land depleted of vegetation cover cannot retain flood waters that wash fertile soil away nor can it support extensive pastoral livelihood systems. Degradation is accelerated by droughts. With the loss of animals to drought and poor performing crops, many communities tend to migrate out of rural areas, relying on humanitarian assistance from the diaspora or on non-sustainable	

[70] World Bank, 2020: Diagnostic study on trends and threats for environmental and natural resources challenges

[75] Mwamburi Mcharo, Marianne Maghenda, 2021: Cost-benefit analysis of sustainable land and water management practices in selected highland water catchments of Kenya. Scientific African, Volume 12, 2021, e00779, ISSN 2468-2276, https://doi.org/10.1016/j.sciaf.2021.e00779

[76] Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf

[77] Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf

[7878] Sodhi and Ehrlich: Conservation Biology for All. http://ukcatalogue.oup.com/product/9780199554249.do

build soil carbon (outputs 2.2 and 3.3)	large tracts of the rangeland (estimated to be at least 4,000 ha). The design of the soil carbon project (output 3.3) at a cost of US4 250,000 will benefit the country by providing an opportunity to debate and establish carbon trading policies. Eventual implementation of the project will earn communities revenues from the sale of the carbon (beyond the project) while contributing to regulating global climate regimes.	Reduced cost of production: (i) reduced production costs within 3 to 5 years as a result of increased organic matter and nitrogen fixing bacteria[79]; (ii) Nitrogen fixers can save a farmer US$ 20- 48 (and up to US$ 200 in the case of Leucaena leucocephala) – (ibid). Improved (quantity and quality) of pasture for livestock: (i) the crude protein content of grasses intercropped with legumes can increase from 7.1 to 14.3, 11.9[80], the grasses; Improved ecosystems functionality with higher provisioning abilities: (i) improved habitat for biodiversity, enrichment planting with indigenous an high value species improves biodiversity in tandem with economic value of the rangelands	extractive livelihoods – e.g. charcoal making for income. Food and nutrition security is low among rural households, which affects their overall health and productivity	development needs against a background of scarce domestic resources, against increasingly climate-intensified droughts and floods, NbS presents the best adaptation strategy due to it being 'low risk' or 'no regret' option that provides more positive consequences than those that are engineering-based. Furthermore, funding for climate change is scarce: in fact, adaptation to climate changes, although a recognized concern. It is not high on the list of government priorities given the multitude of immediate threats the country faces72. Limited government revenues further restrict funding for adaptation.

[79] Dumanski, J., R. Peiretti, J. Benetis, D. McGarry, and C. Pieri. 2006. The paradigm of conservation tillage. Proc. World Assoc. Soil and Water Conserv.P1: 58-6.
[80] Macharia, P. N, et al, 2011: Innovations as Key to the Green Revolution in Africa 2011, pp 309-316: http://erepository.uonbi.ac.ke/handle/11295/45555
[72] Adriana Quevedo, et al: Policy Brief -- Financing Climate Adaptation in Fragile States: A case of Somalia - https://www.sparc-knowledge.org/sites/default/files/documents/resources/financing-climate-adaptation-in-fragile-states-a-case-of-somalia-policy-brief.pdf

E. Consistency With National Sustainable Development Strategies and Action Plans

Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist. If applicable, please refer to relevant regional plans and strategies where they exist

110. The proposed project aligns with Somalia's 9th National Development Plan (NDP-9) 2021-2024, which emphasizes climate-smart practices, disaster management, water infrastructure, and renewable energy. It supports the National Adaptation Plan of Action (NAPA) by focusing on enhancing agriculture and food security. Somalia's NDC recognizes sustainable development, peacebuilding, and adaptation to climate change as top priorities. The project integrates these priorities by enhancing adaptive capacity and resilience, particularly for vulnerable groups. It aligns with the National Disaster Management Policy and Disaster Risk Reduction Strategy by utilizing NbS to mitigate flood and drought risks.

111. Furthermore, the project supports the Somalia Resilience and Recovery Framework (RRF), by focusing on long-term resilience and disaster risk reduction across various sectors. It also aligns with the National Biodiversity Strategy and Action Plan (NBSAP), recognizing biodiversity's role in climate adaptation and resilience. Additionally, the project complements the National Youth Policy and the Women's Charter for Somalia, by promoting youth participation, women's economic empowerment, and gender equality.

112. The Federal Government of Somalia has ratified several key Multilateral Environmental Agreements (MEAs), including the UNFCCC (April 2016), the Paris Climate Accord (April 2016), the Convention on Biological Diversity (September 2009), and the UNCCD (July 2002). This project supports Somalia's to honor its commitments towards these agreements by promoting NbS for ecosystem management, resilience building, and policy improvement.

113. The project addresses challenges identified in the UN Common Country Analysis (CCA), particularly climate change, environmental degradation, conflict, and insecurity. It targets the Shabelle River watersheds which is highlighted in the CCA as an area requiring urgent action. It is also aligned with outcome 3.2, 4.2 and 4.3 of the UN Cooperation Framework. UNEP, through a technical advisor, will ensure project coordination with the UN Resident Coordinator's Office, UN Country Team (UNCT), and SDG technical working groups, leveraging Somalia's recent admission to the East African Community.

F. National Technical Standards and Compliance with the Environmental and Social Policy of the Adaptation Fund

Alignment with national technical standards

114. Environmental policy and legislation in Somalia are under development. Federal laws and regulations for environmental and social impact assessments are yet to be adopted. The National Environmental Policy was approved by the Cabinet on February 13, 2020, and the National Environmental Act on November 26, 2020, both pending Parliament approval. Thus, there are no national technical standards for the AF project interventions. The project will follow locally accepted international industry practices and adhere to the Environmental and Social Policy Frameworks of the Adaptation Fund and UNEP. Additional environmental and social impact assessments will be conducted as needed.

G. Duplication of Project With Other Funding Sources

Describe if there is duplication of project with other funding sources, if any.

115. There is no project duplication. The AF project builds on lessons from previous and ongoing initiatives. Table 6 summarises recently completed, on-going or upcoming projects with relevance to the proposed AF project and identifies potential synergies.

Table 5: Learning Lessons and Collaboration with Other Projects and Programmes

Project & Funding Institution	Objective	Potential Synergies
Building Resilient Communities in Somalia (BRCiS) Phase 3 (on-going since 2013): Funded by UK and implemented by a consortium of eight national and international organizations[81]	BRCiS uses a bottom-up approach, which has helped build strong community structures to shape programming based on the needs of vulnerable populations. Phase 3 will focus on: improving health, food security, and nutrition; promoting local food production; enhancing livelihoods and financial inclusion; building resilience through access to assets; and fostering inclusive community leadership. By 2022, BRCiS had established 194 CRC and implemented early warning systems for climate hazards across 34 districts.	The two projects focus on reducing vulnerability of local communities, each addressing different aspects of resilience while sharing community-led regeneration and inclusive natural resource management strategies. It is unlikely that the two projects will overlap in the same geographic area. The AF project will capitalize on BRCiS's previous community mobilization efforts and utilize existing committees where suitable. It will adopt training tools developed by the BRCiS consortium as appropriate. Knowledge exchange will occur through platforms like the IGAD Support on Durable Solutions Platform, Somalia NGO Consortium, and peer learning forums on national adaptation planning. Participation in the Somali Resilience Innovation Hub (Somali RIHUB), Somali Response Innovation Lab (SomRIL)82, and PANORAMA will facilitate sharing lessons and experiences.
Somalia Water and Land Information Management (SWALIM - ongoing since 2001): Administered by the FAO, SWALIM is funded by the European Union, with contributions from the WB, the UK Department for International Development, and the US Agency for International Development	The project focuses on monitoring and preservation of water and land resources to support livelihoods throughout Somalia. SWALIM provides information on water and land resources, to inform planning and management, filling a critical gap, for which it is widely recognized. SWALIM operates the River Levels Flood Risk and Response Information Management System including monitoring river breakage, which it updates regularly and availed on line - http://frrims.faoswalim.org/rivers/breakages	The AF project will gather information from SWALIM to refine designs for notch weirs, sand dams, terraces, and soil bunds, and identify suitable areas for riverine buffer zones, hedgerows, and urban tree planting. Collaboration with SWALIM will also focus on sharing knowledge on NbS such as notch weirs and sand dams across different platforms.
Improving adaptive capacity via improved natural resources management and conservation (2023-2027): Funded by the GEF and implemented by IFAD, in partnership with Sadar	The project targets degraded areas in 5 districts including Beledweyne, and Hirshabelle State, aiming to restore land, conserve biodiversity, and enhance adaptive capacity through climate-resilient natural resource management. It focuses on improving water resources, eco-agriculture, and livelihoods, alongside forest restoration and governance for land degradation and	Both projects aim to enhance climate resilience in poor rural households through sustainable natural resources management, focusing on water management and rangeland restoration. While they won't overlap geographically, the AF project will collaborate in its development phase to maximize synergies. It will learn from IFAD's experience in implementing NbS and climate-resilient technologies, knowledge exchange will occur through partnerships with BRCiS.

[81] Norwegian Refugee Council (Consortium lead agency), Concern Worldwide, GREDO (National NGO), Action Against Hunger (USA), Save the Children, International Rescue Committee, CESVI (Italian NGO), KAALO Aid and Development (National NGO)
[82] https://www.somrep.org/somril

	biodiversity. One of the project outcomes is focused on NbS	
Sustainable Flood Management and Risk Reduction Action: Applicability of NbS for Flood and Drought Management in Somalia: Phase II.	The completed project created a catalogue of NbS for flood and drought management, highlighting notch weirs with sand dams for flood control and aquifer recharge. A new phase will expand research on NbS for water management, emphasizing flood reduction. It will integrate previous recommendations, using updated modeling with refined data sets.	There are a lot of synergies between the two projects. Apart from using information generated by the first phase, implementation of the AF project will be closely coordinated with the phase 2, once its design is completed. The nature and manner of collaboration will be detailed in the full project document of the proposed AF project, as it will become clearer on finalization of the Phase 2 proposal.
Somalia - Water for Agro-Pastoral Productivity and Resilience II (Barwaaqo): 2023 onwards. The project builds on a phase I (Biyoole) with same name which run from 2015-2022.	Objective: To develop water, agriculture and environmental catchment services among agro-pastoralist communities in dry-land areas of Somalia, focusing on Puntland, Galmudug and Southwest States. Component 1. Support development of multiple-use water sources, Component 2. Institutional and Capacity development, Component 3. Supporting sustainable land management and livelihoods development. Component 4. Project management, M&E, KM and learning and contingent emergency response.	The two projects validate the country's approach to increasing water catchment in the drylands through sand dams which have the potential to protect water from high evapotranspiration whilst supplying in small amounts water for both domestic and agricultural consumption
Building capacity for local governance in Somalia (on-going since 2008): It is a UN Joint Programme is a multi-donor, multi-partner programme that builds the capacity of LGs in Somalia.	The program aims to enhance local governance and service delivery in Somalia, focusing on Policy Reform, Capacity Development, and Inclusion, with emphasis on women and marginalized groups. A core component of the program includes forming District Councils and strengthening governance systems. In 2023, the JPLG developed an adaptation plan for local governments, emphasizing NbS to mitigate climate hazards like floods and droughts.	JPLG Phase 4 is under development. Synergies with the JPLG project are anticipated in policy reviews and implementation of LG adaptation plans, though currently unfunded. The adaptation plan has influenced the design of the proposed AF project. Coordination with JPLG during AF project formulation will update synergies, aligned with Phase 4 goals (focused on LG capacity development). Collaboration will continue during implementation to maximize synergies between the projects.
Saameynta: Scaling-up Durable Solutions for IDPs in collaboration (2022-2024). Funded by the Dutch Ministry of Foreign Affairs and partnering with the UN Development Programme (UNDP), UN-Habitat and the Regional Coordination Office (RCO), Swiss Development Cooperation UN-Habitat	Objective: Innovatively address Somalia's internal displacement challenges by seeking affordable and sustainable durable solutions. Pilot initiatives will be implemented in Baidoa, Beledweyne (Hirshabelle State), and Bossaso.Components: Strengthen local authorities' technical and institutional capacities to manage urban displacement; Enhance IDPs' tenure security; Improve institutional frameworks in target cities to implement a land value capture approach.	The Saameynta project will inform the development of the AF full proposal, particularly on issues related to implementation of NbS measures identified in the Phase II of the Durable Solutions project (MIDNIMO) for Beledweyne, Jowhar and Afgooye. Implementation of the AF project will draw lessons from these UN-Habitat projects and scale up successful elements as relevant.

H. Learning and Knowledge Management

Describe the learning and knowledge management (KM) component to capture and disseminate lessons learned.

116. Output 4.2 of the project focuses on systematizing learning. The Knowledge Management Plan will enhance the project's capacity to generate, utilize, and disseminate knowledge effectively. It will support evidence-based policy making, scaling up efforts, and fostering partnerships. Additionally, the KM plan will increase stakeholder awareness and visibility of project results and impacts.

117. Biennial forums at district and regional levels will facilitate knowledge exchange among stakeholders including Community Committees, government officials, NGOs, and community leaders on resilience and adaptation experiences. A key focus will be conducting cost-benefit analyses specifically tailored to innovative NbS and hybrid solutions, building on existing analyses for improved water access in Somalia. This information will inform policy advocacy and attract financing from development partners and the private sector.

118. The project will evaluate NbS interventions across different landscapes, employing rigorous monitoring and evaluation to assess performance. Lessons learned will guide adaptive management and contribute to global discussions on NbS and adaptation strategies. Specific recommendations will be developed for operationalizing carbon credit systems in Somalia and ensuring sustainable management of measures like tree planting and terracing.

119. Outcome 3 will produce a Financial and policy incentives necessary for increasing financial resources for wide scale replication and upscaling of NbS in Somalia.This will feed into the policy advocacy strategy. Knowledge products such as policy briefs, articles, impact stories, and educational materials will be disseminated through radio, television, websites, and social media platforms. These products will be shared globally on platforms like the Adaptation Learning platform, FEBA, UNEP Global Adaptation Network, and NbS knowledge platforms to facilitate knowledge exchange and replication of successful NbS practices.

120. Partnerships with international and Somali higher learning institutions will support research on NbS cost-benefit analysis, effectiveness conditions, and quantifying benefits. Effective implementation of the KM plan will be overseen by a designated M&E, Communication, and KM Specialist within the project team.

I. Consultative Process Undertaken During Project Preparation

Describe the consultative process, including the list of stakeholders consulted, undertaken during project / programme preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

121. During the development of the AF project proposal, extensive consultations were conducted in two stages under the leadership of Sadar in partnership with UNEP. The first stage, culminating in a draft Concept Note submitted to the AF in September 2021, involved broad stakeholder engagement at various levels, including federal, state, local government, and community levels. Workshops were conducted in Mogadishu and Jowhar, engaging the Directorate of Environment, MOWER, Ministry of Foreign Affairs, Ministry of Humanitarian Affairs, and Ministry of Agriculture. At the government and civil society group consultations, the gender participation ratio was approximately 25% female and 75% male.

122. Community consultations were held from July 27-29, 2021, in Jowhar, involving local authorities, community members, women, youth, and indigenous groups. These consultations included training sessions to formulate local resilience action plans. The participation ratio at these meetings was 35% women to 65% men, with efforts made to ensure comfortable meeting times and locations for both genders. Community members highlighted the necessity of building capacity to refine local resilience plans and the need for financial resources to implement interventions aimed at building adaptive capacity.

123. Further consultations involved international organizations and development partners such as the World Bank, IFAD, WFP, FAO, UNEP, UNDRR, Organization of Islamic Cooperation (OIC), King Salman Humanitarian Aid and Relief Centre (KSRelief), AfDB, and IGAD. The gender ratio for these consultations was 50:50. Additionally, consultations were held with international non-governmental organizations (INGOs), including the Somalia Resilience Program (SomRep) consortium and the Building Resilient Communities in Somalia (BRCiS) consortium. National and local NGOs, such as Save Somali Women and Children (SSWC), Wajir South Development Association (WASDA), WARDI Relief and Development Initiative, and Somali Women Studies Centre (SWSC), were also engaged.

124. The second stage of consultations commenced in July 2023 to update the baseline scenario and gather new information for the concept. This stage involved discussions with the Federal and State Ministries of Environment and Climate Change, UNEP-DHI, BRCiS, UN Habitat, and SWALIM. These consultations aimed to develop a detailed understanding of the impacts of climate hazards on livelihoods, current policies and incentives for the uptake of NbS measures in adaptation, and the challenges and opportunities associated with the use of NbS in adaptation.

125. Key concerns raised during the consultations included increased frequency and incidence of droughts and floods, the lack of adequate understanding and capacity among communities to handle climate hazards, and misconceptions about NbS and the lack of evidence regarding their effectiveness. These concerns have been integrated into the design of the project.

J. How the Project Draws on Multiple Perspectives on Innovation

Describe how the project draws on multiple perspectives on innovation from e.g., communities that are vulnerable to climate change, research organizations, or other partners in the innovation space

126. The project design draws on multiple perspectives on innovation, primarily from researchers, technical staff of partner organisations and institutions in the form of experiences from other projects and communities, as detailed below.

Researchers:

127. The project heavily relies on research undertaken by two groups of researchers: the Ministry of Water Resources and Energy (MWRE) with technical assistance from the UNEP-DHI, and UN-Habitat's work on resilient cities in partnership with the LGs of Jowhar and Beledweyne. MWRE research focused on flood management strategies, flash flood risk assessments, and NbS for flood and drought mitigation. This research yielded a catalogue of tested NbS measures, identified notch weirs and sand dams as highly effective for aquifer recharge and flood mitigation, and developed prioritization indicators for NbS based on flood mitigation potential. These findings have directly influenced the project's NbS measures.

128. UN-Habitat conducted risk analyses for Jowhar and Beledweyne, focusing on flood-prone areas, including IDP areas. They recommended short, medium, and long-term interventions to reduce vulnerabilities and increase resilience at various scales—from peri-urban areas to neighbourhoods. The project's Outcome 2 interventions directly stem from the short-term recommendations.

129. Technical staff from partner organizations, including line ministries, development partners,

SWALIM, and NGOs like Sadar, provided inputs based on their knowledge of climate change challenges and adaptation in Somalia. These views were obtained during the consultation process of project design. The conclusion from these discussions was that NbS indeed provides a 'low risk' or 'no regret' option for the country.

Lessons from other projects:

130. The project has been informed by several lessons from similar initiatives, particularly focusing on generating carbon credits from soil carbon. It will leverage experiences from initiatives such as the Northern Rangeland Trust of Kenya[83], and Boomitra[84], during the project's formulation and implementation phases. The scheme has two objectives: (i) to empower resource-poor pastoralists and agro-pastoralists by enabling them to build and sell carbon assetsin a manner that regenerates land and soils while providing financial incentives for sustainable practices, and (ii) to assist the Ministry of Environment and Climate Change, along with other relevant institutions, in establishing the necessary conditions and policies for effective carbon trading regulation. Given the long-term nature of soil carbon projects (30+ years), the project will primarily focus on designing the scheme and facilitating stakeholders to develop a forward-looking strategy.

Communities:

131. Vulnerable communities have played a significant role in identifying innovative adaptation measures that have in turn informed the design of this project. Draft community resilience plans, formulated with technical support from Sadar during the initial project design phase, will guide the formulation of watershed/catchment plans under Outcome 2 once intervention areas are identified.

132. The project design has particularly been informed by the Building Resilient Communities in Somalia (BRCiS) program, which emphasizes a learning-by-doing approach and community-led interventions. BRCiS has committed to a bottom-up decision-making model, empowering existing community structures to ensure that programming addresses the needs of vulnerable populations. By the end of its second Phase in 2022, BRCiS had established 194 Community Resilience Committees (CRCs) across 34 districts[85]. These CRCs serve as the core for volunteer committees and associations, representing community members in decision-making processes. This approach has made the program flexible and responsive to community needs and experiences. This project will adopt this bottom-up, learning-by-doing model wherever relevant, thereby providing further opportunities for communities to continue to innovate on adaptation.

K. JUSTIFICATION FOR FUNDING REQUESTED, FOCUSING ON THE FULL COST OF ADAPTATION REASONING.

133. Funding is requested to enable rural communities in three catchment/watersheds and urban areas in three cities in the Shabelle basin to effectively utilize proven and readily available (and much needed) NbS and hybrid measures to tackle climate risks; to protect productive assets, livelihoods and the economy from the current high exposure to alternating cycles of floods and droughts. The ineffective use of these measures has left the communities in the Shabelle basin, and indeed the country, highly vulnerable to the negative impacts of climate change, weakening their abilities to cope with projected climate driven hazards, such as more intense and more frequent floods and droughts. The total funding required for this project is US$ 5,000,000 including project management and project execution fees. The adaptation reasoning for each of the project component and Component s is described below.

[83] https://native.eco/project/northern-kenya-rangelands-project/ , https://www.zawya.com/en/press-release/companies-news/worlds-largest-soil-carbon-project-in-kenya-receives-award-during-cop27-dic30pc7 , https://www.nrt-kenya.org/carbon-project)
[84] https://boomitra.com/soil-carbon-removal-project-kenya-smallholder-farmers/
85 Norwegian Refugee Council, 2022: End Term Evaluation Report for – Building Resilient Communities in Somalia, Phase 2.

Component 1: Capacity building for the replication and upscaling of innovative NbS and hybrid technologies in Somalia

Baseline (without AF Resources):

134. The Shabelle basin, an important agricultural area in Somalia, faces recurrent droughts and floods. Climate projections for 2050 and 2070 indicate increased threats to development and livelihoods due to climate extremes, underscoring the urgent need for climate-smart adaptation in national strategies. The basin's climate change impacts are worsened by insecurity and land degradation, driven by droughts, floods, unsustainable resource exploitation, overgrazing, tree cutting, poor agronomic practices, and uncertain land tenure.

135. The entire Somali population is vulnerable to climate hazards, with women and children being the most affected due to cultural norms that limit their social status, decision-making roles, and access to resources. Minority groups in the South, such as the Bantu, Benadiri, and Occupational Groups, also face high vulnerability. NbS and hybrid measures are vital for addressing climate hazards in Somalia, given the high dependency on natural resources and low capacity for costly adaptations. However, scaling up and replicating NbS is challenging due to inadequate technical capacities for planning, implementation, and maintenance. This is exacerbated by the loss of capacities due to decades of instability (1991-2012). Newer states like Hirsabelle and the Southwest have lower capacities compared to older states. Additionally, NbS knowledge is confined to a few institutions and has not reached decision-makers, resource managers, or communities effectively, limiting the implementation of effective climate risk mitigation strategies in the Shabelle basin.

Additional (with AF Resources of US$ 625,000:

136. The AF investment will enhance the capacity of communities, government institutions, civil society organizations, and academia to replicate and upscale proven NbS to mitigate flood and drought impacts, benefiting about 26,250 people in rural and urban areas. Skills and information will support stakeholders in rural communities to develop action plans for integrated runoff control, soil erosion prevention, improved infiltration, soil moisture management, and resilient grazing lands in three target rural catchments.

137. Activities will result in technical protocols and a local enabling framework guiding Component 2's implementation. Urban communities will refine city resilience plans and develop action plans to control urban flooding. To ensure effective community participation, 12-15 community committees will be empowered with structures, awareness, and knowhow for planning, implementing, and monitoring catchment/watershed and urban greening plans, incorporating existing committees where possible. A GASHPP will guide the project, ensuring equitable contributions and benefits across social groups.

Component 2: Protection of productive asset, livelihoods and economies by innovative and proven adaptation NbS and hybrid technologies

Baseline without AF investment:

138. The Shabelle basin communities depend heavily on rain-fed agriculture, making them highly vulnerable to climate hazards. Climate change impacts, such as declining water resources and reduced agricultural productivity, are already evident[86]. Urban populations in riverine areas like Beledweyne, Jowhar, and Afgooye face heightened risks due to concentrated people, infrastructure, and assets. Rapid urbanization and large numbers of internally displaced persons (IDPs) exacerbate these risks. By September

86 Federal Directorate of Environment and Climate Change, 2020: Somalia National Climate Adaptation Strategy

2023, Beledweyne had 91 IDP sites hosting 53,840 individuals[87]; Jowhar had 21 IDP sites hosting 11,100 households or 76,960 individuals, while Afgooye had 52 IDP sites hosting 10,105 households or 57,753 individuals[88].

139. Historical floods have significantly impacted these cities, with major events recorded in Beledweyne in 1961, 1977, 1981, 1997, 2005, 2006, 2016, 2018, and 2019. In Jowhar, clogged river channels and poor river management have turned even minor rains into floods, while dry season water flows are diminished due to upstream damming and overuse.

140. Adaptation measures, particularly NbS, can help in mitigating floods, controlling soil erosion, and enhancing drought resilience. However, traditional knowledge on NbS has diminished, especially as 60% of the population is under 35. Effective adaptation requires a combination of technical and traditional practices, yet both are currently underutilized, and evidence of their effectiveness is limited.

Additional (with AF Resources of US$ 2,700,000):

141. The AF investment will implement concrete NbS measures under component 2 benefiting 26,250 people (15,750 rural, 10,500 urban). Seven combined V-shaped weirs and sand dams will control floods, reducing peak flow by 38-60% and increasing infiltration by up to 156%. These dams will meet 100% of domestic water needs during the 5-month dry season. Solar pumps will harvest and store water for domestic, livestock, and irrigation use.

142. The minimum 4,000 ha of rangelands put under climate smart management practices will enhance ecosystems functionality. Benefits from such measures have been demonstrated up to 30% reduction in sediment load in the run-off on terraced fields89; 30% to 68% higher biomass on terraced fields90. Furthermore, an increase of one ton of soil carbon in degraded cropland soils may increase crop yield by 10 to 20 kg ha-1 for maize91. Urban areas will benefit from a 130 ha sustainable drainage network and waste minimization, reducing flooding by up to 50%. Additionally, 100 ha of flood control forests and 130 ha of hedge networks will be established.

143. Urban tree canopies delay stormwater runoff by up to 3 hours and increase soil infiltration by 69-354%. Collectively, these measures will reduce flood severity, enhance water availability, and increase rangeland productivity. Although cost benefit analysis will be undertaken to confirm and provide evidence, the World Bank estimates a return of $5.85 million per $1 million invested in similar projects. These efforts will boost adaptive capacity, resilience, and reduce climate-related displacement and associated humanitarian costs.

Component 3: Improved enabling environment for increasing financial resources for replication and upscaling of NbS and hybrids for adaptation

Baseline without AF investment:

144. An enabling environment is critical for the effective replication of NbS measures in Somalia. In addition to capacities, knowledge and plans provided under Component 1, replication should be enabled by policies and financial incentives. Policy incentives are particularly necessary because NbS delivers both private and public benefits, meaning market forces alone are unlikely to result in a societally optimal

87 CCCM Cluster SOMALIA, 2023: file:///C:/Users/Admin/Downloads/Belet%20Weyne%20IDP%20Site%20Verification%20-%20Sep%202023.pdf

88 https://reliefweb.int/report/somalia/somalia-verified-idp-sites-afgooye-october-2023

89 Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf

90 Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf

91 Sodhi and Ehrlich: Conservation Biology for All. http://ukcatalogue.oup.com/product/9780199554249.do

adoption of even the most promising approaches[92]. Despite recognizing the potential of NbS in mitigating climate hazards, Somalia struggles with widespread poverty, particularly affecting rural households and IDP settlements. Nearly 70% of Somalis live below the poverty line, and financial resources at all levels of society are constrained. The country's National Development Plan highlights a need for $58.5 billion to implement adaptation priorities, underscoring the severe financial and technical constraints.

145. Moreover, inadequate policies and incentives hinder the adoption of NbS. There is limited awareness of cost-effective NbS measures and insufficient collaboration across governmental departments. Political will and long-term commitment to sustainable practices are lacking, with immediate threats taking precedence over long-term environmental concerns. The two decades of instability (1991 – 2012) resulted in serious erosion of governance structures and policies in Somalia, both at the national and local levels. Addressing these challenges requires enhancing policy frameworks, creating financial incentives, and fostering cross-sector collaboration to mainstream NbS into adaptation strategies effectively.

Additional (with AF Resources of US$ 500,000):

146. The AF investment aims to establish policies, incentives, and coordination mechanisms across departments and sectors to support sustained use of NbS in adaptation. Reviews of federal, member state, and local government policies will identify gaps and opportunities for integrating NbS and hybrid measures into relevant projects. Key policy areas include Environment and Climate Change, Public Works, Planning, Investment, Agriculture, Water, Livestock, and Education. Recommendations from these reviews will inform advocacy campaigns. The soil carbon credit scheme will provide financial incentives for NbS adoption and enable policy development for carbon credits trading. Public awareness campaigns and advocacy strategies will promote NbS-friendly reforms and enhance collaboration among departments. Stakeholder participation and gender strategies will ensure diverse perspectives are considered, shaping inclusive policy and incentive packages that meet societal needs.

Component 4: M&E and learning:

147. ***Baseline, without AF investment:*** Recognition of the value of NbS has grown in recent years, at local, national and international, as reflected in an expanding number of commitments, expressions of support and policy statements from many countries and organizations across the world[93]. In Somalia, this is marked by inclusion of NbS-type measures in the NDC and the NAPA, and the research on NbS measures for managing droughts and floods[94]. However, as reported by UNEP, scepticism about NbS still lingers globally[95], and in Somalia. Questions remain about their effectiveness in different circumstances and in addressing urgent challenges, partly due to the fact that measuring the impacts of NbS to provide evidence of their effectiveness is still a challenge, compounded by a lack of on-going monitoring and evaluation for NbS interventions[96]. Indeed, an exercise to compile evidence base for NbS undertaken by Nature Network identified a series of gap-areas (Table. 7 of the Annex of Figures). These gaps are still huge in Somalia, making it difficult to convince policy makers and relevant stakeholders to invest the scarce resources available in these still largely "unproven" technologies.

Additional with AF investment of US$ 400,342

148. AF investments will enable the project to systematize learning to capture lessons and generate evidence needed to trigger in-country policy reforms as well as share these lessons globally to continue to close the knowledge and evidence gaps. The learning mode adopted for the implementation of the project,

[92] Iseman, T. and Miralles-Wilhelm, F. 2021. Nature-based solutions in agriculture – The case and pathway for adoption. Virginia. FAO and The Nature Conservancy. https://doi.org/10.4060/cb3141en
[93] United Nations Environment Programme (2022). Nature-based Solutions: Opportunities and Challenges for Scaling Up. Nairobi
[94] Ministry of Water Resources and Energy and UNEP-DHI, March 2022: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia
[95]. United Nations Environment Programme (2022). Nature-based Solutions: Opportunities and Challenges for Scaling Up. Nairobi
[96]

together with the deliberate effort to generate lessons on important aspects will improve the project's ability to generate, use and share knowledge. Lessons will be learned from within the project as well as from other projects and their experiences. Lessons will be documented and shared widely, targeting the following groups: project beneficiaries, NbS and adaptation communities at the country and global levels, relevant government ministries and the general public. Lessons will specifically be generated around the topics such as (details under KM Section) cost benefit analysis of NbS measures in adaptation; optimum conditions for the successful implementation of NbS measures; sustainability of NbS measures under the current context in the country; and, financial and policy incentives necessary for increasing financial resources for wide scale replication and upscaling of NbS in Somalia.

L. PROJECT SUSTAINABILITY

Describe how the sustainability of the project outcomes has been taken into account when designing the project.

149. The project results and impacts will be sustainable in all institutional/policy, social, environmental, technical and economic dimensions as explained bellow.

Institutional sustainability:

150. The project aims to enhance the capacity of local communities and technical institutions in Somalia to implement and sustain NbS. Under Outcome 1, resources will be allocated to assess and address capacity gaps necessary for scaling up NbS measures. This includes community mobilization, training for community groups, and technical staff from relevant ministries and civil society organizations. Output 1.4 focuses on empowering 12-15 community committees with the skills and structures needed for effective participation in planning, implementing, and monitoring catchment/watershed and urban greening plans. Additionally, the project plans to enable resource-poor pastoralists and agro-pastoralists to participate in a 30+ year scheme, involving the sale of carbon assets to regenerate land and soils. A stakeholder participation plan ensures consultation, continuous engagement and buy-in of all relevant social groups throughout project formulation and implementation, fostering ownership and sustainability. Collaborations with key institutions like SWALIM and universities will provide ongoing support and information maintenance post-project. Furthermore, an exit strategy (to be designed under outcome 4) will ensure the sustainability of infrastructure developed under the project, detailing how ecological assets will be maintained over time. This comprehensive approach will promote long-term sustainability and replication of NbS initiatives across Somalia.

151. **Financial sustainability:** Mainstreaming of NbS considerations in all sectors and evidence generated on cost-effectiveness of NbS and hybrid measures, which are likely to incentive financing y development partners and investment from private sector, may increase resources available for adaptation. Furthermore, the empowered gender responsive and inclusive mechanism for promoting mainstreaming and cross sector coordination on NbS, together with skills, institutional capacities and incentives for the uptake of NbS will provide more resources (including finances and partnerships), which will support the sustainability of the NbS and the resilience of livelihoods and economies the project seeks to deliver. The carbon credits initiative to be developed by the proposed project, together with the exit strategy explaining how the ecological infrastructure developed during the project will be maintained through time, will increase financial sustainability of the results delivered via the project.

152. **Environmental sustainability:** Well planned, professionally executed and maintained NbS technologies are environmentally sustainable by nature. Indeed, NbS by definition helps societies to meet today's needs for adaptation and mitigation without compromising the ability of future generations to meet their needs. Indeed, they allow communities to meet these needs while promoting the ability of ecosystems to continue the regeneration of the services without harming other important aspects of environmental sustainability such as biological diversity, emission's reduction and land degradation neutrality. The NbS measures to be supported by this project, including V-weir and sand dams, terracing, soil bunds, riverine buffer zones etc., will address major social, economic and environmental challenges, such as biodiversity loss, climate change, land degradation, desertification, food security, disaster risks, urban development,

water availability, poverty eradication, inequality and unemployment, and contribute to human health[97]. The stakeholder-driven design and implementation of the NbS and hybrid measures to be adopted by the project will be informed by scientific assessments. The actual building of the NbS infrastructure will be guided by technical standards and protocols developed under Output 1.2 to ensure high level functionality in addressing floods and droughts in effective and efficient manner, in the short and long-term.

Social and economic sustainability:

153. The project's design was informed by extensive stakeholder consultations to ensure all segments of society contributed to and understood the project. Implementation strategies will include a Stakeholder Participation Plan, Gender Mainstreaming Plan, and Environmental and Social Management Plan (ESMP). These plans are integral to the project's detailed document, ensuring:

a) Marginalized groups (IDPs, indigenous, disabled, women, youth) are equipped to overcome barriers, participate fully, and influence project processes, addressing systemic inequalities and promoting inclusivity.
b) The ESMP will evaluate social impacts (positive and negative), and ensure inclusive implementation, empowering community committees The project will engage in social procurement, by using cash for work, which will create employment for local people, using the stakeholder participation and gender mainstreaming plans.

Drawing on international best practices, the project aims to enhance social sustainability by fostering inclusive societies, empowering citizens, and building resilient communities in line with global standards.

M. Environmental and Social Impacts and Risks Identified

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
ESP 1 Compliance with the Law.	x	All the project activities have been designed to comply with relevant national laws, regulations and policies. During the project inception and implementation phase both local and national stakeholders will be consulted to ensure that all relevant legal requirements are met.
ESP 2 Access and Equity		The project aims to enhance resilience and reduce vulnerability among marginalized groups like women, the disabled, youth, and historically marginalized communities such as Bantu, Benadiri, occupational groups, and IDPs. It will prioritize equitable participation through gender-responsive and inclusive approaches guided by stakeholder participation and gender mainstreaming plans. Cash-for-work initiatives will adhere to Somalia Cash Consortium and international guidelines, including the Mercy Corps Guide to Cash-for-Work Programming and FAO's Cash-for-work in Somalia: Linking Relief to Recovery. Furthermore, community committees formed under Outcome 1 will ensure representation of all groups in project processes, including policy reviews and the development of incentives for scaling up NbS interventions. These efforts will promote broad community engagement and benefit distribution.

[97] United Nations Environment Assembly of the United Nations Environment Programme, 2022: Resolution adopted by the United Nations Environment Assembly on 2 March 2022 - https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/Nature-Based%20solutions%20for%20supporting%20sustainable%20development.%20English.pdf

ESP 3 Marginalized and Vulnerable Groups		While acknowledging that the entire population of Somalia is vulnerable to the impacts of climate change, the NAPA[98] identified women, youth, IDPs and the rural population, particularly the pastoralists, as highly vulnerable. To ensure that these groups in the targeted communities are fully engaged with the project, implementation will be guided by the stakeholder participation and gender mainstreaming plans, which will be designed during the project inception phase. The provisions of this ESMP will be integrated into the stakeholder and gender mainstreaming plans, and will be integral part of the full proposal.
ESP 4 Human Rights	X	No further assessment of potential impacts and risks is required for compliance with human rights since the project is designed to respect and adhere to the requirements of all relevant conventions on human rights in compliance with the ESP. As UN organization UNEP is committed to support the realization of the United Nations principles expressed in the Universal Declaration of Human Rights and the toolkits for mainstreaming employment and decent work. No activities will be proposed that could present a risk of non-compliance with either national requirements relating to Human Rights or with International Human Rights Laws and Conventions.
ESP 5 Gender Equity and Women's Empowerment.		The project will integrate women into all activities, including water resources, agriculture, and NbS subprojects, guided by gender mainstreaming and stakeholder participation plans. The project aims to include women in local decision-making bodies and project governance. The gender mainstreaming plan will identify opportunities and challenges to ensure full participation of women and marginalized groups, with child-friendly schedules, culturally respectful consultations, and women's inclusion in project leadership and staffing. These efforts seek equitable access to project benefits and enhance gender equality in project implementation
ESP 6 Core Labor Rights		The Labor Code of the FGS, elaborated in 2018 with ILO support, is still at a draft level. UNEP will ensure that the project will fully comply with relevant labor laws guided by the ILO labor standards. The ESMP will refer explicitly to the obligation for the contractors to comply with the requirements relating to the safety of workers in accordance with ILO Convention insofar as they are applicable to the project. Activities throughout the project are targeted at reducing inequality and raising gender awareness for gender equality to overcome traditional stereotypes regarding the role of women in society. Positive discrimination in favor of women will be used to provide fair and equal opportunity to women who seek employment as labor and gain from wages earned.
ESP 7 Indigenous Peoples		The World Directory of Minorities and Indigenous Peoples99 recognizes 'Bantu' groups - Gosha, Shabelle, Shidle and Boni - collectively known as (Wa) Gosha (literally, 'people of the forest') as the principal non-Somali minority group in the country, who live in the Lower Juba Valley and the Shebelle Valley; and who speak a Bantu language. Other groups are Asharaf and Bravanese, also based in Southern Somalia. During the civil war many members of these communities were displaced and a large number are still based in IDP settlements, where they face renewed discrimination in IDP camps, with numerous cases of rape of Bantu women, who are not protected by traditional clan structure in the camps (ibid). There are also very small Christian minority, comprising first- or second-generation converts from Islam, who are under extreme threat, especially with the presence of al-Shabaab[100.] The project will prioritize stakeholder participation in line with the stakeholder engagement plan to address discrimination faced by minority groups integrated into Somali clans. This Plan, developed during project design, will be reinforced by the

[98] Federal Republic of Somalia Ministry of National Resources, 2023. National Adaptation Action Plan
[99] Minority Rights Group International, *World Directory of Minorities and Indigenous Peoples - Somalia: Bantu*, March 2018, available at: https://www.refworld.org/docid/49749cae2.html [accessed 11 October 2023]
[100] https:// minorityrights.org/country/somalia/#:~:text=Most%20conventional%20descriptions%20of%20Somali, part%20of%20the%20Dir%20clan

		ESMP. Both plans will assess stakeholders, engage diverse groups, and mitigate environmental and social impacts effectively.
ESP 8 Involuntary Resettlement	X	No risk The subprojects' components will not involve activities potentially leading to involuntary, physical or economic resettlement of any people settled in or using the area of influence of the project. This issue will be re-examined at the point of formulating the ESMP.
ESP 9 Protection of Natural Habitats		The project is designed to avoid negative impacts on critical natural habitats, including legally protected areas, proposed protected areas, high conservation value sites, and habitats protected by indigenous communities. The ESMP will identify and monitor critical habitat areas to ensure project activities do not encroach upon or convert natural habitats. Guidelines and selection criteria will exclude interventions near protected areas. Subprojects will be located away from areas designated for biological conservation or potential critical habitat, in alignment with IFC PS6 (IFC, 2012).
ESP 10 Conservation of Biological Diversity		Somalia joined the Convention on Biological Diversity as its 193rd Party in December 2009. The project will align with the CBD and Somalia's 2015 National Biodiversity Strategy and Action Plan. While not focused on biodiversity conservation, NbS measures in the project will enhance habitats without harming biodiversity. Activities such as revegetating riverine forests and installing terraces, check dams, and weirs will promote vegetation regeneration and improve micro-ecosystems, supporting biodiversity recovery. Indigenous, non-invasive species will be prioritized for planting. Excavation and sediment removal linked to project components like V-weirs, sand dams, terraces, and soil bunds will have minimal impact, avoiding protected areas and biodiversity hotspots. Detailed mitigation measures will be outlined in the ESMP.
ESP 11 Climate Change		The project aims to equip communities with tools and resources to manage climate-intensified floods and droughts without promoting climate change drivers. Activities align with priorities in the NAPA and NDC, focusing on sustainable land management, food security, integrated water management, and reducing risk for vulnerable populations from natural disasters. The project directly implements adaptation measures outlined in the NAPA for Agriculture, Food Security, Water, and Natural Disasters sectors. However, further changes in the climate could reduce the positive impacts of NbS on reducing the vulnerability of people, productive assets and livelihoods to the intense climate hazards.
ESP 12 Pollution Prevention and Resource Efficiency		The project will not pose any significant risks to resource efficiency (water) or pollution risks. The limited use of pesticides in certain circumstances cannot, however, be ruled out completely. In order to, where possible comply with international good practice and in the context of the increasing controls on pesticide use (e.g. by WHO) should its use, even limited quantities, be anticipated, conditions should be set out in a pesticide management plan which should cover amongst others: alternative approaches (e.g. organic approaches); approved substances; protection of ecosystems, permitting and other requirements of national authorities. These mitigation measures will be outlined in the ESMP.
ESP 13 Public Health		Access to safe water from sand dam reservoirs will directly benefit health by providing clean water for drinking, cooking, and hygiene. NbS will increase food production, improving food security and nutrition. However, potential COVID-19 outbreaks, along with regular occurrences of cholera and measles in Somalia, pose health risks. Contingency plans will address these challenges, including alternative approaches to large gatherings that adhere to infection prevention practices, ensuring the project's continuity and community safety.
ESP 14 Physical and	.	The project will not have negative impacts on the physical and cultural heritage of Somalia. Once the target communities in the catchments are selected the project will

Cultural Heritage		identify through the ESMP if any national or international cultural heritage will be included in or near the project zones and describe the location of the heritage in relation to the project and if absolutely necessary explain why it cannot be avoided and what measures are being taken to minimize negative impact. Community members and traditional leadership within targeted areas will be engaged to ensure that the project implementation does not affect cultural resources like burial sites.
ESP 15 Lands and Soil Conservation		The project aims to contribute to the improvement of soil and regeneration of land. By definition NbS enhances the soil health and soil functions. The potential for soil degradation and consequent impacts on ecosystem services is likely to be limited. Nevertheless, the ESMP will identify any potential impacts on lands and soil conservation and identify mitigation measures, as relevant.