ADAPTATION FUND

SINGLE COUNTRY/ REGIONAL INNOVATION PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT INFORMATION

Title of Project/Programme	Enhancing Adaptation and Resilience through Nature-based Solutions (EARNSS) in Somalia
Country/ Countries	Somalia
Thematic Focal Area:	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:	US$ 5,000,000 (in U.S Dollars Equivalent)

Contents

List of Tables

List of Figures

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
~~GDP~~	~~Gross Domestic Product~~
~~GEF~~	~~Global Environment Facility~~
~~HA~~	~~Hectares~~
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
~~KM~~	~~Kilometers~~
LDN	Land Degradation Neutrality
LG	Local Government
LoCAL	Local Climate Adaptive Living Facility
~~M&E~~	~~Monitoring and Evaluation~~
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
~~NDC~~	~~Nationally Determined Contribution~~
~~NDP~~	~~National Development 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)
~~USD~~	~~United States Dollar~~
WASH	Water, Sanitation and Hygiene
WB	World Bank

Brief summary

1. Somalia is highly susceptible to the effects of climate variability and projected climate change-driven hazards, such as extended drought, flash floods, erratic rainfall, disruption to the monsoon seasons, strong winds, cyclones, sandstorms and dust storms. Indeed, the country was ranked the eighth (178 out of 185) most vulnerable countries and almost the least equipped to adapt to climate change on the 2023 Country Index of the Notre Dame Global Adaptation Initiative. Impacts of climate change are already evident in Somalia: the median annual temperature has risen by between 1°C and 1.5°C since 1991[1]. 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[2].

2. The Shabelle basin, one of the country's most productive areas and considered a national food basket, is also prone to repeated drought cycles and floods. The 2050 and 2070 climate-driven projected changes in rainfall, temperature, and PET scenarios show that Somalia's development and livelihoods will, in the future, face increased threats of climate extremes unless effective climate-smart adaptation systems form integral components of national development strategies[3]. This is particularly so because evidence shows that a level of change is locked into the global climate system, regardless of efforts to mitigate future emissions (ibid). In the Shabelle basin, the impacts of climate change are compounded by insecurity and land and rangeland degradation. Rangeland degradation is driven by a set of complex drivers, including droughts, floods, unsustainable and inappropriate natural resources exploitation systems, overgrazing, tree cutting for fuel wood and charcoal production, poorly designed agronomic practices, all enabled by uncertain land tenure and exacerbated by climate hazards.

3. Due to the agricultural productivity of the basin, the impacts of climate change on food security are more significant. Beledweyne city was affected by major historical river floods in 1961, 1977, 1981, 1997, 2005, 2006, and most recently 2016, 2018 and 2019. In this regard, the river is prone to recurrent flooding yet almost dries up at other times of year. The problem is especially apparent in Jowhar, where river management and related disaster prevention and mitigation are practically absent. The result is the accumulation over the past 30 years of high levels of silt and rubbish in the river channels, which in turn causes increasingly frequent bank over-topping and damage to surrounding farmland. Then, the dry season's water flows in the river have become lower and lower, sometimes failing altogether, due to upstream damming and over-use in Ethiopia.

4. Somalia is one of the countries where Nature-based Solutions (definition in Box 1) and hybrid measures can contribute significantly to tackling climate hazards and variability, given the high levels of dependency on natural resources combined with low capacities to adopt costly adaptation measures. Despite the strong and growing baseline of policy, programs and project initiatives, the effective upscaling and replication of readily available NbS and hybrid measures to reduce the vulnerability of people, productive assets and livelihoods in the three target districts 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 colonization 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.

5. Although the entire population of Somalia is vulnerable to climate hazards, women and children are the most affected by climate-driven poverty and food and nutrition insecurity due to the fact that culture and norms confer low social status on them, reducing women's role in decision-making and limiting their access to assets and resources. Furthermore, access to land and property ownership by women and

[1] Federal Republic of Somalia, 2021: Climate Change Adaptation Baseline Report; Somalia
[2] World Bank, 2020: Diagnostic study on trends and threats for environmental and natural resources challenges
[3] World Bank 2020: Somalia Country Environment Assessment Report.

minority groups in the South has been weakened by both conflict and the ensuing reconstruction process and breakdown in social stability, law and order. This has compromised traditional and customary laws for women and minority groups, their social support systems and their access to land and property.

6. The proposed five-year project will put in place systems to promote the effective replication and upscaling of innovative Nature-based Solutions (NbS) and hybrid measures to mitigate the impacts of climate-intensified droughts and floods in Somalia, piloted in three districts in the Hirshabelle watershed in the Southern part of the country. The project is expected to provide direct adaptation benefits to at least 26,250 people (about 3% of the population of the three districts), equitably along gender and social groups. It will indirectly benefit about 920,183 people (total population of 3 districts) through an improved enabling environment (planning and policy).

7. The project objective is to enhance the 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 the vulnerability of people, productive assets and livelihoods to floods and droughts. The objective will be delivered through four Outcomes.

8. Under Outcome 1 – skills and information will be provided to facilitate stakeholders in rural communities to develop action plans for an integrated approach to control run-off, soil erosion, improved infiltration, soil moisture and more resilient grazing lands in the three target rural catchments. The set of activities under this Outcome will result in the development of technical protocols and a local enabling framework to guide the implementation of activities under Outcome 2. Similarly, communities and stakeholders in selected vulnerable urban areas will be supported to refine the city resilient plans and develop action plans for implementing selected measures to control city flooding.

9. Under Outcome 2, the project will implement a set of proven NbS interventions that mitigate the 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), in line with the plans developed under Outcome 1. These include:

- **Nature-based solutions and hybrid solutions to reduce run-off and soil erosion and improve water infiltration and soil moisture**. The intervention will cover a minimum of 4,000 ha in three rural catchment areas, benefitting at least 26,250 people (50% men, 50% women and at least 30% youth and minority groups). The project will develop knowledge-informed watershed-level plans for optimizing the use of the combined V-shaped weir and sand dams, which reduce peak flow (incidents and intensity of flooding) while promoting water storage and alluvial aquifer recharge considerably. 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. V-weirs and sand dams will be complemented by: (a) solar-powered (hence renewable energy) water supply infrastructure for micro-irrigation, fodder production, livestock watering and domestic use; (b) a program 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.

- **Supporting the implementation of innovative green infrastructure for flood risk reduction in both rural and urban areas**. In urban areas, this will align with the recommendations of the Beledweyne and Jowhar cities' resilient plans and the yet to be completed plan for Afgooye as well as the JPLG LG Adaptation Plans[4], benefiting about 10,500 people. The project will refine the resilience plans, in line with the recommendations by the developers of the plans and implement selected green measures such as: riparian forest buffers, hedgerow networks on the borders of agricultural croplands near the cities, urban "green" areas by planting trees in strategic spaces, small-scale sustainable urban drainage network and waste minimization in selected urban neighborhoods including internally displaced people (IDPs) settlements. In rural areas, measures to reduce soil erosion and run-off, such as terraces and soil bunds, will be implemented strategically in the three selected watersheds, benefitting approximately 15,750

people in rural communities.

10. Under Outcome 3, the project will **create awareness and identify and advocate for incentive packages 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 knowledge management (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[5] as one potential financial incentive package. The piloting will provide an opportunity for the Ministry of Environment and Climate Change to interrogate and identify relevant policy measures to regulate carbon credits and trading in the country.

[5] (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

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[6]. 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)[7], 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.

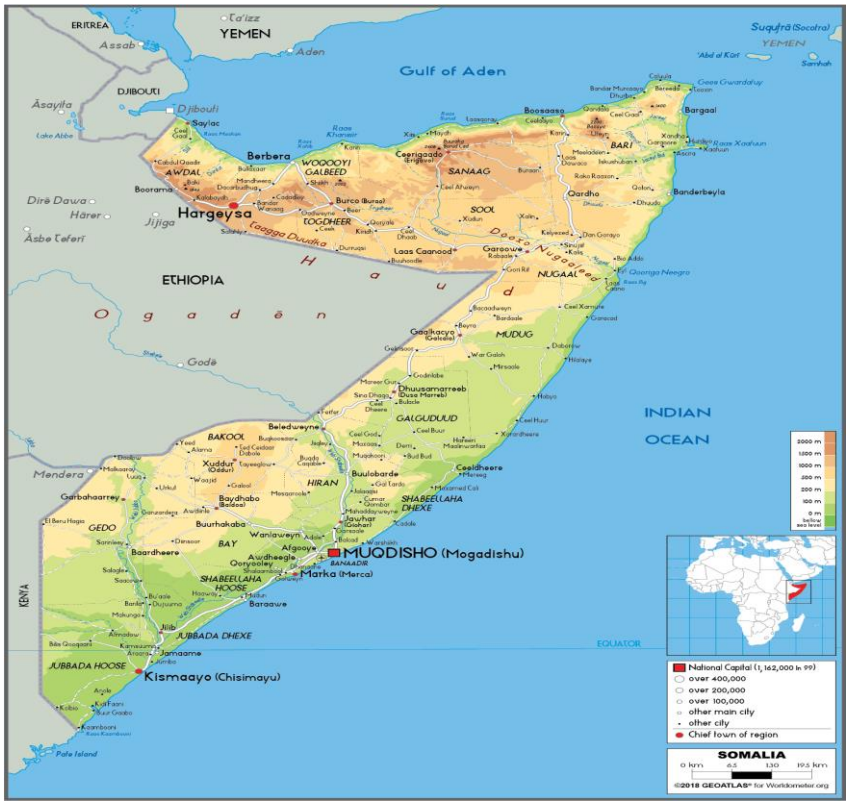

Figure 1: Map of the Federal Republic of Somalia

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

[6] Sahel is the sub-Saharan semi-arid zone which traverses the African continent from Senegal to Somalia
[7] 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 ~~estimated to be 920,183 by 2029 (Table 1). These figures are projected from the latest valid estimation of 2014 by the United Nations Development Programme (UNDP)[8] using the average annual growth rate for the period 2014-2022 (3.49%) provided by the World Bank (WB)[9]. About 26,250 people (3% of the population of the three districts) are expected to benefit directly from the project (50% men, 50% women, including the youth and other marginal groups and minorities).~~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 ~~is,~~ characterized by an arid to semi-arid climate, ~~with extensive~~ features diverse landscapes including drylands ~~and,~~ riverine ~~natural~~ vegetation ~~types (trees, grasslands, shrubs),~~ crop fields (both rainfed and irrigated), dunes, bare lands ~~and,~~ natural water bodies, ~~interspersed by~~ and a few urban ~~and associated~~ areas ~~(settlement/cities and airport)[10] (Table 2 and Fig. 2).~~ . The rural population primarily consists ~~mainly~~ of sedentary farmers~~, practicing~~ engaged in small~~-~~scale mixed farming, ~~keeping~~integrating livestock ~~in conjunction~~ with crop production ~~(Tables 3 and 4).~~

~~5.~~4. ~~As described~~). According to by SWALIM[11], land use ~~in the Shabelle~~ is dominated by pastoralism, agro-pastoralism, and crop farming~~. Crop farmers are primarily~~ , with sedentary~~,~~ crop farmers also practicing animal husbandry ~~in conjunction with crop production. They tend to keep lactating cattle,~~ . Lactating cattle, sheep, and goats are kept near ~~their~~ homes, while non-lactating animals are herded further away~~, like herding nomadic stock. However, rainfed~~. Rainfed and irrigation farmers ~~keep~~maintain relatively small livestock numbers, ~~mainly~~primarily cattle and ruminants.

~~6. The Food Security and Nutrition Analysis Unit (FSNAU)[12] summarises the land use and livelihoods of the area as follows:~~

~~[8] UNDP 2014 Population data – https://data.humdata.org/dataset/cod-ps-som~~
~~[9] WB Pop growth annual % Somalia : https://data.worldbank.org/indicator/SP.POP.GROW?end=2022&locations=SO&start=1961&view=chart~~
~~[10] FAO SWALIM, 2020: Land Use Characterization of the Juba and Shabelle Riverine Areas in Southern Somalia – https://www.faoswalim.org/resources/site_files/L-07%20Land%20Use%20Characterization%20of%20the%20Juba%20and%20Shabelle_0.pdf~~
[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. https://www.faoswalim.org/resources/site_files/L-07%20Land%20Use%20Characterization%20of%20the%20Juba%20and%20Shabelle_0.pdf
~~[12] Food Security and Nutrition Analysis Unit, 2016: Somalia Livelihood Profiles June 2016~~

- **Crop-based agriculture in the riverine zone:** cultivation of crops is practiced along alluvial plains within the 5-10 km corridor adjacent to the rivers (in the riverine zone). Although soils in the riverine areas are rich due to alluvial deposits after flood events, some areas have a mix of clayey vertisols or sandy soil or soil with high salt content[13]. Up to 90% of agriculture in this zone was irrigated, allowing for intensive agriculture based on mixed cereal and cash cropping. Up to 85% of irrigation is by gravity flow method. The rest of the irrigation is by diesel pumps to extract water. Access to land is dictated by clan ownership[14]. Most farmers own land, although a small proportion (10-20%) of the poor and very poor rent. A smaller proportion, less than 10%, share crops.
- There is very limited use of other inputs and agricultural technologies, notably tractors to plow by the relatively wealthy and purchase of seeds by the poor farmers: the middle and better-off farmers use seeds from their own stock. Fertilizer is rarely used, only on cash crops such as onions or fruit trees by the relatively wealthy. Notably, the poor cannot afford fertilizer. The most common crops in this category are sorghum, cowpeas, sesame, mung beans, maize and vegetables. Water is a limited resource in this area and drought is a common phenomenon. The use of inorganic inputs is generally low, although 40% of farmers indicated that they use machinery dominated by tractors and oxen for plowing. Local seeds are widely used, although farm management, consisting of fencing farms, is not widely practiced. Crops are produced for food, marketing and animal fodder. Crop performance in the area ranges mostly from poor to total failure due to a combination of factors, including inadequate adoption of appropriate technologies and crop husbandry, low erratic rainfall that frequently turns into droughts, pests, floods, and inherent low soil fertility. Consequently, yields fall far below potential levels; here, maize yields can be as low as 200 kg/ha for rainfed and 1,000 kg/ha under irrigation, far below the potential 3,000 kg/acre under improved management practices. Most farmers have had no training on improved agricultural practices or the effective use of NbS and hybrid measures to mitigate climate hazards. A key concern here is broken irrigation infrastructure and poorly regulated water use. There are many reports of farmers breaching the riverbank to create informal irrigation channels, causing incidents of uncontrolled flooding during periods of heavy rain.
- Farmers in this zone (with access to riverine irrigation) rarely engage in livestock rearing, although they tend to be wealthier than the pastoralists outside the irrigated zone (Tables 3 and 4). Instead, complementary sources of income include the collection and sale of bush products (such as firewood, charcoal and grass) and mat making. Women earn income by working on hut maintenance (thatching and mud application). Men earn income as porters, carrying goods across the river. Sales of handicrafts, labor migration to urban centers, local agricultural work and petty trade are also options for cash generation. Labor migration to urban areas, including Mogadishu, occurs during the jilaal season (December-March). Most work is found in the construction sector.
- **Transhumance Pastoralism outside riverine zones:** Away from the riverine zone, the semi-arid areas are covered with dense shrubs interspersed with grazing areas comprised of savannah grasslands, where the stony soils are characterized by limited root depth and low moisture availability. Here, transhumance pastoralism is the predominant livelihood activity, either as a single land use class or mixed with agriculture and wood collection for charcoal burning. Livestock production is the basis of the local economy and households rely heavily on camels, goats and sheep to meet their food and cash needs. Camels are the most valuable livestock in the herd, and greater numbers signify greater wealth. These drought-tolerant animals provide milk for consumption and sale, and they are also the most valuable animals to be sold on the hoof. There is little land or pasture improvement, limited to water provision (boreholes and wells). Lactating cattle, a few sheep and goats are kept near homesteads, while non-lactating animals are herded further away. Typically, animals are fed from natural vegetation and crop residues and are driven to the rivers for watering, especially in the dry season. Woody and herbaceous species include Acacia bussei, A. seyal, A. nilotica, A. tortilis, A. senegal, Chrysopogon auchieri var. quinqueplumis, Suaeda fruticosa and Salsola foetida (ibid).

[13] Food Security and Nutrition Analysis Unit (FSNAU) and Famine Early Warning Systems Network (FEWSNET), 2016: Somalia Livelihood Profiles

[14] Noting that land tenure systems in the Lower Shabelle have had a complicated history since the 1960s with notable episodes of land grabbing and displacement.

Groundwater is also an important source of water for livestock in the form of hand dug wells, swamps, creeks, and boreholes. However, during the wet season, numerous temporary water bodies provide water for the livestock. Livestock ownership is private, but grazing lands are communal, making it very difficult to regulate range use. Constraints associated with livestock production include disease, water shortage, poor quality dry season pasture, drought, low market prices for livestock products, poor livestock management systems, long distances to watering points, high water costs and poor road networks. Feasible opportunities for livestock production include the provision of veterinary services, improved security, construction of shallow wells, and provision of markets for livestock and livestock products, rehabilitation of damaged water reservoirs, rehabilitation of water canals, sinking more boreholes, training in proper livestock husbandry, establishment of sustainable rangeland management strategies.

Table 2: Land Use Categories[15]

Land use	Km^2
Transhumance pastoralism/wood collection	43,372
Transhumance pastoralism	36,841
Transhumance pastoralism/rainfed agriculture	11,868
Rainfed agriculture	8,326
Rainfed agriculture/transhumance pastoralism	2,568
Dunes and bare land	1,933
Irrigated agriculture	1,873
Transhumance pastoralism/wood collection/rainfed agriculture	1,399
Transhumance pastoralism/irrigated agriculture	234
Water body	140
Built up area	99
Rural settlement	3
Total	**108,656**

[15] These figures are for both Juba and Shabelle watersheds, but the approximate mix by percentage cover is likely to be the same for the project target areas, once defined. Source – FAO SWALIM, 2020: Land Use Characterization of the Juba and Shabelle Riverine Areas in Southern Somalia - https://www.faoswalim.org/resources/site_files/L-07%20Land%20Use%20Characterization%20of%20the%20Juba%20and%20Shabelle_0.pdf

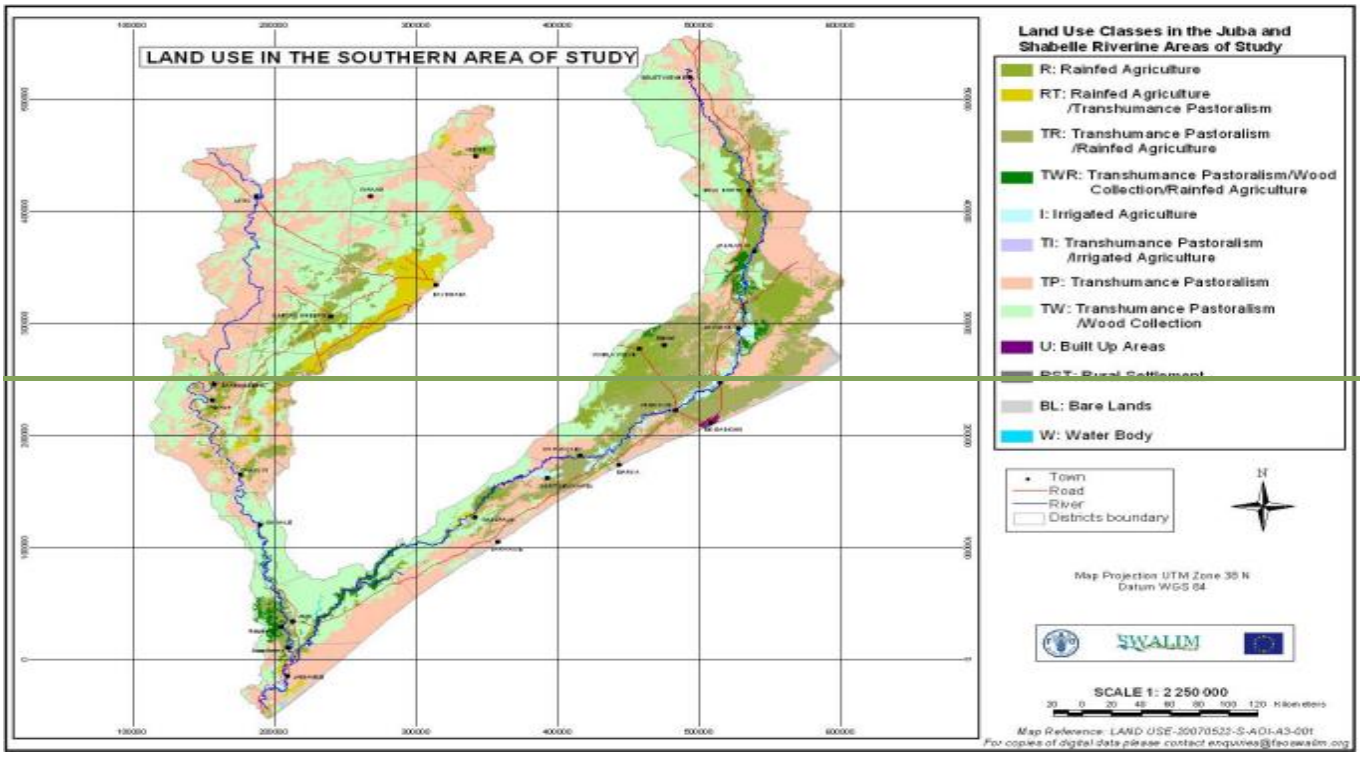

Figure 2: Land Use Categories in the Rivers Shabelle and Juba Basins[16]

- **Charcoal burning** is common wherever there are trees, especially Acacia bussei, A. nilotica and A. seyal. Other tree species cut for charcoal include Acacia tortilis, Terminalia prunoides and Prosopsis juniflora. Charcoal burning is practiced as an alternative livelihood, its negative effects on the environment notwithstanding. Trees are cut live and kilns are mostly of the mound type, with rare cases of pit and trench types. The highest demand for charcoal comes from urban areas in the country and export destinations (Arab countries). The practice is, however, illegal and is conducted against the wishes of pastoralist communities and government. Charcoal burning sites are, therefore, often located far from settlements. The practice has contributed to land degradation and a decline in rangeland conditions.

[16] Source: FAO SWALIM, 2020: Land Use Characterization of the Juba and Shabelle Riverine Areas in Southern Somalia - https://www.faoswalim.org/resources/site_files/L-07%20Land%20Use%20Characterization%20of%20the%20Juba%20and%20Shabelle_0.pdf

~~Table 3 and Table 4: Wealth Group Characteristics in the Shabelle-Juba Gravity Irrigation Livelihood Zone and Wealth Group Characteristics in the Southern Agropastoral Zone~~[17]

	Poor	Middle	Better off
Household %	25-45	45-60	5-20
Household size (#)	4-9	7-9	5-9
Land holding (ha)			
Land area owned	0.5-2	1.5-2	2.5-5
Typical livestock holding (#)			
Sheep	0	2-5	3-5
Goats	0		
Cattle	0	0-1	1-2
Other productive assets			
Ox-cart	0	0-1	1-2
Tractor	Rent	Rent	Rent
Mango trees	Yes	Yes	Yes

	Poor	Middle	Better off
Household %	40	45	15
Household size (#)	5-7	6-8	8-10
Land holding (ha)			
Land area cultivated	1-3	3-7	4-6
Typical livestock holding (#)			
Shoats	5-20	20-50	50-100
Cattle	0-5	5-10	15
camels	0-3	4-6	15

CURRENT AND PROJECTED CLIMATE

~~7.~~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[18]. 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[19]. 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[20]. 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).

~~8.~~6. Indeed, the median annual temperature has risen by between 1°C to 1.5°C since 1991[21]. 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[22].

~~9.~~7. The average annual rainfall is generally low (200mm) and erratic across the country, with inter-annual and

[17] ~~Source – Source: FAO SWALIM, 2020: Land Use Characterization of the Juba and Shabelle Riverine Areas in Southern Somalia - https://www.faoswalim.org/resources/site_files/L-07%20Land%20Use%20Characterization%20of%20the%20Juba%20and%20Shabelle_0.pdf~~

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[21] Federal Republic of Somalia, 2021. Climate Change Adaptation Baseline Report; Somalia

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

intra-seasonal variability[23]. 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[24]. 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).

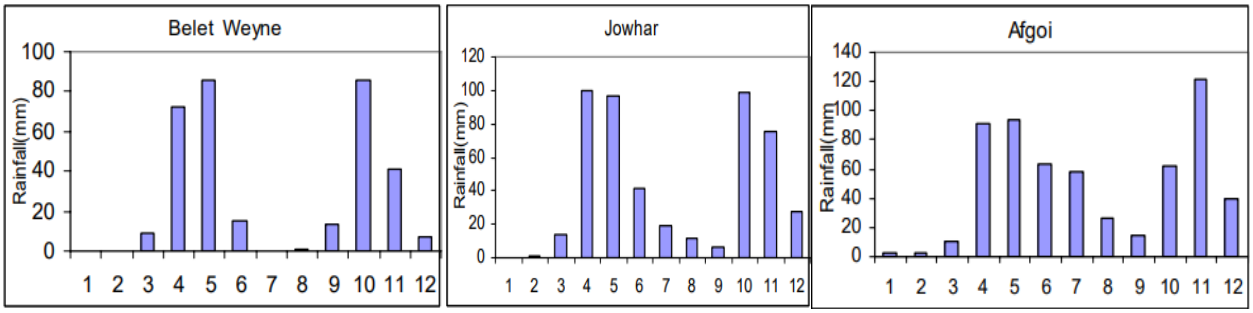


Figure ~~3.~~2: Mean Monthly Rainfall Patterns in the Target Areas (1963-2001)[25]

~~10.~~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[26]. 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[27]. 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, with comparatively stronger increases in northern Somalia, and relatively substantial increases in northern and southern Somalia[28].

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

~~11. Somalia is highly susceptible to the effects of climate variability and projected climate change-driven hazards, such as extended drought, flash floods, erratic rainfall, disruption to the monsoon seasons,~~

[23] 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
[24] 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
[25] 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.
[26] 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
[27] 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
[28] Source: Binder, Lisa; Barbora Šedová, Lukas Rüttinger, Julia Tomalka, Stephanie Gleixner 2022: Climate Risk Profile: Somalia. Berlin: PIK/adelphi

~~strong winds, cyclones, sandstorms, and dust storms[29]. These hazards, particularly drought and floods, which are the most prevalent climate hazards in the country and the Shabelle watershed, have impacted the socio-economic context of the Somali people largely negatively. Indeed, the country was ranked the eighth (178 out of 185) most vulnerable country and almost the least equipped to adapt to climate change on the 2023 Country Index of the Notre Dame Global Adaptation Initiative[30]. This poor rating is due to the complex interplay between natural hazards, climatic shocks, conflict, and insecurity, and their joint and compounding impacts on economic development, livelihoods and well-being – as expressed in current climate risks in the food systems, ecosystems and natural resources, water resources, human health, infrastructure and human habitat, described below.~~

~~12.~~9. **Impacts of climate hazards on water:** ~~Water plays a pivotal role in food security, human health, urban and rural settlements, energy production, industrial development, economic growth, and ecosystems.~~ 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[31].

~~13.~~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 ~~(Fig. 4).~~. 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.

~~[29] Federal Directorate of Environment and Climate Change, 2020: Somalia National Climate Adaptation Strategy~~

~~[30] https://gain.nd.edu/our-work/country-index/rankings/~~

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

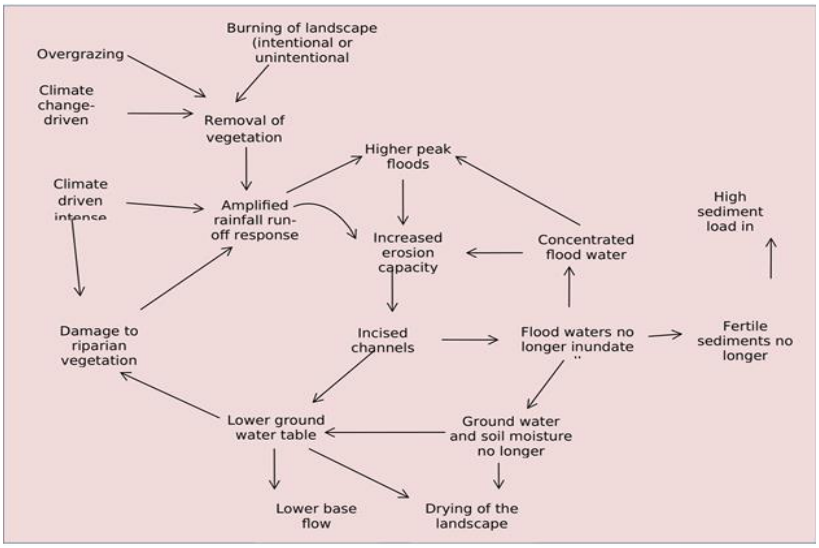


Figure 4: Land Management Processes Driving Negative Feedback Loops with Water Runoff and Land Degradation[32]

14. **Impacts of climate hazards on agriculture and food systems:** Given the absence of manufacturing industries, development is highly dependent on agriculture and livestock-based industries and commerce, both highly sensitive to climate hazards. At the national level, about 80% of the country is arid or semi-arid land, of which approximately 50 % can be considered permanent pasture. The International Fund for Agricultural Development (IFAD)[33] estimates that only 4.7% (3 million ha) of the country is cultivable land, with about 76% (2.3 million) cultivable under rainfed conditions. About 700,000 hectares are suitable for irrigation, of which only 15.8% (110,800 ha) are under irrigation[34]. The Somalia Investment Agency estimates that almost two-thirds of all cultivable land (rainfed and irrigated) is in the country's southern parts, including the three target districts[35]. Frequent and intense droughts and floods undermine food security and worsen livelihood conditions, adversely affecting marginalized groups (especially women, youth and IDPs), fuelling grievances, increasing competition over scarce resources and exacerbating existing community tensions and vulnerabilities.

The major agricultural area lies **Impacts of climate hazards on agriculture and food systems:**

15.11. The major agricultural areas along the Shabelle and Jubba Rivers. Indeed, the three districts are considered the country'sSomalia's food basket. Although due to their superior soils. However, agriculture in these districts have better soils than the rest of the country, agriculture is threatened by seasonal increasingly erratic weather phenomena that have become more erratic and harder to predict, particularly droughtdroughts and floods. Due to the agricultural productivity of the basin, the impacts of climate change on, which significantly impact food security are more significant. The. Since 2016, the intensity and frequency of droughts have escalated since 2016, with several droughts compounding the effect of the previous, with minimal recovery intervals. The 2016-2017/18 drought caused severe food shortages and

[32] Source: Modified from Government of Somalia, 2021: Shabelle River Diagnostic and Strategic Action Plan, Somalia
[33] IFAD 2021, Country Strategy Note (2022-2023). Report No: 6032-SO Near East, North Africa and Europe Division Programme Management Department
[34] IFAD 2021, Country Strategy Note (2022-2023). Report No: 6032-SO Near East, North Africa and Europe Division Programme Management Department
[35] https://sominvest.gov.so/key-sectors/farming/

extensive environmental damage. The WB reported that about , resulting in the loss of 68% of vegetation was lost and theenvironmental destruction to the environment was estimated to be valued at approximately around 1175.5 million USD[36]. The drought caused displacement of 920,000 people and pushed more than 6 million into poverty and food insecurity, thus creating pressure on the FGS and humanitarian agencies to provide emergency food supplies (ibid).

16.12. Since 2019, the countrySomalia has experiencedfaced continuous droughts (and famine),, a swarm of desert locustslocust invasion in 2020 that destroyed crops and vegetation, causing a loss of approximately about 20% of national crop yields, and failed rainfallrains in 2021 and 2022. The impacts of theseThese climate hazards were, exacerbated by the effects of the COVID-19 pandemic (in 2020), the, ongoing insecurities in the South and large parts of the target districts, and the impact of the war in Ukraine that reducedreducing grain exports on which many Eastern African countries depend (including Somalia). These have cumulatively , have culminated in a food insecurity crisis where nearly. Nearly 5 million people facedare facing food shortages, and thousands werehave been displaced[37]. Women, with women, children, the youth, and IDPs are commonlybeing the most affected negatively by the consequent challenges of droughts, including food insecurity. [38].

17.13. The three districts are highly prone to flash flooding. The intensity and frequency of flood events are reported tofloods have increased since around the year 2000, as evidenced by the fact that the country registered floods flooding events in 1946, 1961, 1977, 1981, 1997-98, 2005, 2006 and, 2009, 2011, 2013, 2015, 2016, 2018, 2019, and 2020. According to UNHCR[39], the latest floods point to a worrying pattern where extreme weather conditions are increasing in frequency and intensity. Prior to June 2020, flash floods and riverine flooding caused by seasonal rains displaced more thanover 450,000 in the country. With floods in 2018, 2019 and 2020 displacing 281,000, 416,000 and 919 000 persons respectively, the flood-based displacement figures demonstrate a rising year-to-year trend. 144,000 hectares of agricultural fields were destroyed by the 2020 floods, in addition to destroyed infrastructure. The country is experiencing El Nino intensified rains in its October- December rainy season. Coming after the prolonged drought, the flood is severe. OCHA reports that as of mid-November 2023, 1.7 million people before June 2020. The WFP warns that 4.3 million people were affected by heavy rain and floods; 164,000 have been displaced from their homes; 125,000 people have been relocated to higher grounds, 41 people have died from heavy rains and flood-related causes with about 1.5 million hectares (3.7 million acres) of farmland destroyed[40]. The UN World Food Programme (WFP) warned that livelihoods and lives are at risk, with 4.3 million people – a quarter, or 25% of Somalia's population – likely to, could face crisis-level hunger or worse by the end of 2023 due to extreme weather (ibid). Indeed, theThe FGS declared emergencyemergencies in the most-affected states, including Hirshabelle South West among them. The others are, Southwest, Jubbaland, and Galmudug[41] –.

18.14. The impacts of drought and floods on food production are reflected in declining yields of crops. Cereal crops make up a , which account for one-third to half of the Somali diet by calories and are among the most important food crops produced by the country[42] largely grown in the Shabelle and Juba regions. However, , are significantly impacted, with cereal production per capita declineddeclining by 66 %

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

[37] 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

[38] 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

[39] https://www.unhcr.org/news/briefing/2020/8/5f2cf86c4/floods-drive-650000-somalis-homes-2020.html

[40] OCHA situation report, November 2023: https://reliefweb.int/report/somalia/somalia-2023-deyr-season-floods-situation-report-no-1-17-november-2023

[41] Reported by BBC: https://www.bbc.com/news/world-africa-67383727

[42] 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

between 1966 and 2012[43], and is believed to have declined even further by 2023. Furthermore, cereal production has been characterized by extreme year-to-year volatility, amounting to about 20 % of production in research trials (ibid). While maize and sorghum are grown in the country, wheat and rice are largely imported, leading to high food import dependency[44]. Between 1980 and 2015, agricultural imports, mainly food, rose 18 times to stand at $1.5 billion annually up from $82 million in the late 1980s, with local and continuing to decline. Local crop production meetingmeets only 22 % of per capitalcapita cereal needs (ibid). , 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.

19.15. Consequently, Somalia is among the ten countries with the highest prevalence of malnutrition in the worldrates globally, and the third highest in the eastern and southern Africa region, with 17.42 %. It has a Global Acute Malnutrition amongst rate of 17.42% among children under five years (U5) and, with 3.2 % severely malnourished[45]. According to OCHA, overOver 8.3 million Somalis (, or 49 % of the population), were expectedprojected to face high levels of acute food insecurity between April and June 2023 due to the impacts of the just-ended prolonged drought[46]. Indeed, food inflation reached 17.5 % by the end of 2022, disproportionately affecting poor households, including IDPs, and exacerbating inequality. At the same time, about 1.8 million children under five were likely to face acute malnutrition through mid-2023, including over 513,000 who would probably be severely malnourished. Indeed, over 1.3 million children received treatment for malnutrition between January and November 2022, while 1,049 children died in nutrition centres during the same period (ibid). Many more may have died without being able to receive treatmentprolonged drought[47].

20. Although dependence on livestock modifies the exposure of agriculture and livelihoods to climate hazards, livestock production is underLivestock production, primarily rainfed nomadic pastoralism, often disrupted by the same cycles ofalso suffers from drought and flooding exacerbated by degradation of the rangelands. Indeed, according to OCHA,cycles, with one-third of all livestock in the worst-affected areas diddying between mid-2021 and the end of 2022[48]. Rangeland degradation is driven by a set of complex drivers, including droughts, floods, unsustainable and inappropriate natural resources exploitation systems, overgrazing, tree cutting for fuel wood and charcoal production, poorly designed agronomic practices, all enabled by uncertain land tenure and exacerbated by climate hazards (Fig. 4).

21. The reliance on agriculture (including livestock) for livelihoods and economic development has led to high poverty levels with 69 % of the population living below the international poverty line of US$ 1.90 per day in 2021. GDP per capita was US$ 315 by 2020, the second lowest globally[49]. Amid repeated climate-related shocks exacerbated by worsening global economic conditions, GDP growth averaged only 2% from 2013 to 2020 and contracted by 0.2% in 2020[50]. Although GDP growth

[43] 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

[44] FAO, 2021: The Agricultural Economy of Somalia. https://agris.fao.org/agris-search/search.do?recordID=US2022285108.

[45] 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

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

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

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

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

[50] World Bank, 2022: https://www.worldbank.org/en/country/somalia/overview

~~recovered to 2.9% in 2021, it is projected to have fallen to 1.7% in 2022 and is forecast to rebound to 2.8% in 2023 and 3.7% in 2024[51].~~

~~22.~~16. ~~As explained in the section on vulnerable groups, poverty affects women, children, the youth and IDPs more severely. The gender gap in agriculture is particularly huge~~. This highlights the severe impacts of climate hazards on agriculture and livelihoods in Somalia~~, where social norms assign the primary responsibility for household food production and duty of care to women who are already marginalized by cultural norms. The Gender Inequality Index for Somalia is 0.776 (with a maximum of 1 denoting complete inequality), placing Somalia at the fourth highest globally. Women's access to land, services, credit, and digital technology lag behind men's, while a higher burden of unpaid care limits their education, training, and employment opportunities. These discriminatory norms reinforce gender barriers to knowledge, resources and social networks – holding women back from being effective in their roles.~~..

~~23. Implemented properly, NbS can improve agricultural production and resilience, mitigate climate change, and enhance nature and biodiversity. Several NbS measures can also increase the productivity and resilience of pastoralism, including optimal grazing intensity, adopting silvopasture practices for animal nutrition, shade, and fencing, incorporating legumes into the planted pasture, and improving feed quality.~~

~~24. Impacts of climate hazards on ecosystems and ecosystem services: Local livelihoods and economic development are highly dependent on a finite and diminishing natural capital, comprising of land, soil, forests, water resources, minerals, and fisheries, at the national and Shabelle watershed levels. However, the country's ecosystems are fragile and largely degraded: climate change threatens to shift vegetation, disrupting ecosystems and their ability to provide ecosystem services needed for economic development, livelihoods, and human well-being.~~

~~25. Deforestation is rampant in the South, especially the Shabelle and Juba watersheds, where most of the country's forests are located. By 2020, the forest cover in Somalia was estimated to be 9.4% of the country's compared to 13% in 1990[52]. The country reportedly lost 3,070,000 ha (34%) of forest cover between 1980 and 2020, declining from 9,050,000 ha to 5,980,000 (ibid). Deforestation is driven by the current household energy mix and wide-scale production and sale of charcoal, compounded by prolonged and more severe episodes of droughts and flooding. 82% of total energy is derived from charcoal and wood fuel; charcoal constitutes a major export, driving deforestation and land degradation. The loss of riparian forest has progressively contributed to the severity of flooding in Beledweyne, Jowhar and Afgooye. Severe deforestation and soil degradation from poor agricultural practices, overgrazing of rangelands and climate change threaten the growth prospects and the viability of Somalia's traditional nomadic pastoralism and rain-fed crop cultivation.~~

~~26. According to Adelphi[53], although climate change is expected to significantly influence ecosystems, the magnitude and direction of expected changes are very uncertain. However, the following changes are likely (ibid): Species richness is projected to increase in the very northern mountainous regions by up to 140 % and projected to decline in most other parts of the country by up to 17 % by 2080, compared to the year 2010. (b) Although the projections of changes in tree cover for the short and medium terms are very uncertain, the projections for 2080 are more certain and agree on a slight increase in tree cover, which might increase by up to 24% relative to 2020. These projections do not consider anthropogenic impacts that currently affect ecosystems and need to be urgently addressed. The anthropogenic pressures and impacts are particularly heavy in the Shabelle and Juba basins, the wetter areas that are more densely populated, with associated heavy exploitation of the natural~~

~~[51] World Bank, 2022: https://www.worldbank.org/en/country/somalia/overview~~

~~[52] FAO, 2020: Global Forest Assessment Report, 2020. Somalia Country Report. FAO~~

~~[53] Binder, Lisa; Barbora Šedová, Lukas Rüttinger, Julia Tomalka, Stephanie Gleixner 2022: Climate Risk Profile: Somalia. Berlin: PIK/adelphi~~

resources.

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

27.17. 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. For example, an increase in temperature and extreme temperature events could interact with urban heat islands – i.e., areas of higher temperatures in comparison to outlying rural areas – which occur due to (1) characteristics of urban environments, including a reduction in vegetation and evapotranspiration, (2) an increased anthropogenic heat production and (3) a higher prevalence of dark surfaces with low levels of heat reflection[54].

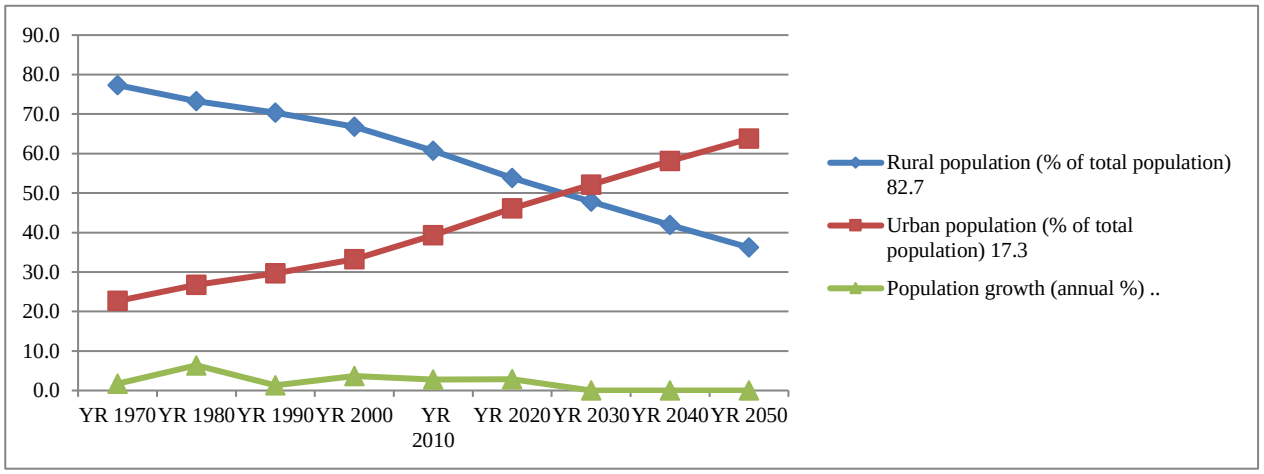


Figure 5: Population Dynamics[55]

28.18. Somalia is urbanizing rapidly; in 2018, Mogadishu was the second-fastest growing city in the world, with a 4 % annual rate of urbanization growth[56]. The built-up area in Beledweyne has grown steadily at an average rate of 5% per year over the last fifteen years[57]. According to the WB58, 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 (Fig. 5).

29.19. Beledweyne, Jowhar and Afgooye cities are expected to continue a high growth rate over the next

[54] Håkanson, L., 2021: Strategies for overcoming barriers to implementation of Nature-based Solutions. Master thesis in Sustainable Development at Uppsala University, No. 2021/56, 42 pp, 30 ECTS/hp

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

[56] 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

[57] 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

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

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 individuals[59], 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[60]. ~~Furthermore, urbanization in the whole of the Shabelle watershed and the rest of the country is occurring within a context of poorly planned urban areas; weak regulations and weak institutions that rarely factor risk reduction into investments, putting large investments and livelihoods at risk. Here, the land degradation and water management challenges that create negative feedback loops on floods are further complicated by inadequate waste management, rainwater, urban soil and vegetation, creating conditions that turn even small scale natural and climate hazards into disasters (Fig. 1 in Annex of Figures).~~

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.

~~30.~~21. Beledweyne ~~city was affected by~~ has experienced major ~~historical river~~ floods in 1961, 1977, 1981, 1997, 2005, 2006, and ~~most~~ recently in 2016, 2018, and 2019. ~~The problem is especially apparent in~~ Jowhar, ~~where river management and related disaster prevention and mitigation are almost completely absent. The result is the accumulation over the past~~lacking river management, suffers from 30 years of ~~high levels of~~ silt and rubbish ~~in the river channels, which in turn causes increasingly~~ build-up, causing frequent bank over-topping and ~~damage to surrounding~~ farmland~~. Then, dry season's water flows in the river have become lower and lower, sometimes failing altogether, due to upstream damming and over-use in Ethiopia. When it rains, the~~ damage. Floods often relocate Beledweyne's livestock market ~~is often flooded and moved to the stadium in Kulmis Village. The floods~~ and disrupt communication with Mogadishu ~~as~~by flooding the main road ~~is situated on a flooded area. Urban~~. These urban floods~~, lead to~~ result in crop loss~~,~~ and ~~cut off communication~~hinder access to ~~outside~~external markets and ~~access to outside resources such as~~ specialized health facilities, ~~greatly~~ disrupting ~~overall livelihood in the city. The current El Nino and a positive Indian Ocean Dipole are already causing heavy rainfall and flooding especially along the Shabelle and Juba rivers. Beledweyne was the worst affected district by floods in~~livelihoods. In July 2023, ~~with~~Beledweyne faced severe floods, displacing over 240,000 people ~~displaced and needing assistance. Numerous NbS measures can alleviate urban challenges and increase ecosystems services to the urban environment. For example, green infrastructures, the hybrid systems that use NbS as a substitute for or in conjunction with grey infrastructure, are cost effective measures that could alleviate many of these challenges.~~.

VULNERABLE GROUPS

~~31.~~ While acknowledging that the entire population of Somalia is vulnerable to the impacts of climate change, the NAPA[61] 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 ~~because culture and norms confer low social status to them and largely restricts their lives to the "private domain"[62]. This reduces women's role in decision-making and limits their access to assets and resources.~~

~~32.~~22. . According to the preliminary gender assessment[63], Somalia has extremely high maternal mortality,

[59] CCCM Cluster SOMALIA, 2023: file:///C:/Users/Admin/Downloads/Belet%20Weyne%20IDP%20Site%20Verification%20-%20Sep%202023.pdf
[60] https://reliefweb.int/report/somalia/somalia-verified-idp-sites-afgooye-october-2023
[61] Federal Republic of Somalia Ministry of National Resources, 2023. National Adaptation Action Plan
[62] ~~Source?~~
[63] UNEP, unpublished. Preliminary Gender Assessment - Produce to support mainstreaming gender issues in the project

rape, female genital mutilation and child marriage rates, and violence against women and girls is common, though statistics are difficult to find. ~~The participation and role of women~~Women's involvement in politics and decision-making ~~spheres are extremely limited, perpetuating narrow~~remains minimal, exacerbating gender~~ based roles and~~ inequalities. ~~Across the country, traditional or customary~~Customary law ~~is applied more instead of the~~often supersedes state judiciary, ~~and~~leaving sexual and gender-based violence ~~often goes unpunished, particularly as traditional Somali society does not openly discuss these issues. Girls are married early, with~~unaddressed due to societal taboo. Early marriage affects 45% of women~~ aged 20 to 24 married before 18. With an overwhelming pastoralist economy, livestock represents the family's wealth and has traditionally been the property of men. However, women often manage the sale and exchange of livestock products such as milk and ghee and spend their earnings on household needs. Women's participation in~~. Women's wage employment ~~in the non-agricultural sector is the~~ is highest in Puntland ~~state at (~~40~~%,~~%), followed by Somaliland ~~state at (~~36~~%,~~%) and ~~33% in~~ South Central states~~. Efforts are still needed to achieve gender equality and women empowerment.~~ (33%).

~~33.~~23. ~~At the FGS level, the Ministry of Women and Human Rights Development of the FGS of Somalia is mandated to promote and protect gender equality and human rights, including the rights of women, children and other vulnerable groups.~~ 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[64]. 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.

~~34. Both conflict and the ensuing reconstruction process and breakdown in social stability, law and order have weakened women's access to land and property ownership. This has compromised traditional and customary laws for women, their social support systems and their access to land and property. Land grabbing by male relatives following the death of a husband/father is a problem in Somalia. Widows rarely inherit land under customary norms and are often deprived of access to their husband's land if they have no children – land is therefore vested in trusteeship with uncles and other male relatives and inherited by children when they become of age. Furthermore, IDPs are often left in a legal vacuum, with almost no access to legal remedies because the formal justice system is not established in IDP camps, and traditional clan systems have broken down.~~

~~35. About 55 % of women lack access to education, compared to 40 % of men; and labour force participation rate is 74 % for men, compared to 19 % for women[65]. Furthermore, assessments by the UN Common Country found that societal norms, partial and scant law enforcement, as well as evolving gender roles and conflict, have contributed to high levels of gender based violence, which disproportionately impacts the most vulnerable in society. Female Genital Mutilation is still widely practiced, and women are at greatest risk to domestic and other forms of violence. Internally displaced women and girls are particularly vulnerable to rape by armed men, including government soldiers and militia members.~~

~~36. Pastoralists face vulnerabilities because a large portion of the country's population is engaged in this livelihood, largely wholly dependent on rain fed pastures. Pastoralists tend to have very few fixed assets, exacerbating their vulnerability to climate risks. IDPs are also highly vulnerable. They are~~

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

~~65 IFAD 2021, Country Strategy Note (2022-2023). Report No: 6032-SO Near East, North Africa and Europe Division Programme Management Department~~

~~often forced to move as either a direct result of a climatic hazard, such as drought, or to flee conflict. In either case, migration is commonplace and places pressure on natural resources surrounding IDP settlements and on the outskirts of urban areas[66]. IDPs frequently fear returning to their own district, or simply no longer have the means to do so having used up or sold all assets, and consequently become even more susceptible to climate risks.~~

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

~~37.~~25. **Youth.** The country has a very young population: about 60 percent is under 35 years ~~(source)~~ with a high age dependency ratio (value of 95.7 %, against a global average of 58.64 – in 2021)[67]. This ratio rose from 83.68 % in 1960, increasing the burden on the economically active segment of the population. ~~The space and opportunities are even further restricted for girls and young women.~~ The NAPA recognized ~~the fact~~ that many ~~of the~~ young people are trapped in an environment of violence, fear, unemployment and poverty[68]. ~~This erodes their hopes for human development and makes them more likely to~~ Jobless youth, lacking economic opportunities, often become ~~part of conflict (ibid). As highlighted in the NAPA (ibid), experiences from Somalia and elsewhere show that when large numbers of young people are jobless and have few opportunities for positive engagement, they become a ready pool of~~ recruits for ~~extremists. This is~~ extremist groups like Al Shabaab. This exacerbates instability, particularly ~~concerning for Somalia where Al Shabaab still poses a real threat to the stability of the country, particularly in the South, including the~~ in the Shabelle basin~~. Climate~~, where climate change ~~often leads to increased~~is escalating conflicts ~~and would thus have a particularly severe impact on youth~~.

~~38.~~26. ~~**Minority groups.** The clan system is the most important social factor among the nomadic pastoralist Somalis: clans constitute sub-ethnicities of the Somali nation. Clan relationship is regulated by the Somali customary law, xeer.[69] 'Many ethnic minorities, such as Bantus, are in many places in South Central Somalia and are in fact local majorities.~~**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

~~39. There are several current, past and/or planned projects, programmes and policy initiatives that have, or are contributing to building capacities and providing the requisite resources to upscale NbS and hybrid measures to tackle climate-intensified hazards floods and droughts - described below. However, there are still barriers to achieving the ideal conditions for the replication and upscaling of NbS and hybrid measures to enhance adaptive capacities and increase resilience, described in the Section on "Barriers to the effective upscaling and replicating NbS", below. The project will remove these barriers and enhance the adaptive capacity of the nine communities in the targeted districts, producing lessons, experiences and methodologies to be replicated in the rest of the country and the world.~~

~~*Global Policy Initiatives and Programmes*~~

~~40. At the global level, NbS have gained ground rapidly as people-centric innovations that acknowledge the important link between human resilience and the integrity of ecosystems. They are perceived to offer familiar, accessible and cost-effective solutions to evolving climate risks. They are increasingly becoming a uniting force for the objectives shared between the UN Framework Convention on~~

[66] ~~Federal Republic of Somalia Ministry of National Resources, 2023. National Adaptation Action Plan~~
[67] Age dependency ratio by country, around the world | TheGlobalEconomy.com
[68] Federal Republic of Somalia Ministry of National Resources, 2023. National Adaptation Action Plan
[69] ~~EASO report 2014~~

~~Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the Sustainable Development Goals (SDGs). Multiple global frameworks and policy initiatives support using natural or ecosystem approaches to slow climate change and enhance the environment. The UNFCCC recognizes that the Agriculture, Forestry and Other Land Use sector is responsible for nearly a quarter of annual GHG emissions. The Koronivia Joint Work on Agriculture (established at the Conference of Parties in 2017) has identified the need for improved soil and water management practices, nutrient use and livestock management as key to reduce emissions and maintain food security. The Sustainable Development goals state the need to embrace sustainable agricultural systems, and the emerging CBD framework calls for the integration of Nature-based Solutions into productive systems. The UN Convention to Combat Desertification (UNCCD) specifically articulates goals to reverse land degradation trends and recognizes that land-based solutions (as part of NbS) are promising options in connection with sequestering carbon and enhancing the resilience of people and ecosystems affected by desertification, land degradation, drought and climate change.~~

~~41. The UN General Assembly reaffirmed in 2018 that achieving land degradation neutrality (LDN) can act as an accelerator and integrator for achieving the SDGs and can catalyze sustainable development and climate financing. IUCN has recently (2020) launched the Global Standard for Nature-based Solutions to provide a user-friendly framework for verifying, designing and scaling up NbS measures and technologies[70]. This guide was informed by the results of the numerous projects implemented by IUCN, globally, working with many partners and supporters, combining the latest science with the traditional knowledge of local communities to reverse habitat loss, restore ecosystems and improve people's well-being (ibid). Furthermore, by 2020, ecosystem-oriented measures were included in the Nationally Determined Contribution (NDCs) of 133 governments (66 % of Party Members) as a climate mitigation and adaptation strategy[71], with developing countries more readily including ecosystem-based approaches in their NDCs than developed countries. As at March 2020, all 19 of the National Adaptation Plans (NAPs) that had been submitted to the UNFCCC included some consideration of ecosystems and the services they provide, and most had specifically included NbS measures in their plans, especially in forests, freshwater, and coastal ecosystems.~~

~~***National Policy Initiatives***~~

National Policy Initiatives

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

~~[70] IUCN (2020). Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN.~~

~~[71] United Nations Environment Programme (2022). Harnessing Nature to build Climate Resilience: Scaling up the use of Ecosystem-based Adaptation – Full Report. Nairobi.~~

42. National Adaptation Plan of Action (NAPA): ~~*Somalia formulated its NAPA*~~ Formulated in 2013, ~~*based on a thorough national level stakeholder mapping and analysis of the climate vulnerability of key sectors. A village level analysis and mapping of local vulnerabilities complemented this analysis. The NAPA identified*~~the NAPA identifies critical adaptation actions such as rangeland restoration, disaster risk reduction, sustainable land management, agroforestry, afforestation, and clean energy investments ~~*as critical adaptation actions with the greatest mitigation co-benefit potential. The overarching vision for the NAPA is*~~. It aims to ~~*make the Somali people more resilient*~~enhance resilience to climate change, ~~*recognizing their*~~acknowledging Somalia's high vulnerability ~~*in an economy dominated by a high*~~ due to its dependence on natural resources[72]. ~~*Furthermore, the country is in the process of developing a NAP, with technical assistance from UNDP.*~~ .

43. Intended Nationally Determined Contribution (INDC~~*): the country*~~) and NDC: Somalia developed ~~*the first Intended*~~its INDC in ~~*November*~~ 2015~~,~~ and updated it to an NDC in 2021. Both ~~*policy*~~ documents ~~*recognize*~~prioritize sustainable development, peace~~-~~building, and climate adaptation ~~*to climate change as the highest*~~as national priorities ~~*for the Somali people and their governments at FGS, Member State (MS) and Local Government (LG)*~~ across federal, member state, and local government levels. ~~*The overall adaptation objective of the NDC is to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change through mainstreaming climate adaptation into sustainable development*~~[73]~~.~~

44. National Development Plan – 2020 – 2024 (NDP-9~~*)*~~[74]~~:~~): NDP-9 ~~*recognises*~~recognizes climate disasters as a ~~*one of the key drivers*~~major driver of poverty in ~~*the country,*~~Somalia. It emphasizes better management of environmental and ~~*specifically mentions land*~~natural resources and ~~*water resource degradation of the Shabelle river basin. It identifies six "*~~building resilience among households, communities, and government as key imperatives~~*" that will inform and bind together the pillars of the development of the political and security infrastructure. These 6 imperatives are considered an essential wrap into which the programming responses to NDP 9 goals are woven. Two of the six imperatives are "Better Management of Somalia's Environment and Natural Resources" and "Building the Resilience of Households, Communities and Government".*~~ .

45. National Disaster Management Policy: ~~*Somalia developed a National Disaster Management Policy, approved in 2018; whose implementation is driven by the National (and MS level) Disaster Management Committees, guided*~~Established in 2018, this policy guides disaster management efforts in Somalia. It is supported by the National Disaster Risk Reduction (DRR) Strategy~~. The DRR strategy focuses on tackling~~, focusing on addressing underlying disaster risk drivers~~, among them the~~ including unsustainable use of natural resources, ~~*environment deterioration*~~environmental degradation, conflict, poverty, ~~*unplanned*~~ and rapid urbanization~~, institutional arrangements and capacities for DRR. Use of NbS measures and technologies~~. NbS are recognized as effective tools for flood and drought mitigation ~~*measures, hence DRR tools. The Somalia Disaster Management Agency is in the process of preparing a Framework for Flood Specific Anticipatory Action in Somalia*~~.

- ~~*The*~~ Somalia Resilience and ~~*Resilience*~~Recovery Framework (RRF) (2018~~*) helps*~~): This framework aims to transition Somalia ~~*progress*~~ from early drought recovery to long-term resilience and ~~*mitigation of disaster risk, with vulnerabilities caused by frequent climate-related issues. It aims to break the cycle of humanitarian crisis. The 3–5-year framework primarily aims to facilitate a more*~~ disaster risk mitigation. It focuses on efficient financial ~~*response by the Somali government and its development and humanitarian partners, using current funding methods and aid coordination structures. The RRF prioritizes areas and outcomes in*~~responses, prioritizing sectors like agriculture, food security, water, sanitation~~ and~~, hygiene (WASH), education, transportation, ~~*the*~~ environment, social protection, gender, governance, and disaster management.

~~46.~~

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

47.28. 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. This workThe 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 such as the task forces established to coordinate its implementation and the National Flood and Drought Task Force established to coordinate inter-ministerial responses to droughts and floods. The project objectives were: (i) to provide an enabling environment to support government ownership and coordination of flood risk reduction. (ii) To improve the ability of communities to adopt flood risk mitigation measures; (iii) to establish evidence-based documentation of effective strategies for flood management. UNEP's scope of work under the project was to provideUNEP's role included providing data, information and tools to carry outfor assessing flash flood risk assessmentrisks and conductconducting research on the applicability of Nature-based Solutions (NbS) for flood and drought mitigation. UNEP-DHI delivered three results that are highly relevant to the proposed project. The first one was). Deliverables included a catalogue of tested NbS measures targeting flood and drought in the Somalia context; the second is the result of, modelling a selection of theeffective options with highest potential using hydrologic and hydraulic mathematical modelling; the third is , and indicators for guiding future prioritization of the most suitableprioritizing NbS, giving priority to indicatorsrelating specifically to with flood mitigation potential.

The NbS catalogue

29. The NbS catalogue (Table 1 in Annex of Figures) was, developed primarily via desk research. It, contains a record of previouspast and currentpresent documented NbS primarily for flood and drought management, drawn in Somalia and similar climates. It draws from available research articles, reports and publicly available development project , and evaluation and assessment reportsdocuments of projects, covering Somalia and other locations with a broadly comparable climate. Here the focus was on capturing relevant solutions with limited (documented) application in Somalia specifically. The report noted that manyMany NbS measuresin the catalogue have been used primarily for addressinghistorically to address drought (, focusing on water capture and storage to provide water for human and livestock consumption); and that many of the structures and approaches used are based on traditional. Traditional methods —e.g.like berkhads, gabions, earth dams, and soil bunds. Furthermore, many traditional water capture and storage structures fall under the 'hybrid' NbS type — meaning that the solutions do not rely exclusively on ecosystem services to provide the expected benefits. 'Hard' are prevalent. These structures are often blended with "hard" construction materials such as stones, wires, and cement, etc. are used to establish the body of the structures. However, these can and have been used in combination with green measures such aslike revegetation and reforestation. Given their long record, basis in , 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 use of locally available materials for establishment, theseresilience. They are considered highly important for upscalingvital for expanding NbS applications., leveraging their historical use and adaptation to local conditions.

48.

NbS and hybrid measures with the highest potential for mitigating floods

49.30. 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. The wadis were selected because their

~~geographic locations represent a risk of flash floods for both cities, as proven by the many recorded floods over the past ten years. The modelling was based on the fact that increased sediment deposition in the Shabelle River is a major contributor to flooding; and that more frequent floods may destabilize riverbanks. Furthermore, riverbank collapse possibly caused or exacerbated by sediment erosion processes also contribute to flooding. The assessment investigated the sediment transport processes in the upper Shabelle River using a hydraulic river model with sediment transport components. The baseline sediment transport model developed confirmed that the primary sediment process is deposition. Although most locations along the river experience both erosion and deposition, 23% of the river is primarily eroding, and 77% is primarily depositing (Fig. 6). This was corroborated by the river breakage information provided by SWALIM which proved that overflow riverbank breakages are proportionately distributed between eroding and depositing river reaches, indicating that erosion is not an important process for riverbank collapse (Fig. 7). The assessment therefore focused on NbS measures on:~~ 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.

- ~~**Bank stabilization** – to reduce risks of bank collapse and breakages through soil stabilization and soil erosion control measures; change in land management practices and behavior is also an important variable.~~
- ~~**Sediment control** – to improve sediment management, which may create sediment and silt accumulation, further increasing flooding risks.~~
- ~~**Reduction of soil erosion and soil degradation** – factors which may exacerbate risks of flash floods and soil stability in embankments.~~

50. ~~The modeling results showed that a **combination of V-shaped weir and sand dams** (Fig. 8) gave the best results in reducing peak flow and promoting aquifer recharge. A sand dam is a reinforced cement wall built across a river channel, often built by securing one or two long concrete barriers across river beds and placing a pipe under these barriers. When it rains, the water carries the sand downstream, depositing it against the concrete wall. Eventually, the area behind the wall becomes filled with this sand. At the end of the rainy season, water remains trapped in this piled-up sand. This water gradually drains into the pipe and can be collected using a basic hand pump or simply by digging into the sand deposit upstream of the dam. A v-shaped weirs is a structure similar to the sand dam, but with a v-shaped opening that starts at the riverbed level and reaches a width of 5 m at the top of the weir. This allows low flow to passthrough, making the weir more efficient for flood peak reduction.~~

51. ~~While the sand dams performed better at increasing infiltration increasing it by more than 200%) (For instance in Beledweyne, they are almost ineffective at reducing peak flow (reducing it by a mere 1%) (Table 5). The v-shaped weir performs better at increasing infiltration (23%) and reducing peak flow (30%). However, the combination of the sand dams and the v-shaped weir gave the best performance, increasing infiltration by 118% (at 1.5 meter) and 156% (at 2 meters) while reducing peak flow by 21% and 8% at 1.5 meters and 2 meters respectively. Indeed, the combined V-shaped and sand dams showed potential of reducing floods by up to 60% in Qardho and up to 38% in Beledweyne. The results vary based on the size of the event,the season, and the area, but the v-shaped weirs show the potential can significantly reduce flood peaks and thereby reduce losses of lives and property in downstream settlements. The highest efficiency can be expected at locations where floods are~~

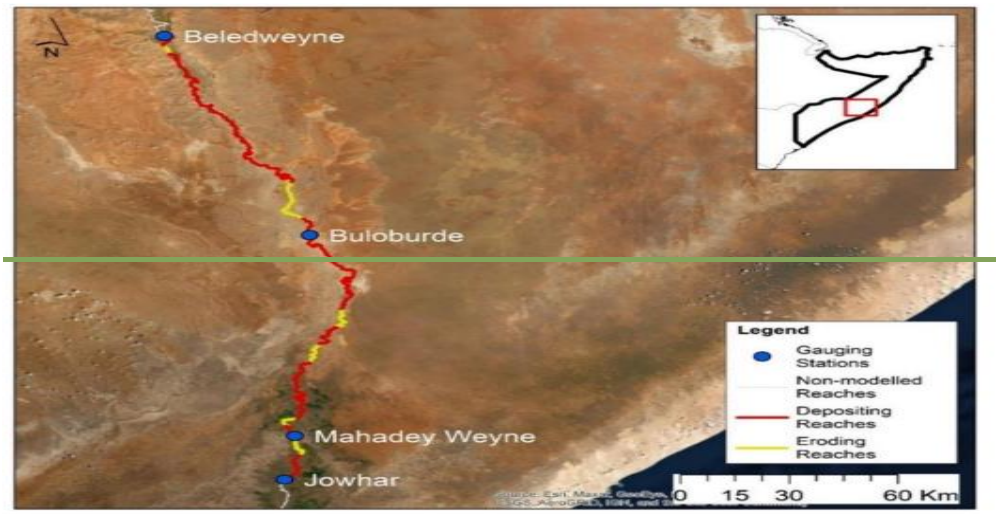
~~particularly flashy, having high maximum flow values but limited total volume of run-off. Furthermore, trade-offs between infiltration and peak flood control are clear, with poorer performance in flood peak reduction leading to more infiltration and vice versa.~~

~~52. Two other NbS measures tested via modelling did not prove to be as efficient in reducing flash floods, with the report concluding that: (a) Terracing, implemented for agricultural purposes, could contribute to reducing flash flood runoff; (b) Re-planting of trees on 5% of the catchment area, corresponding to the loss of forest cover over the last 30 years, would have little impact on flash floods. However, these measures are more efficient at mitigating drought impacts on agriculture.~~

~~Table 5:~~

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[75]

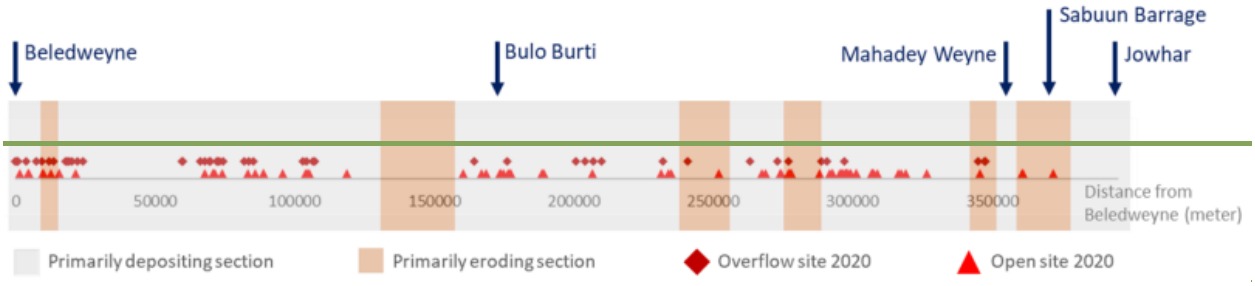
Scenario	Average infiltration [m^3/d]	Infiltration increase from baseline [%]	Flood peak reduction from baseline [%]
Baseline	240	0	0
V-shape	295	23	30
Sand dam	727	203	1
Combined 1.5 m	522	118	21
Combined 2 m	614	156	8



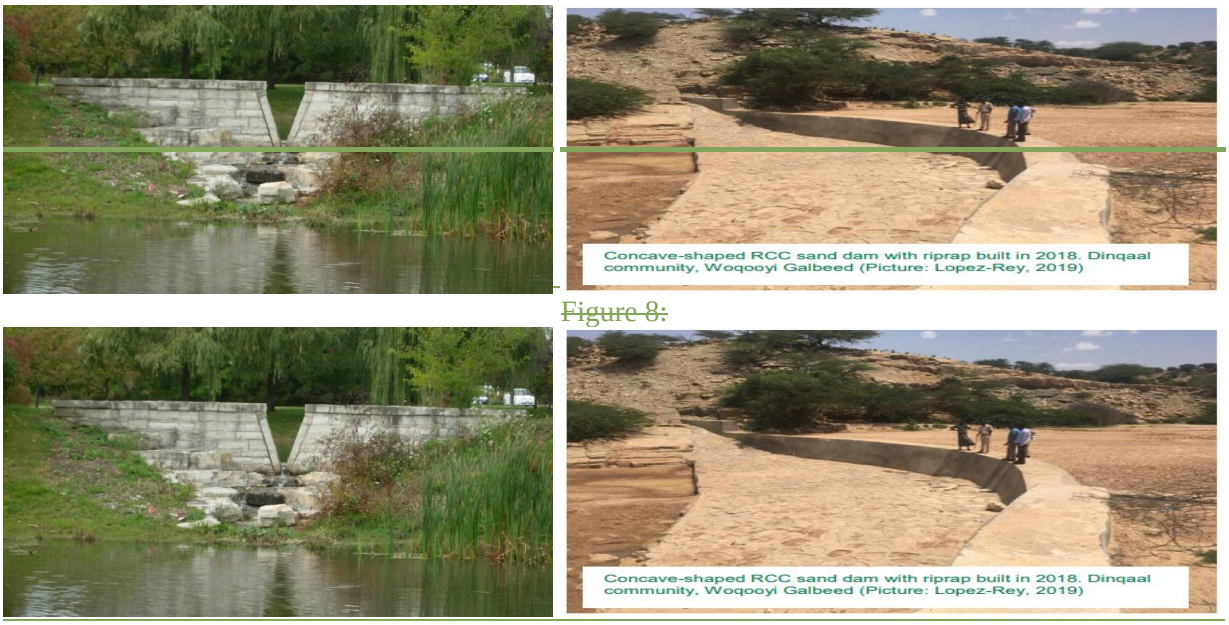
~~Figure 6: Depositing and Eroding River Reaches in the Shabelle River as Identified From the Baseline Scenario[76]~~

[75] 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.

~~[76] Source: Ministry of Energy and Water Resources, Federal Republic of Somalia – 2022: Sustainable Flood Management and Risk Reduction Action: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia~~



~~Figure 7: Location of Eroding and Depositing River Reaches Shown in Profile (Grey & Brown Panels). Location of Overflow and Open Sites From the FAO-SWALIM FRRIMS database for baseline year 2020[77]~~



~~Figure 8:~~

Figure 3: V-Shaped/Notched Weirs[78] (Left) and Sand dam (Right)[79]

Proposed indicators to guide the prioritizing NbS interventions

~~53.~~31. The project proposed a framework of indicators to guide stakeholders (government, development community, local communities, etc.) when planning and prioritizing NbS interventions ~~(Fig. 2 in Annex).~~. 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.

~~54.~~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~~, the project is~~ and implemented

~~[77] Source: Ministry of Energy and Water Resources, Federal Republic of Somalia – 2022: Sustainable Flood Management and Risk Reduction Action: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia~~

[78] 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*

[79] 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

by UNDP in ~~partnership~~collaboration with ~~the International Organisation for Migration (~~IOM~~) and the United Nations Human Settlement Programme (~~ and UN-Habitat~~). The~~, this project is part of ~~a~~ broader ~~set of durable solutions programs that aim~~efforts to provide ~~long term~~ durable solutions to ~~displacement affected~~displaced communities ~~by strengthening the capacities of government at all levels and capacities of communities to work together to address challenges of the IDPs in an accountable and transparent manner. The project target areas were~~in Galmuduug and Hirshabelle (cities of Jowhar, Balcad, and Beledweyne~~), where it build~~). It aims to strengthen government and community capacities to address challenges through accountable and transparent approaches. Building on the ~~momentum for state/district expansion of authority and accountability (supported by the~~ UN Joint Programme on Local Governance ~~- JPLG) to address challenges of conflict, displacement~~(JPLG), it focuses on expanding state/district authority, enhancing livelihoods, and promoting community cohesion~~ through government-led but community-driven solutions, improvement in livelihoods and local economy informed by~~, with gender~~-differentiated baselines. The programme had~~ considerations integrated across four main components: Community Empowerment~~ and Social Cohesion;~~, Urban Resilience~~;~~, Livelihoods and Employment~~;~~, and Gender and Women's Empowerment~~, crosscutting across all components.~~..

~~55.~~33. Under the Urban Resilience component, the project developed various working papers, tool kits, urban profiles, base maps and city resilient plans for Jowhar[80] to build the capacity of government and its partners in securing resilient urban development[81]. 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[82]. 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.

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"[83]

~~56.~~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. ~~SWALIM provides information on water and land resources, to inform planning and management, filling a critical gap, for which it is widely recognized[84] (example – Important reports produced by SWALIM include: a) mapping of riverbank breakages and areas of potential flooding along the Juba and Shabelle Rivers in southern Somalia (2014)[85] using high resolution~~

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

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

[82] 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.

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

~~[84] FAO-SWALIM Recognised For Partnership With Banadir University.~~

~~[85] FAO SWALIM: Somalia Water and Land Information ManagementSWALIM Completes Mapping Riverbank Breakages on Juba and Shabelle Rivers | FAO SWALIM: Somalia Water and Land Information Management~~

satellite images; b) Current and historical river flow for the Juba and Shabelle Rivers – River Levels Flood Risk and Response Information Management System (FRRIMS)[86]; c) Climate Change Projections and the Associated Potential Impacts for Somalia[87] d) Land Use Characterization of the Juba and Shabelle Riverine Areas in Southern Somalia[88] and (e) river breakage information, which is updated regularly and availed on line[89] (Fig. 3 in Annex of Figures shows the September 2023 status of river breakage report).It provides information on water and land resources, to inform planning and management, filling a critical gap[90].

57.35. **Building Resilient Communities in Somalia (BRCiS) (on-going since 2013):** BRCiS is a humanitarian consortium that holistically supports Somali communities in developing resilience to shocks and ability to move out of poverty. 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). Consortium Members work together to leverage integrated programming models, flexible multiyear funding streams, community participation and ownership structures, and the expertise and resources of local and international agencies.

58. Since the beginning, the The BRCiS consortium was committed to has focused on a bottom-up decision-making model and has built a strong foundation for , working through existing community structures, which has empowered to ensure that programming is fully informed by and is based upon programs meet the needs of vulnerable populations. By the end of the second Phase II in 2022[91], the consortium, it had established 194 Community Resilience Committees (CRCs) acrossin 34 districts. These CRCs act as the nucleus for establishingform volunteer committees and associations representingthat enable community members in-driven decision-making, making the programme flexibleprogram adaptable and responsive to learning and community needs and experiences.. The consortium has also establisheddeveloped community –based early warning systems that effectively provide alerts to emerging for climate hazards, which enables targeted anticipatory action and effective early response. It has also supported diverse income –generating and livelihood options to stabilise economic growth at the local level, as a pathway to financial inclusion, income stabilisation and economic growth. Private sector engagement has supported the latter, with the consortium acknowledging that a partnership model in which humanitarian organisations collaborate, and engaged with the private sector and other institutions on what they each do best to create for long-term resilience gains is an important challenge for resilience projects.

59.36. . The consortiumprogram is about to start implementing a third phase, which strongly emphasizes natural resources management to restore ecosystems services as a basis of sustaining ecosystems services. The programme enter Phase III which will work infocus on five areas: i) improve the health, food security, and nutrition status of marginalised communities by restoring vital ecosystem services through community-led regeneration and strengthened, more inclusive natural resource management; ii) increase demand for and sustainable local production of nutritious food; iii) engage members of marginalised communities in diverse market-based livelihoods and financial inclusion initiatives; iv) increase access to financial assets, meet basic needs and increase investment in collective and individual resilience capacities; v) engage local leaders and community-led structures to become more inclusive and better understand, advocate for and manage community priorities1) Health, Food Security, and Nutrition, 2) Nutritious Food

[86] River Levels | Flood Risk and Response Information Management System | FAO SWALIM

[87] Climate Change Projections and the Associated Potential Impacts for Somalia (scirp.org);

[88] https://www.faoswalim.org/resources/site_files/L-07%20Land%20Use%20Characterization%20of%20the%20Juba%20and%20Shabelle_0.pdf

[89] http://frrims.faoswalim.org/rivers/breakages

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

[91] Norwegian Refugee Council, 2022: End Term Evaluation Report for – Building Resilient Communities in Somalia, Phase 2.

Production, 3) Market-Based Livelihoods, 4) Financial Assets and Resilience, 5) Community engagement.

60.37. **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 programme goal is program aims to improve the performance of local governments (LGs to enhance) in Somalia, enhancing local governance and service delivery for the benefit of the Somali people – thus contributing to establishing a functional local governance institution in the country. Support is delivered via. It supports three main outcomes: Policy Reform, which seeks to finalize policy, legal and regulatory frameworks on local governance; capacityCapacity Development where LGs have the capacity to deliver equitable and sustainable services, promote economic development and peace; and inclusion where LGs are able to demonstrate improved engagement of citizens, with an emphasis on women and marginalized groups., Inclusion. A core component of the latter is the formation ofkey element is forming District Councils, establishing systems for local governance structures, and strengthening their capacity to promotefor democratic and accountable LGs that providegovernance to ensure better basic services forand stability and enhanced peace., In 2023, the UN Joint Programme on Local Governance (JPLG) developed an adaptation plan for LGs, emphasizing focusing on Nature-based Solutions (NbS measures) to mitigate climate hazards such aslike floods and droughts (Fig. 4 in Annex of Figures). JPLG is funded by Denmark, the European UnionEU, Norway, Switzerland, Sweden, USAID, the UK, and the UN Peacebuilding Fund. The programme , and is implemented by five UN agencies – the United Nations Capital Development Fund, the: UNCDF, UNDP, UN-Habitat, UNICEF, and the International Labour OrganisationILO.

61.38. Improving adaptive capacity via improved natural resources management and conservation (2023-2027): IFAD, in partnership with Sadar, is rolling out a project to contribute to land restoration, biodiversity conservation and restoration of degraded ecosystems, as well as improvement of adaptive capacity of vulnerable smallholder households, through climate resilient sustainable natural resource management[92]. Targeting five districts where natural resources are seriously degraded (Beledweyne, Hirshabelle State) among others[93], the project aims to enhance the climate resilience of poor rural households through sustainable natural resources management on multiple levels: improved water resources and adaptive farm and pastureland management; eco-agriculture and climate-proof livelihoods; forest/habitat restoration; improved governance and information systems for land degradation and biodiversity". One of the project outcomes will equip vulnerable households to implement nature-based solutions and climate-resilient technologies and practices across productive landscapes (farm and pasture lands).

62. Furthermore, Sadar is hostingIFAD and runningSadar 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 Innovation Hub (Somali RIHUB)[94] and is), part of the Global Response Innovation Lab network operating in country as the(SomRIL), enhancing Somali Response Innovation Lab (SomRIL). SomRIL is an inter-agency partnership which co-creates and applies effective innovations to enhance the impact ofresilience through innovative interventions to improve the resilience of the Somali people. . Additionally, Sadar is implementing several community based capacity -building projects in Hirshabelle and South West States.

63.39. **Programme for Sustainable Charcoal Reduction and Alternative Livelihoods (PROSCAL)[95] (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

[92] IFAD, undated - Adaptive Agriculture and Rangeland Rehabilitation Project (A2R2) – Somalia (Jan 2023 to Dec 2027):
[93] The other districts are Baydhaba, Gaalkacyo and Dhuusamarreeb (South West State), and Cabudwaaq (Galmudug State)
[94] https://www.ranlab.org/
[95] Programme for Sustainable Charcoal Reduction and Alternative Livelihoods (PROSCAL)

energy security and ~~more~~ resilient livelihoods by ~~gradually~~ reducing unsustainable charcoal production, trade, and use. ~~The programme supported the development of~~It developed alternative energy sources, rehabilitated degraded land, and ~~helped local residents secure more~~created sustainable jobs. ~~Its main objectives were: (i) to mobilize key~~Objectives included mobilizing stakeholders ~~in the region and build institutional capacities among~~, building government ~~entities across Somalia for effective monitoring and enforcement of the charcoal trade ban, energy security and natural resources management; (ii) To support the development of~~capacities, developing alternative energy ~~resources; (iii) To facilitate a transition towards livelihood options that are~~ , transitioning to sustainable~~, reliable and more profitable than charcoal production; (iv) To begin~~ livelihoods, reforestation ~~and afforestation throughout the country to rehabilitate degraded land; (v) To build~~, and forming Regional Economic Partnerships to curb ~~the unsustainable~~ charcoal use~~, trade in, and production of charcoal in Somalia~~.

~~64.~~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.

~~65.~~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. ~~PBCRGs provide funds to cover the additional costs of making local investments climate resilient. The grants are channelled through existing government fiscal transfer systems. LoCAL sets minimum conditions, performance measures and a menu of eligible investments. Putting the grants in place typically involves: (a) Undertaking local climate risk assessments to inform adaptation planning and mainstreaming; (b) Integrating adaptation in a participatory and gender-sensitive manner into local development planning and budgeting; (c) Disbursing grants within LGs' annual planning and budgeting cycles (d) Developing, selecting and implementing adaptation measures e) Appraising performance to see how resources have been used and conducting audits as part of a regular national process. LoCAL established the Somali Chapter in 2022 and are in the process of rolling out the PBCRGs programme.~~

PROBLEM TO BE ADDRESSED BY THE PROJECT

~~66.~~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.

~~67.~~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.

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

~~68.~~44. ~~Despite the rapid advancement of the technical capacities at the global level, the overall use of NbS effectively in~~ 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.

~~69.~~45. ~~Furthermore, Hirshabelle and the South West are among the newly formed States, where capacity is much lower than the older States[96]. Although several capacity building programmes have been implemented (e.g. SWALIM providing data on water and land management, UNEP-DHI capacity building and testing of NbS measures to manage floods and JPLG building capacity of LGs to deliver services at the local levels), there are still huge capacity gaps in adaptation and the use of NbS measures to tackle climate driven hazards, particularly more intense and frequent floods and droughts.~~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 approach97 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.

~~70. Like in many other parts of the world, the information on NbS available remains within a few institutions and international organizations and has not trickled down adequately to decision-makers, natural resources managers and communities. This has led to two interrelated challenges that hinder the uptake of NbS especially among policymakers, private sector actors and the local authorities and technicians tasked with implementing NbS on the ground. i) Limited awareness of the importance of nature and NbS in adaptation; ii) Inadequate access to practical and up-to date knowledge products, technologies and information for scaling up NbS by communities (herders and farmers and urban households). Critical stakeholders lack practical knowledge and skills to improve upon traditional practices to make NbS effective in mitigating climate risks. They may also lack specific information to support planning and effective use of NbS and hybrids such as climate change projections, vulnerability of various stakeholder groups, benefits and effectiveness of different NbS measures.~~

~~[96] Pablo Fernández Maestre and UN-HABITAT, 2020: Beledweyne Urban Profile Working Paper and Spatial Analyses for Urban Planning Consultations and Durable Solutions for Displacement Crises~~

[97] 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.

71. These knowledge gaps often make it difficult to design effective NbS initiatives. This challenge is exacerbated by the fact that policymakers and local authorities often lack staff with the necessary technical skills to effectively design, implement and mainstream NbS into relevant policies, plans and investments. Many engineers, planners and technicians tasked with implementing NbS on the ground are trained in conventional engineering approaches and lack the requisite skills for ecosystem management and related stakeholder consultation processes. These capacity deficits lead to the next barrier, the inability to produce high-quality data and information for planning and implementing NbS and hybrid measures.

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

72. To be effective and efficient, NbS requires knowledge based climate smart catchment/ecosystems level planning, to identify current and projected vulnerabilities to climate hazards, stakeholders at various levels of exposure and sensitivity to the hazards and potential measures needed to mitigate such hazards at various levels. Indeed, all Nature based Solutions consist of measures that can be implemented directly by households (land users/managers) and those that need to be implemented at landscape or ecosystem scale, by diverse stakeholders including agro pastoralists, public agencies, landowners and the private sector. Up to date good quality information is necessary to identify the right level of intervention, especially determining whether the intervention should be at ecosystem or catchment level. It is also important to identify the climate vulnerabilities and challenges to be addressed, the ecosystems services at risk, and the optimum methods to secure them.

73. Careful, knowledge based planning is also important in identifying potential and actual trade offs. This is necessary because while landscape level measures may generate important broader societal benefits (e.g. watershed services, flood control), they may present a higher burden on individual households (e.g. foregoing production in certain areas). They therefore require funding and implementation beyond the scope and footprint of a single household or individual. A landscape overview is also necessary to ensure that NbS does not promote maladaptive practices or encourage leakage[98]. For example, reforestation or afforestation through monocultures or low diversity plantations could reduce habitat and biodiversity. For these reasons, NbS should be guided by smart landscape level plans that identify the various scales of intervention required to maximize benefits (systematically to maximize benefits to households, communities and nature), understand impact if actions are scaled up and identify and deal with any necessary trade offs, identify institutions and policies required to sustainably incentivize these NbS measures for long term benefits.

74.46. 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[99]. Furthermore, the MOEWR produced a Shabelle Basin Diagnostic Report[100] 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, making it difficult for FGS and MS officials to access the river system, and inadequate capacities (individual, institutional and systemic) for water resources management at all levels.

75.47. The development of a catalogue of NbS measures for managing drought and floods ready for

[98] 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.

[99] http://frrims.faoswalim.org/rivers/breakages

[100] Government of Somalia, 2021: Shabelle River Diagnostic and Strategic Action Plan, Somalia

upscaling and replication in Somalia[101] and the modelling of NbS and hybrid measures for flood control have significantly contributed to addressing the data gaps. However, while acknowledging that manyMany NbS measures currently in use in the country are based on traditional knowledge, the Ministry (ibid) concluded. The government acknowledges that lack of data wasis still a key challenge that affected theaffects quality of the research and probably reduces the effectiveness of the NbS measures. The lack of data. This has led to difficulties such as insufficient site assessment causing malfunctioning of NbS measures in use; insufficientassessments, and evaluation and management of sediment and silt processes, weakening planning for NbS.. Inadequate catchment-level NbS planning, which fails to cater for externalities and leakage (e.g. transferring the potential risks to other locations), may also leadleads to land use conflicts.

76.48. 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 a limited store of scientific knowledge and paucity of research specific to Somalia, making it difficult to undertake comprehensive planning in any sector, without first generating the relevant information. The NbS modelling report recommended that the accuracy and efficiency of the selected 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 (Text Box 1 in Annex of Figures lists recommendations on further work on NbS targeting flash flood mitigation and sediment reduction)..

77. Furthermore, during the development of district profiles and urban resilience plans for Jowhar and Beledweyne, the consortium implementing the Durable Solutions project warned that these plans are challenged by lack of up-to-date data and that require further refinement during the implementation processes. For instance, while acknowledging the potential of wetlands in flood control and providing ecosystem services (water filtration, mitigating water loss to evaporation in dry seasons), the partnership concluded that there is not enough information on their effectiveness. They recommended that it would be important to conduct a more detailed analysis of the ecosystem services provided by the wetlands and riparian vegetation to further understand their role in flood and drought mitigation and how to enhance it.

78. While community engagement is important in identifying NbS measures and planning their implementation, much traditional knowledge on the use of NbS has been lost (due to the young nature of the country's population where about 60% of the population is below the age of 35), and/or has been rendered ineffective due to the increased intensity and severity of climate hazards with ever declining recovery period in between hazards. While a combination of both technical/scientific and traditional/indigenous knowledge on NbS would provide the most ideal basis for planning effective NbS measures, both types of knowledge are currently limited.

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

79.50. Enabling policies are critical for the effective implementation of NbS measures. This is necessary because NbS delivers elements of both private and public benefits, meaning that market forces alone are unlikely to result in a societally optimal adoption of even the most promising approaches[102]. For many households and individuals, the transition to NbS may involve fundamental changes in how they use their

[101] Ministry of Energy and Water Resources, Federal Republic of Somalia – 2022. Sustainable Flood Management and Risk Reduction Action: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia

[102] 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

~~scarce land, aquatic resources (including freshwater and fish), labor and capital. The direct and opportunity costs of these changes are immediate and non-trivial, while the benefits can take years to manifest[103]. This is because the biological processes and knowledge required to restore agricultural ecosystems and leverage natural processes to replace synthetic agricultural inputs take time. In some cases, the transition period can even result in a short- term reduction in crop, livestock or fish yields and an increase in yield variability (ibid). It is therefore important to: a) identify the private benefits and co-benefits of NbS that have a private economic driver in the supply chain, and augment and amplify those with thoughtful policy; and b) recognize those benefits that are true externalities and/or public goods and tailor policy and financial incentives to level the economics and bolster their adoption~~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.

~~80. Moreover, the upfront costs, short-term risks and uncertainty associated with a transition to nature-based agricultural practices pose a significant barrier to adoption. This is particularly the case for poor farmers, many of whom are women, who face significant resource constraints — including capital, land, access to fisheries, and labour- and frequently cannot insure themselves against crop, livestock or fish production failure risks. For these farmers, the choice of which agricultural practices to adopt is inseparable from concerns over food security. Under these conditions, taking on the added costs and risks of transitioning to a new way of managing livelihood activities (such as farming, pastoralism) is extremely difficult. In the absence of smart policies and incentives, farmers and land managers may still make the economically rational choice of implementing lower cost, near-term solutions, rather than investing in unknown, more expensive and long-term NbS practices, such as terracing and grass buffer strips. As reported by IUCN[104], even for those NbS that make economic sense today, adoption and market penetration may be slow due to many factors such as lack of training, awareness, certainty of the financial return on investment, culture, ease of implementation, and non-economic factors. Other NbS may not be adopted because they're not yet profitable, even on a longer time horizon, in this case, policy, novel payment mechanisms and new business models will be needed.~~

~~81. Somalia does not yet have such smart policies or incentive packages to encourage adoption of NbS in relevant sectors and programmes. The two decades of instability (1991 – 2012) resulted in serious erosion of governance structures and policies in Somalia at the national and local levels. While the country is making progress towards recovery of governance, including formulation of relevant policies, mainstreaming NbS measures in the new and emerging policy frameworks is hindered by weak institutional and technical capacities compounded by inadequate awareness of the value of effective NbS in mitigating the impacts of climate hazards. Furthermore, formal education at all levels paid little heed to the role of NbS in adaptation and natural resources management, compounding the loss of traditional knowledge systems and practices in livelihoods activities such as agriculture, livestock production, urban and infrastructure development and other economic development initiatives.~~

~~82. Similar conditions prevail under pastoralism. When operating optimally, many pastoralists have rich knowledge of their rangelands environment and their customary institutions allow them to make use~~

~~[103] 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~~

~~[104] IUCN (2020). Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN.~~

~~of that knowledge for the sake of effective land and natural resource management. However, the effectiveness of the local management depends on how well their institutions are functioning and their capacity to sanction malpractice. The breakdown of those institutions, compounded by insecurity and loss of legitimacy weakens the effectiveness of pastoralism, contributing to land degradation. When governments fail to engage pro-actively with pastoral institutions and/or disrespect their role in decision making over resource use as well as their roles in other areas of pastoral life, it weakens these institutions and their ability to strengthen the uptake of NbS measures. Furthermore, pastoralism will fail to be an effective NbS without a deliberate overarching policy goal and political agenda of promoting and legitimizing pastoralism, protecting their territorial rights and security of their land tenure, strengthening market integration for diverse goods and services, enabling diversification of the income portfolio, and strengthening pastoralists' rangelands management capacities.~~

~~83. Policies, incentives and financial resources are also required to promote the use of NbS to alleviate climate hazards within urban planning, particularly for the urban poor. This is because, despite being recognised for their potential in mitigating climate hazards in the urban areas, the implementation of NBS in urban areas is limited globally and even less utilized in Somalia. Indeed, the several programmes have recently developed resilience plans (e.g. Jowhar and Beledweyne city resilient plans developed by Durable Solutions under MIDINIMO II, and Jowhar city resilient plans developed by Sadar in partnership with United Nations DRR and the Ministry of Humanitarian Affairs and Disaster Management (described in the Section on baseline programmes). These plans and related working papers, tool kits, urban profiles and base maps are useful for building the government's capacity to facilitate urban resilience and respond to their constituents' infrastructural needs. However, the impact of these tools and plans will manifest once they are implemented and heir provisions enforced by the relevant authorities, which requires financial resources and other relevant capacities. This requires a strong legal framework, planning principles and policies at the relevant levels. However, as explained earlier the newly established States of Hirshabelle and South West lack requisite financial resources and are yet to develop strong capacities and systems. Furthermore, due to a combined effect of inadequate financial resources, poor urban planning and rapid growth of informal settlements, weak capacities and poor intra and inter-sectoral coordination, city and city authorities rarely provide basic management of the urban environment: poorly maintained drainage system and inadequate rainwater management as well as weak soil and vegetation management leads to pollution and obstruction, exacerbating floods in urban areas. Furthermore, poor urban planning and rapid growth of informal settlements results in high exposure of the population to flooding as they tend to settle in flood prone areas, river buffer zones, streams.~~

51. ~~Mainstreaming the use of NbS in adaptation is further challenged by limited awareness and inadequate cross-collaboration across departments, inadequate political will and long term commitment: while NbS generally have long term and more uncertain outcomes, politicians tend to prioritize based on tangibility and immediacy of the outcome. These challenges are compounded by inadequate skills for improved and effective use of NbS, adaptation and natural resources management in general, and limited financial resources to pay for quality technical skills and competition for land. This is particularly true in the informal sectors of Somalia. Slums and IDP settlements are largely located in environmentally fragile areas on insecure land tenure. The socio-economic characteristics of slum dwellers and IDPs - high levels of poverty and illiteracy – mean that these communities have low capacity to deal with climate impacts and are often marginalized, finding it difficult to integrate into political and institutional processes.~~ 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.

~~84.~~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.

85. Somalia is, a least developed country with unique circumstances; the government lacks adequate financial capacity to mobilize funds for adaptation and mitigation priorities and will need the support of international partners., faces significant financial, technical, and capacity constraints in addressing climate change. According to the NDC, the countrySomalia requires US$ $58.5 billion to implement its adaptation priorities for 2021 –2030 to tackle the significant financial, technical, technological, and capacity constraints[105]..... Limited government revenues further restrict funding for long-term adaptation; when funds are available, these, often go towards redirecting resources to short-term measures to deal with shocks, such as prevailing drought and flooding, thereby addressing the symptoms rather than the root cause of thesefor immediate disasters[106]. Furthermore, even where they exist, like droughts and floods. Existing climate policies are rarely backed up by frequently lack implementation plans and funding[107]. Indeed, most . Most government institutions lack capacitiesstruggle to access multilateral and bilateral sources of climate funding, to remove barriers, to strengthen and to attract private sector investment in climate action, and to mobilize and effectively use climate funding. Replicating and upscaling of. NbS and hybrid measures to reduce negative impacts ofmitigate climate hazards isare not yet seen as a priority, evenprioritized within the adaptation programmes; hence it is barely allocatedprograms, receiving minimal budgetary resources. The lack of financial and other resources for NbS replication is exacerbated by inadequate mainstreaming of NbS considerations in relevant sectors, where it would benefit from the limited is inadequate, further limiting financial allocation to sectors. support. Planning documents, such as the two resilient plans (for Jowhar and Beledweyne and the JPLG Adaptation Plans for LGs) are inadequately implementedlocal governments, remain largely unimplemented due to lack of financial resources.

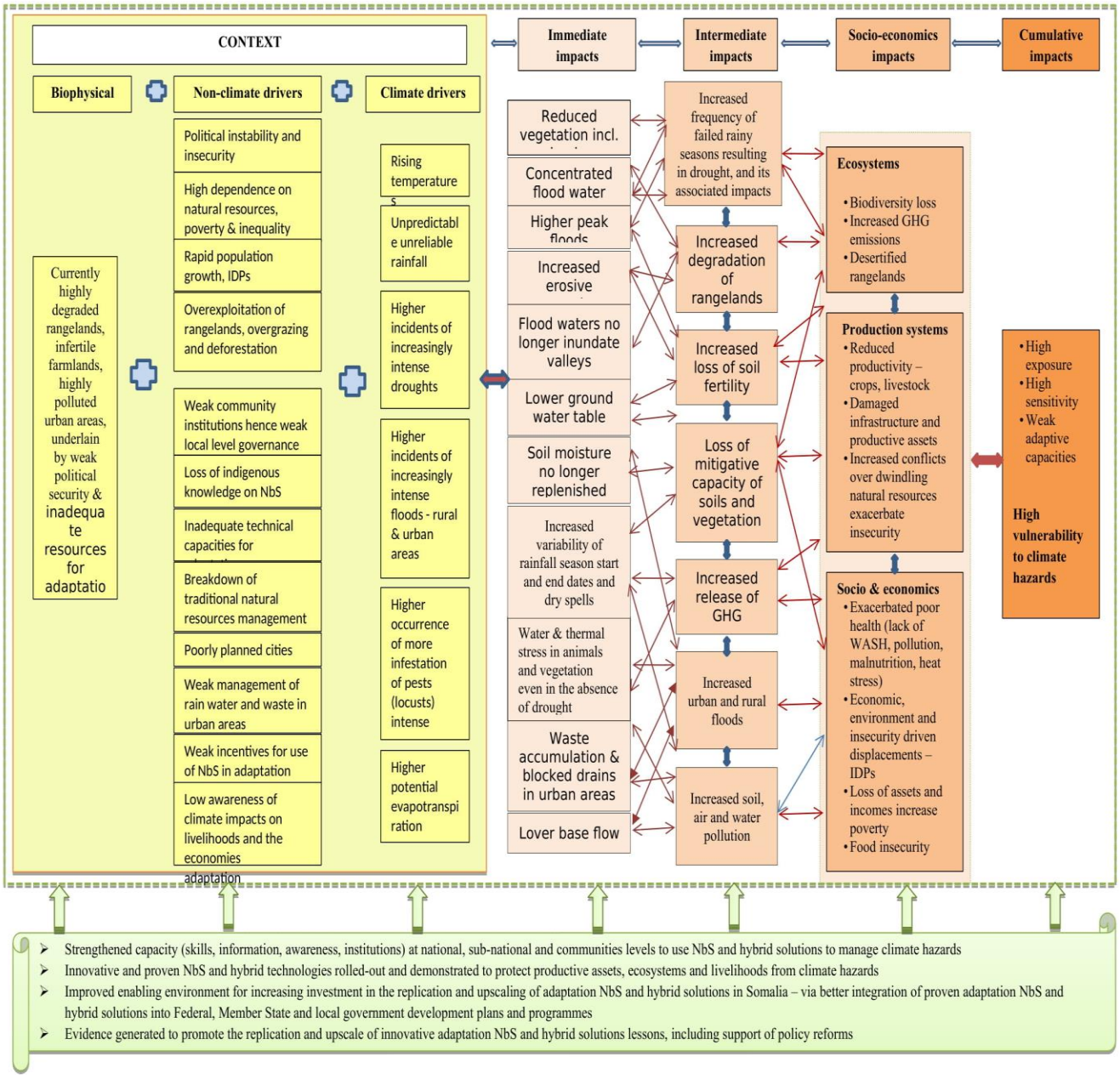
[105] The Federal Republic of Somalia, 2021: Updated Nationally Determined Contribution (Ndc) - Microsoft Word - Final Updated NDC for Somalia 2021.docx (unfccc.int)

[106] 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

[107] 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

53. constraints.

Figure ~~9:~~4: Problem Tree



B. PROJECT OBJECTIVES

~~86.~~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).

87.55. 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[108], 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

88.56. The theory of change (Fig. 105) 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).

89.57. 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

[108] 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.

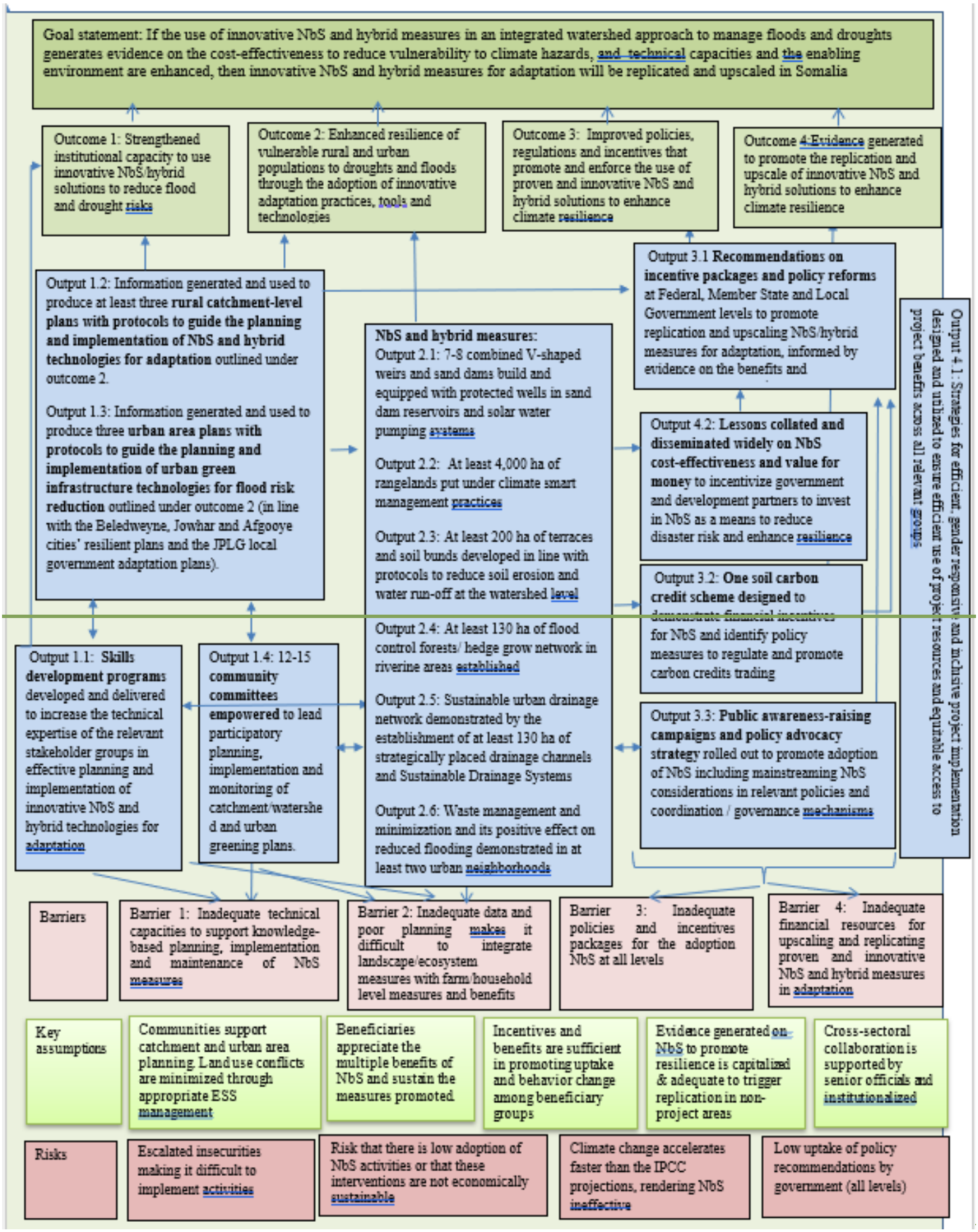
10,500 people. The project will refine the resilience plans, in line with the recommendations by the developers of the plans and implement selected green measures such as establish riparian forest buffers, enhancing hedgerow network on the borders of agricultural crop lands near the cities; establishing 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.

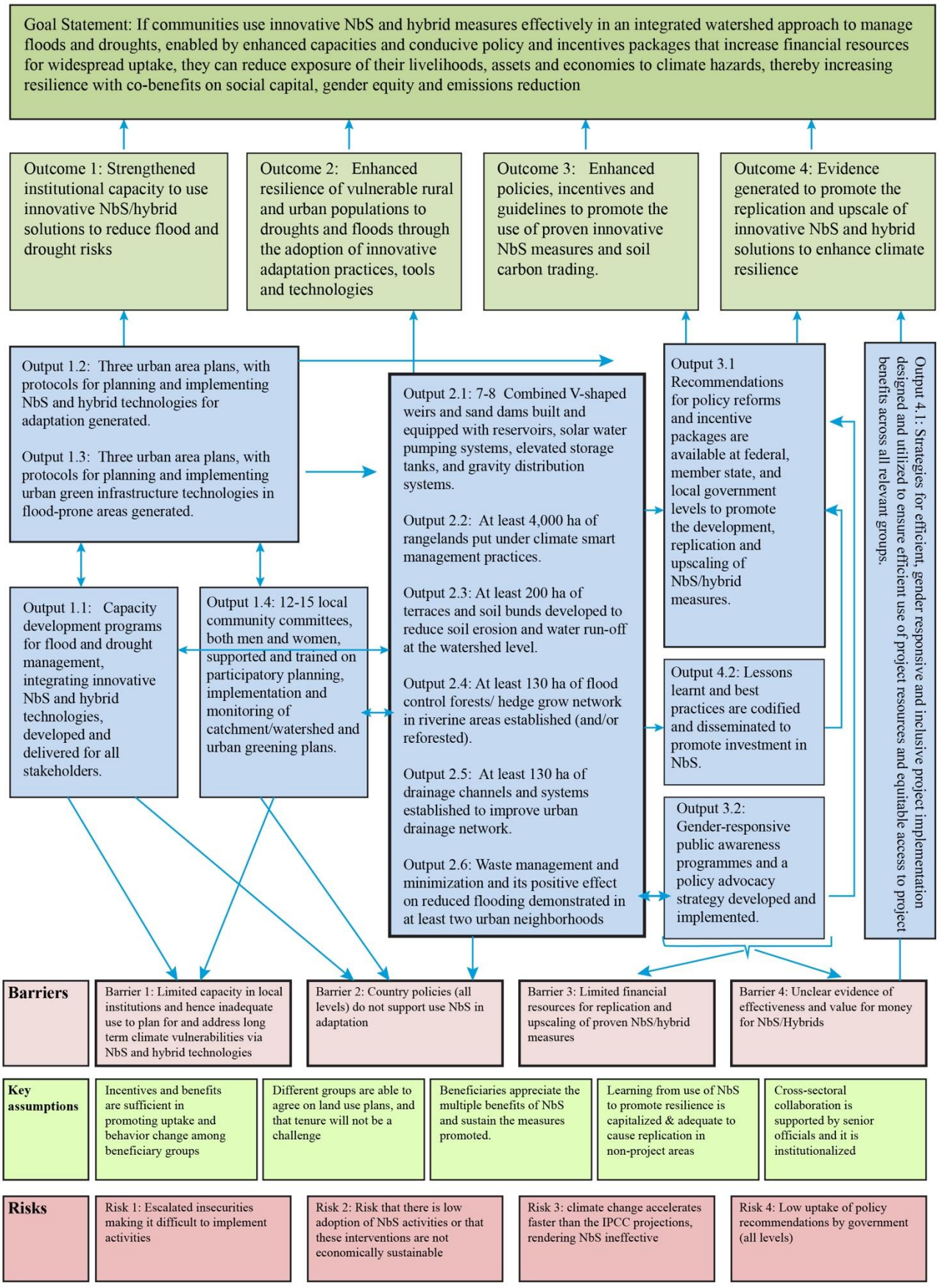
60. In particular, the project will **create awareness and identify and lobby for incentives package and policy reforms** to encourage greater replication of the proven NbS measures, supported by evidence of cost-effectiveness and benefits of these measures, generated via the KM process (Outcome 4). 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[109] 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).

[109] (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

Figure ~~10.~~5: Theory of Change


Goal statement: If the use of innovative NbS and hybrid measures in an integrated watershed approach to manage floods and droughts generates evidence on the cost-effectiveness to reduce vulnerability to climate hazards, and technical capacities and the enabling environment are enhanced, then innovative NbS and hybrid measures for adaptation will be replicated and upscaled in Somalia
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: Improved policies, regulations and incentives that promote and enforce the use of proven and innovative NbS and hybrid solutions to enhance climate resilience
Outcome 4:Evidence generated to promote the replication and upscale of innovative NbS and hybrid solutions to enhance climate resilience
Output 1.2: Information generated and used to produce at least three rural catchment-level plans with protocols to guide the planning and implementation of NbS and hybrid technologies for adaptation outlined under outcome 2.
Output 1.3: Information generated and used to produce three urban area plans with protocols to guide the planning and implementation of urban green infrastructure technologies for flood risk reduction outlined under outcome 2 (in line with the Beledweyne, Jowhar and Afgooye cities' resilient plans and the JPLG local government adaptation plans).
NbS and hybrid measures:
Output 2.1: 7-8 combined V-shaped weirs and sand dams build and equipped with protected wells in sand dam reservoirs and solar water pumping 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 in line with protocols 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
Output 2.5: Sustainable urban drainage network demonstrated by the establishment of at least 130 ha of strategically placed drainage channels and Sustainable Drainage Systems
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 on incentive packages and policy reforms at Federal, Member State and Local Government levels to promote replication and upscaling NbS/hybrid measures for adaptation, informed by evidence on the benefits and
Output 4.2: Lessons collated and disseminated widely on NbS cost-effectiveness and value for money to incentivize government and development partners to invest in NbS as a means to reduce disaster risk and enhance resilience
Output 3.2: One soil carbon credit scheme designed to demonstrate financial incentives for NbS and identify policy measures to regulate and promote carbon credits trading
Output 3.3: Public awareness-raising campaigns and policy advocacy strategy rolled out to promote adoption of NbS including mainstreaming NbS considerations in relevant policies and coordination / governance mechanisms
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: Skills development programs developed and delivered to increase the technical expertise of the relevant stakeholder groups in effective planning and implementation of innovative NbS and hybrid technologies for adaptation
Output 1.4: 12-15 community committees empowered to lead participatory planning, implementation and monitoring of catchment/watershed and urban greening plans.
Barriers
Barrier 1: Inadequate technical capacities to support knowledge-based planning, implementation and maintenance of NbS measures
Barrier 2: Inadequate data and poor planning makes it difficult to integrate landscape/ecosystem measures with farm/household level measures and benefits
Barrier 3: Inadequate policies and incentives packages for the adoption NbS at all levels
Barrier 4: Inadequate financial resources for upscaling and replicating proven and innovative NbS and hybrid measures in adaptation
Key assumptions
Communities support catchment and urban area planning. Land use conflicts are minimized through appropriate ESS management
Beneficiaries appreciate the multiple benefits of NbS and sustain the measures promoted
Incentives and benefits are sufficient in promoting uptake and behavior change among beneficiary groups
Evidence generated on NbS to promote resilience is capitalized & adequate to trigger replication in non-project areas
Cross-sectoral collaboration is supported by senior officials and institutionalized
Risks
Escalated insecurities making it difficult to implement activities
Risk that there is low adoption of NbS activities or that these interventions are not economically sustainable
Climate change accelerates faster than the IPCC projections, rendering NbS ineffective
Low uptake of policy recommendations by government (all levels)


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)

90.62. UNEP, Sadar, and the Somali government of Somalia currently collectively advocate for gender responsiveness and equitable access to project benefits by all groups, including for marginalized and minority groups. Project implementation will therefore be guided by a genderGender and stakeholder participation plansStakeholder Participation Plan (GASHPP) to maximizeensure the inclusion and ensure that the needs, interests and viewpoints of women, youth, the disabled, and other marginalized stakeholders are fully expressed and consideredgroups in decisions about NbS replication and related interventions. ImplementationAdditionally, an Environmental and Social Impacts Management Plan will also be guided by an environmental and social impacts management plan, to ensure that be developed to identify and manage potential risks are identified and strategies to manage them developed. All three . These plans will be designed during the full project development phase. These guidelines will to ensure that project results will contribute, equitably, to the national development priorities and, the Paris Agreement on climate, and sustainable development goals, despite the negative impacts of intensifying climate hazards on the overall attainment of these goals in Somalia. .

91.

92. Table 6 describes the project Components, Outcomes, Outputs and Activities. The inception phase of the project will involve: (i) formulating criteria for the selection of specific watersheds/catchments per district and the targeting of urban and rural communities; (ii) performing baseline assessments in the chosen project areas to quantify data on climate change vulnerabilities and validate site-specific interventions; and (iii) develop the GASHPP and Environmental and Social Impact Management Plans.

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

C. PROJECT COMPONENTS AND FINANCING

Table 6:3: 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: Skills Capacity development programs developed and delivered to increase the technical expertise of the relevant stakeholder groups (communities, technical institutions, CSO, private sector, Academia) in effective planning and implementation ofor flood and drought management, integrating innovative NbS and hybrid technologies for adaptation outlined under outcome 2 , developed and delivered for all stakeholders.	200,000
		Output 1.2: Information generated and used to produce at least three rural catchment level Three urban area plans, with protocols to guide thefor planning and implementation ofimplementing NbS and hybrid technologies for adaptation outlined under outcome 2generated.	170,000
		Output 1.3: Information generated and used to produce three Three urban area plans, with protocols to guide thefor planning and implementation ofimplementing urban green infrastructure technologies forin flood risk reduction outlined under outcome 2 (in line with the Beledweyne, Jowhar and Afgooye cities' resilient plans and the JPLG local government adaptation plans). prone areas generated.	105,000

		Output 1.4: 12-15 local community committees ~~empowered with relevant structures, awareness~~, both men and ~~know-how to lead~~women, supported and trained on participatory planning, implementation and monitoring of catchment/watershed and urban greening plans.	150,000
Component 2: Protection of productive assets and livelihoods by innovative and proven adaptation NbS and hybrid technologies	Outcome 2: Enhanced resilience of vulnerable rural and urban populations to droughts and floods through the adoption of innovative adaptation practices, tools and technologies	Output 2.1: 7-8 ~~combined~~ Combined V-shaped weirs and sand dams ~~build~~built and equipped with ~~protected wells in sand dam~~ reservoirs ~~and~~, solar water pumping systems, elevated ~~water~~ storage tanks, and gravity distribution systems ~~(livestock troughs, tap stands and irrigation outlets);~~.	1,000,000 [110]
		Output 2.2: At least 4,000 ha of rangelands put under climate smart management practices ~~incorporating measures such as pastoralist-led regeneration, optimal grazing intensity, silvopasture practices incorporating legumes into planted pasture for animal nutrition, selective enrichment planting, shade and fencing~~.	400,000[111]
		Output 2.3: At least 200 ha of terraces and soil bunds developed ~~in line with protocols~~ to reduce soil erosion and water run-off at the watershed level.	200,000[112]
		Output 2.4: At least 130 ha of flood control forests/ hedge grow network in riverine areas established (and/or reforested~~) in strategic locations – including riverine buffer forests, trees in open areas/streets and hedge grow fences around cropping areas~~).	300,000[113]
		Output 2.5: ~~Sustainable urban drainage network demonstrated by the establishment of at~~ At least 130 ha of ~~strategically placed~~ drainage channels and ~~Sustainable Drainage Systems~~[114] ~~-~~systems established to improve urban drainage network.	500,000[115]
		Output 2.6: Waste management and minimization and its positive effect on reduced flooding demonstrated in at least two urban neighborhoods	300,000[116]
Component 3: Improved enabling environment for investment in the	Outcome 3: ~~Improved~~ Enhanced policies, ~~regulations and~~ incentives ~~that~~ and guidelines to	Output 3.1 Recommendations ~~available on~~ for policy reforms and incentive packages ~~and policy reforms~~ are available at ~~Federal, Member State~~federal, member state, and ~~Local Government~~local government levels to promote the development, replication and upscaling of	~~100~~250,000

[110] 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.

[111] 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.

[112] 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

[113] 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.

[114] ~~These options include: infiltration trenches/ponds/soakaways; earthen bunds; rainwater gardens; filter strips; and urban water harvesting structures~~

[115] 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

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

replication and upscaling of adaptation NbS and hybrid solutions in Somalia	promote ~~and enforce~~ the use of proven ~~and~~ innovative NbS ~~and hybrid solutions to enhance climate resilience~~measures and soil carbon trading.	NbS/hybrid measures~~ for adaptation, informed by evidence on the benefits and effectiveness on NbS~~[117].	
		~~Output 3.2: One soil carbon credit scheme designed to demonstrate financial incentives for NbS and provide an opportunity for the Ministry of Environment and Climate Change to identify policy measures to regulate and promote carbon credits trading in the country~~	~~150,000~~
		Output 3.~~3: Public~~2: Gender-responsive public awareness ~~raising campaigns~~programmes and a policy advocacy strategy ~~rolled out to promote adoption of NbS including mainstreaming NbS considerations in relevant policies~~developed and ~~coordination / governance mechanisms for inter and intra collaboration~~[118]implemented.	250,000
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 ~~(gender mainstreaming, stakeholder participatory plan, M&E and KM plans).~~	150,000
		Output 4.2: Lessons ~~collated~~learnt and best practices are codified and disseminated ~~widely on NbS cost-effectiveness and value for money~~ to ~~incentivize government and development partners to invest~~promote investment in NbS~~ as a means to reduce disaster risk and enhance climate resilience~~.	200,342
Project/Programme Execution cost			438,295
Total Project/Programme Cost			4,613,637
Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			386,363
Amount of Financing Requested			5,000,000

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**

~~[117] Policies to be reviewed include Environment and Climate Change, Public Works and Reconstruction, Planning, Investment and Economic Development, Agriculture and Irrigation, Water and Energy, Livestock and Education~~

~~[118] Including district disaster management committees, basin management committee, National Floodand Drought Task Force, national adaptation task force and other relevant ones to be identified during implementation~~

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

~~93.~~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

~~94.~~65. ~~To achieve this outcome the project will empower the relevant groups of stakeholders (communities, civil society and staff of relevant ministries and departments) with the tools required for the effective use of NbS and hybrid measures to reduce the negative impacts of floods and droughts to people, livelihoods and productive assets.~~ 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.

~~95.~~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 ~~as listed below~~.

- ~~Protocols to guide building and maintaining V-shaped weirs and sand dams.~~
- ~~Protocols to guide improved range management measures such as pastoralist/farmer managed natural regeneration[119], optimal grazing intensity, adopting silvopasture practices for animal nutrition, selective enrichment planting, shade and fencing, incorporating legumes into planted pasture and improving feed quality.~~
- ~~Protocols on establishment, management and sustaining terraces and soil bunds.~~
- ~~Protocols on establishment and management of riverine buffer forests, trees in open areas/streets, hedge grow fences around cropping areas.~~
- ~~Protocols to guide sustainable urban drainage network including Sustainable Drainage Systems~~
- ~~Protocols to guide waste minimization based on the model of rethink, reduce, reuse, recycle and refuse the use of single-use items.~~
- ~~Protocols on mainstreaming NbS into relevant policies and programs.~~
- ~~Protocols to guide implementation of a soil carbon credit scheme.~~

[119] ~~Example – see Obwocha E, Muriuki J, Wanjira EO, Mohamed A, Muse IM. 2022. Farmer managed natural regeneration in Somali context: Practitioners' manual. Nairobi: World Agroforestry (ICRAF), p84.~~

96. The choice of the most effective means of training and empowering communities will be informed by lessons generated by other relevant current and past projects, e.g. BRCiS, which has created and empowered community resilience committees in many places. For example, the training strategy will be largely based on practical demonstration of successful NbS measures and cross learning / knowledge exchange between communities/districts. This methodology has been proven to be highly effective in the country by programmes such as the BRCiS. Where there is no geographic overlap with the BRCiS previous activities, its proven methodologies of community mobilisation will be adopted. A further review of similar programmes will be undertaken at the point of implementing the training to ensure that implementation is informed by the latest lessons available.

97.67. 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).

98.68. 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[120] produced by the United Nations Human Settlements Programme (UN Habitat)[121], and the adaptation action plan for LGs produced by the JPLG). The project will therefore provide the additional information required to refine the analysis and support effective implementation (example in Box 2 in the Annex of Figures). This will include site assessment of the landscape/sub-catchment areas, based on application of the learning from the UNEP-DHI catalogue, cross-referenced with the IUCN Global Standard for Nature-based Solutions (Guidance criteria summarised in Box 3 in the Annex of Figures). The assessment will also be aided by known water harvesting planning tools, such as the Wadi Evaluation Tool (WET) developed specifically for Somalia, allowing for fast and broad spatial analysis of wadi water harvesting potential in a selected area, thus allowing the rapid identification of areas where sand or sub-surface dams might be a viable solution to water harvesting[122].

99.69. 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 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. The participatory planning process will be undertaken using established methodologies – e.g. those outlined by IUCN[123]:

100.70. All the above assessments will be guided by experts and will provide an opportunity to provide on-the-job training for technical staff from district, region, CSO, academic on the processes, as part of the training strategy. It will be particularly important to identify, through this planning process, any trade-offs, externalities and/or leakages[124], 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).

101. Furthermore, the project will in particular collaborate with existing programs and projects to obtain and collate as much of the information/data available, before engaging on the generation of any primary information. These include the SWALIM, UN-Habitat and BRCiS Phase 3, among others. The latter is

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

[121][121] Pablo Fernández Maestre and UNHABITAT, 2020: Beledweyne Urban Profile Working Paper and Spatial Analyses for Urban Planning Consultations and Durable Solutions for Displacement Crises

[122] As reported by Paz Lopez-Rey, online: MSc Research dissertation Water, Engineering and Development Centre (WEDC)

[123] Example - Guyo Roba and Jonathan Davies (2018) – Participatory Rangeland Management Planning: A Field Guide - https://www.iucn.org/sites/default/files/2022-08/2018-prmp_methodology.pdf

[124] 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.

~~set to start implementation and will likely generate considerable information in the natural resources and climate arenas, including mapping of ecosystem services in selected areas. Where the proposed project does not overlap with BRCiS Phase 3 or other relevant programmes geographically, the proposed project will utilize methodologies proven to be effective via these programs/projects, including obtaining and/or adapting data from the SWALIM, which generates considerable information and provides methodologies (example is the Land Use Characterisation of the Juba and Shabelle riverine areas in Southern Somalia)[125] .~~

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

~~102.~~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[126] direct beneficiaries and 3 urban areas, selecting 1 neighbourhood per city—Jowhar, Beledweyne, and Afgooye- reaching an estimated total of 10,500[127] 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 ~~the~~ community NbS plans ~~formulated under~~ from Outcome 1. ~~Although the specific~~Specific measures ~~to be implemented in specific areas in the targeted landscape will be confirmed~~ will be selected during the assessment and planning process, ~~they will be selected among those identified in the~~ drawn from the catalogue ~~of measures~~ for managing floods and ~~drought~~droughts in Somalia~~,~~ and the resilience plans for Jowhar, Beledweyne, and Afgooye ~~and the JPLG adaptation plan for LGs.~~. These ~~documents propose the use of an array of~~ plans recommend green infrastructure ~~as NbS and hybrid measures~~ to mitigate floods and droughts while ~~providing other benefits such as~~enhancing biodiversity, food security, and income generation. ~~Widely acknowledged as nature's best defence against disasters, green~~

~~103.~~ Green infrastructure will be implemented at the watershed level ~~will be used~~ to protect rangelands ~~while increasing its~~, urban areas, and increase productivity. ~~They will protect urban dwellers and their assets, providing cleaner air and water as well as significant value for the community with flood protection, diverse habitat, and green spaces (as described under outputs 2.1 to 2.6, below).~~

~~104.~~ Under output 2.1, the project will establish 7-8 combined ~~v~~V-shaped weirs and sand dams ~~which will be fitted~~equipped with solar pumping systems, elevated water storage tanks, shallow protected wells ~~in sand dam reservoirs, and a system to distribute water by~~, and gravity-based water distribution systems for livestock ~~troughs, tap stands~~ and irrigation ~~outlets~~. The v-shaped weir and sand dams are described in the Baseline Section and shown on Fig. ~~8~~3. The ~~UNEP-DHI modelling showed that this hybrid technology, that combines a small notch weir constructed with stones or concrete with sand dams, reduced floods by up to 60% in Qardho and up to 38% in Beledweyne. This makes it a suitable hybrid technology for replication and upscaling. Furthermore, studies conducted in the country found that, although the Somaliland (and likely the whole of Somalia) has favourable climatic and hydrogeological conditions for sand dams, and that sand dams have high storage potential, the technology is underutilized in Africa, and by extension, Somalia[128].~~

~~105.~~ The enhanced alluvial aquifer ~~is enhanced by the v-weirs and sand dams improving significantly communities'~~ will improve water access ~~to water~~ for ~~micro~~ irrigation, ~~watering~~ livestock, and domestic ~~consumption~~use during ~~the~~ dry seasons ~~and thereby~~, mitigating drought impacts ~~of drought~~. The project

~~125 Oduori, S., Vargas, R. and Alim, M. 2007b. Land Use Characterization of the Juba and Shabelle riverine areas in Southern Somalia. FAO-SWALIM. Project Report No. L-07. Nairobi, Kenya.~~

126 9 communities with an average 250 households per community and an average of 7 people per household = 15,750 people

127 3 urban communities with an average of 500 households per neighborhood and average of 7 people per household = 10,500 people

~~128 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. Available at: https://admin.concern.net/sites/default/files/documents/2020-12/MSc%20final%20research%20report-%20Sand%20dams%20Somaliland-Lopez-Rey%202020%20%28003%29.pdf~~

will ~~provide~~support water supply systems, including ~~shallow protected wells in sand dam reservoirs,~~ solar ~~water~~ pumps~~, elevated water storage tanks~~ and livestock watering troughs. ~~Although the core of the project is not focused on conservation agriculture, crop farmers benefitting from micro-irrigation~~Farmers will be encouraged to ~~grow high value crops and~~ adopt ~~other~~ climate~~-~~smart farming ~~systems~~practices including ~~the use of~~ drought~~-~~tolerant ~~crop varieties.~~

~~106.~~73. crops. Technical experts from the project management unit and relevant LG, FMS and the FGS will ~~fully participate~~be engaged in community mobilization~~, which will allow them to collect more details on the specific problems that communities face. They will also be able~~ to provide technical ~~information that can explain the underlying causes of problems and how NbS can solve them. Ultimately, they will bring the information needed for the communities to~~ inputs and help communities make informed decisions ~~on the use and sustainability of NbS in adaptation~~about NbS .

~~107.~~ Under ~~output~~Output 2.2, the project will support agro-pastoralists and pastoralists ~~to adopt, in a learn-by-doing mode,~~in adopting climate-smart rangeland management practices ~~in~~on 4,000 ~~ha~~hectares of rangelands~~. This~~ through a learn-by-doing approach. Practices will include ~~the adoption of measures such as~~ pastoralist/farmer~~-~~managed natural regeneration, optimal grazing intensity, silvopasture ~~practices~~ for animal nutrition, selective enrichment planting, ~~shade and fencing~~ and legumes planting to improve pasture quality~~ (See Box 4 in the Annex of Figures). To~~. The project will promote the natural regeneration of indigenous ~~grass~~grasses, shrubs~~ and tree species, the project will promote pastoralist/farmer managed regeneration. Under this system pastoralists and farmers will be supported to restore~~, and trees by supporting the restoration of multi-purpose indigenous ~~trees~~tree species in farmlands~~ (fodder, fruits, and fuelwood trees),~~, pasturelands, and community-managed forests~~ by identifying~~. This will involve protecting regrowth from the stumps of felled trees and ~~protecting the regrowth into new trees, as well as protecting~~ new recruits of grass and shrubs from ~~the seeds in the~~ seedbeds. ~~Table 2 in the Annex of Figures shows examples of potential~~Regrown trees and shrubs ~~recommended by SWALIM for use in Somalia. The regrown trees and shrubs~~will help restore soil structure and fertility, inhibit ~~soil~~ erosion and ~~soil moisture~~ evaporation, rehabilitate springs and the water table, and increase biodiversity.

~~108.~~ Selection of grasses, legumes, and trees ~~to be planted~~ will ~~be guided by the~~follow protocols developed under Output 1.1~~, which will consider characteristics such as the root system density and depth, water requirements, height, leaf cover density, suitability for the local soils, etc. SWALIM recommends the use of plants that do not promote evapotranspiration (such as broad leaves) suggesting indigenous species such as most of the Acacia and Ziziphus species, Pithecellobium dulce, Parkinsonia aculeate, Schinus molle, Salixsubserata, Sclerocarya birrea, Moringa oleifera, Commiphora erythraea, Ximenia americana, Celtis africana, Balanites aegyptiaca, Boswellia rivae, Securidaca longepedunculaat. Care will be taken to avoid the introduction of invasive species, such as Prosopis, which has ravaged rangelands in the East Africa region (550,000 hectares in Somaliland alone[6]), reducing rangeland productivity and carrying capacity considerably where they have established.~~

~~109.~~74. ~~There have been previous community development programs, supported by the UN and other local and international organizations that have organized communities in the country, including work by Sadar and BRCiS consortium. The project will deliberately seek out any other projects and~~. The project will collaborate with other initiatives ~~being implemented~~ in the ~~AF~~ target areas to ~~operationalize collaboration and to~~ leverage ~~potential~~ synergies ~~such as support to community governance structures, training, livelihood improvement benefits, market linkage opportunities, and others~~.

~~110.~~75. Under output 2.3, the project will ~~facilitate the establishment~~establish NbS structures in at least 130 ha[129] to ~~protect land surface and to reduce the erosive velocity of runoff water, thereby mitigating~~combat water erosion ~~across the landscape.~~and protect land surfaces. These ~~include~~structures, including terraces, soil bunds, grass strips, and infiltration trenches, ~~which~~ will ~~be established in line with~~follow protocols developed under output 1.1. ~~These structures, especially terraces, transform~~Terraces convert steep slopes

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

into ~~an artificial sequence of relatively flat~~flatter surfaces, ~~thereby decreasing~~reducing slope length and gradient, ~~which~~thereby significantly ~~reduces~~decreasing sediment yield and runoff. ~~Reshaped slopes change specific~~They also alter hydrological paths, ~~decrease hydrological~~ reduce connectivity, and ~~enlarge the~~increase catchment surface area, ~~so they may intercept rainfall and mitigate~~enhancing rain interception and flood peak discharge ~~efficiently[130]. Furthermore, the interception of surface runoff from terraced fields encourages infiltration, while the diverting of harvested rainwater to protected outlets at controlled velocities prevents soil erosion and water loss. Dryland terraces have been shown to reduce both rate of run-off and sediment load by up to 30% (ibid). The structures will be stabilised by planting appropriate multi-purpose plants such as grass, legumes, bushes and trees. Community members will be incentivised to protect the structures from livestock for at least two years to avoid destruction and promote revegetation.~~mitigation[131].

~~111.~~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. ~~Project success will therefore be gauged by percentage of seedlings surviving beyond year three, rather than number of seedlings planted.~~

~~112.~~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.

~~113.~~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.

~~114. Activities under this component will be implemented in close coordination with the activities under Component 1. A critical part~~Construction of ~~implementation of each NbS measure will be the careful assessments of the conditions necessary for the long-term maintenance of the NbS infrastructure. Given the long-term nature of NbS, it will be important to identify resources (such as time, funds, skills) required to ensure continuity of the functionality of any innovative NbS measures established by the project and to make provisions for long-term maintenance and protection. For example, seedlings planted in semi-arid lands require long-term tree husbandry commitment to ensure survival and transition from seedlings to trees. Moreover, a specific exit strategy will be carefully planned to guarantee sustainability of the NbS and hybrid infrastructure established after the project ends, as part of the overall exit strategy of the project (to be designed under Outcome 4).~~

~~115. The actual construction of the NbS and hybrid~~ NbS and hybrid structures will ~~be implemented, where relevant and appropriate, through cash for work~~ leverage Cash for Work (CfW) ~~to ensure quality and sustainability of the structures. The CfW will build~~approaches, building on ~~the extensive lessons on its use~~ successful models like those from the Somalia Cash Consortium~~, Mercy Cops Guide to Cash-for-Work Programming[132] and FAO's Cash-for-work in Somalia: Linking Relief to Recovery[133]. According to CONCERN[134], CfW is particularly effective in Somalia because local markets are most often functional, even in those places which are difficult for aid agencies to reach with more traditional~~

~~130 Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf~~
131 Chuxiong Deng et al, 2021: Advantages and disadvantages of terracing: A comprehensive review: file:///C:/Users/Admin/Downloads/DengChuxiong-AdvantagesanddisadvantagesofterracingAcomprehensivereview.pdf
~~132 https://www.calpnetwork.org/wp-content/uploads/2020/01/mercy-corps-guide-to-ctp.pdf (accessed on 27th Sept 2023).~~
~~133 https://www.calpnetwork.org/wp-content/uploads/2020/01/full-report-602-1.pdf (accessed on 27th Sept 2023).~~
~~134 CONCERN, 2018: How mobile cash transfers save lives and empower locals in Somalia: https://www.concern.net/news/how-mobile-cash-transfers-save-lives-and-empower-locals-in-somalia~~

~~interventions.~~

~~116.~~79. ~~Guided by the gender~~ and FAO[135]. Gender mainstreaming ~~action plan developed~~efforts under Outcome 4~~, the project~~ will ensure ~~that the CfW~~equitable benefits ~~all relevant groups,~~ from CfW, including women, men, the physically challenged, ~~the marginalised (such the minority~~marginalized groups~~),~~ and IDPs~~,~~ ~~as appropriate. The CfW programme will be closely monitored to eliminate~~ . Rigorous monitoring will address security risks ~~related to money~~associated with fund transfers ~~to beneficiaries and to ensure that it is not prone to corrupt practices~~and safeguard against corruption within the CfW framework.

Outcome 3: ~~Improved~~Enhanced policies, ~~regulations and~~ incentives ~~that~~ and recommendations to promote ~~and enforce~~ the use of proven ~~and~~ innovative NbS measures ~~to enhance climate resilience~~and soil carbon trading.

~~117. The project will improve the enabling environment for the replication and upscaling of adaptation NbS and hybrid solutions in Somalia promoting the integration of these measures into FGS, FMS and LG development plans and programmes. This will be achieved through three complementary outputs that address awareness, policy and financing barriers.~~

~~118. The project will~~Output 3.1 aims to deliver recommendations on incentive packages and policy reforms at ~~Federal, Member State~~the FGS, FMS, and ~~Local Government~~LG levels ~~to promote replication and upscaling NbS/hybrid measures for adaptation, informed by evidence on the benefits and effectiveness on NbS (Output 3.1).~~ . A participatory, gender responsive review of relevant ~~FGS, MS and LGs'~~ policies ~~will be carried out to identify shortfalls and entry points for mainstreaming the use and financing of NbS and hybrid measures in relevant projects and programmes. Policies to be reviewed include~~ in areas such as Environment and Climate Change, Public Works ~~and Reconstruction, Planning, Investment and Economic Development~~, Agriculture ~~and Irrigation~~, Water ~~and Energy, Livestock~~, and Education~~. The FGS, Member States and districts are still in the continuing process of establishing and/or updating~~ will identify gaps and opportunities for integrating NbS and hybrid measures into development plans. Existing policies ~~since the establishment of the FGS in 2012. Nevertheless, NbS are already subject to a range of pre-existing policies, plans, laws and regulations, in some cases constraining and in others supporting. The project will therefore identify complementarity, lacuna and/or any contradictions where existing policies (such as land use policies) undermine one another, negatively affecting (hindering) the wide scale~~ will be assessed to identify synergies or conflicts that impact the uptake ~~or the efficiency, effectiveness, sustainability and durability of NbS and hybrid measures for adaptation. Policy review and reform recommendations will be facilitated through specialized technical assistance and the engagement of relevant policymakers, existing resilience and DRR coordination groups at national and sub-national level and community-level committees.~~

~~119.~~80. ~~Under this outcome the project~~and effectiveness of NbS measures. Incentive mechanisms will also ~~support the development of an innovative pilot financing mechanism scheme for community-led NbS based on the sale of soil and vegetation carbon credits (Output 3.2). The scheme will build on lessons generated by existing similar schemes such as the Northern Kenya Soil Carbon project[136] and Boomitra[137] and other similar schemes to~~ be identified and ~~interrogated during the full project formulation and implementation phases. The overarching goal of the scheme is to empower pastoralists and agro-pastoralists, along with their local governance institutions, to develop and sell carbon assets through Nature-based Solutions (NbS) measures. These measures (implemented under Outcome 2) aim to regenerate soils and vegetation, increase~~

[135] https://www.calpnetwork.org/wp-content/uploads/2020/01/mercy-corps-guide-to-ctp.pdf (accessed on 27th Sept 2023).

~~[136] 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 (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)~~

~~[137] https://boomitra.com/soil-carbon-removal-project-kenya-smallholder-farmers/~~

productivity, and enhance soil organic carbon levels. This empowerment allows evaluated in consultation with local communities to generate income from carbon credits and diversify their livelihoods, all while promoting land and soil regeneration. The expected output within the scope of this AF project proposal is to design the scheme for future implementation and contribute to the ongoing advisory and technical assistance provided by UN agencies and partners to the Government of Somalia for establishing the necessary conditions and policies for the country to regulate and implement carbon trading effectively.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.

120. Under outputOutput 3.2, the project will formulate and roll outimplement awareness -raising and advocacy strategies to increase appreciation of NbS measures by all segments of the society and to mobilize the power of public opinion in support of NbS in adaptation, thereby influencing the political will ofand influence decision -makers to adopt relevant policy reforms. The design of the awareness and advocacy. These strategies will be informed by the analysis of thetailored to overcome specific barriers to NbS in the country and the various aspects that can be tackled through public campaigns. This information will be used to set specific goals and precise, concrete, tangible and measurable objectives of the campaign along with identification of relevant prioritized list of target audiences and stakeholders. Key messages will be developed to suit the prioritized audiences, matched with the most appropriate dissemination methods to reach specific audiences. This is likely to include identification of champions among the different audiences and appropriate slogans for the campaign. The project will therefore create appropriate communication messages and operationalize the campaign.

121. The strategy will be cross-checked against relevant criteria for quality control, including the UN supported criteria[138]. Implementation is likely to be through a combination of the following:

- Production and dissemination ofidentified in Somalia, utilizing educational resources such as reports, studies and infographics;
- Holding or participating in, events such as thematic discussions, roundtables, seminars, webinars, workshops, conferences, debates, exhibitions and demonstrations;
- Utilizing radio – including community radio – which forms a powerful means to spread information and raise awareness, especially in poor and rural areas;
- Producing audio-visual material such as television, video and documentary film;
- Using the internet, including online forums, petitions, groups and interactive websites, as well as social, media engagement, and digital platforms such as Facebook and Twitter;
- Using wireless communication such as mobile phones and text messaging, which is possible due to the widespread and rising use of cell phones even in rural areas of Somalia;
- Engaging the media including through press releases, briefings, newspaper articles and opinion pieces, and conducting media campaigns.

81. . 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).

122.82. 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. The effectiveness of the campaign will be monitored, along with the projectOngoing monitoring and evaluation, and the information used to support will ensure the effectiveness of these efforts, supporting adaptive management and continuous improvement

[138] https://www.unodc.org/documents/human-trafficking/Toolkit-files/08-58296_tool_9-9.pdf.

of the ~~campaign~~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

~~123.~~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.

~~124.~~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.

~~125.~~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

~~126.~~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

~~127.~~87. ~~While the~~The V-shaped weir ~~has been considered as,~~ a ~~convenient, reliable and inexpensive device~~long-standing tool for measuring small flows in open channels[139] ~~for decades, its use as~~, is now utilized an efficient technology for flood peak reduction in Somalia ~~is new. Similarly,~~ , along with sand dams and sub-surface dams, which have been ~~in use for millennia and are recognised as low-cost and robust~~ used for rainwater harvesting ~~technologies to enhance water availability in drylands. However, their use in~~ . This

[139] ~~John Shena, 1981: Studies of Flow of Water Over Weirs and Dams - comprehensive study of the discharge characteristics of triangular-notch thin-plate weirs: https://pubs.usgs.gov/wsp/1617b/report.pdf~~

combination ~~with the notch weir to achieve both flood~~ aims to control floods and ~~increase~~enhance water availability ~~and hence~~, thus increasing resilience to ~~the effects of~~ climate change ~~is new in Somalia. The combined V-shaped and sand dams showed~~. Results indicate potential flood reduction of ~~reducing floods by~~ up to 60% in Qardho and ~~up to~~ 38% in Beledweyne[140] ~~. Although the results vary~~. Efficiency varies based on ~~the~~event size ~~of the event,the~~, season, and ~~the~~ area, ~~this technology combination has the potential to significantly reduce~~ with greater effectiveness in flashy flood ~~peaks, thereby reducing losses of lives and property in downstream settlements. The highest efficiency can be expected at locations where floods are particularly flashy, having highmaximum flow values but limited total volume of run-off. Furthermore, trade~~areas. Trade-offs exist between infiltration and ~~peak~~ flood control ~~are clear, with poorer performance in flood peak reduction leading to more infiltration and vice versa. The~~, influencing design ~~of structures will therefore be made considering the~~ decisions based on local preferences ~~of the local population and the local potential for~~ and flash flood ~~mitigation and increased water storage~~potential.

~~128.~~88. ~~Moreover, the~~Additionally, alluvial aquifers ~~developed~~ upstream of ~~the~~ sand dams will be ~~fitted~~equipped with protected ~~-~~wells, solar pumping systems, elevated tanks, and gravity distribution systems to ~~enhance~~improve community access to water ~~supply for livestock watering, small-scale irrigation and domestic purposes all~~ throughout the year ~~round. The integration~~. Integration of renewable energy and climate-resilient hydrology infrastructure will ~~provide an innovative system which reduces the risk of~~mitigate flash flooding ~~in the rainy season~~ while ~~augmenting the~~increasing alluvial reservoir capacity during ~~prolonged~~ dry seasons. ~~Improved~~ Enhanced water access ~~to water supply also reduces the dependency~~will reduce reliance on expensive water trucking during ~~dry periods, thereby saving household's~~droughts, improving household income and ~~enhancing their~~ resilience~~.~~

b. Community-based and climate smart rangeland management practices

~~129.~~89. Community-based management systems ~~incorporate~~integrate local institutions, ~~customary~~traditional practices, and knowledge ~~systems~~ into ~~the management, regulatory, and enforcement processes of~~ biodiversity and natural ~~resources. While widely practiced in~~ resource management. Although commonly used for conservation ~~strategies for protecting threatened ecosystems like wildlife habitats, forests, mangroves, and freshwater~~, its application as an adaptation tool ~~is less common~~, particularly in Somalia~~.~~ ~~Here~~, 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 ~~related to two core tenets~~: the use of a participatory approach to planning and management, and pastoralist-led rangeland regeneration.

~~130.~~ The ~~use of a~~ participatory approach ~~to planning and management puts communities back in the driving seat of climate smart and sustainable natural resource management in rangelands. The system will be based on proven customary resource management practices and will support community based leadership in rangeland resource land use planning and practice. By doing so, it~~ empowers communities ~~and reinforces the customary practices of negotiations between different groups to establish consensus on pasture and water use, critical for sustaining the nomadic movements under pastoralism. Moreover, participation serves as both an empowerment tool and a means for improved planning,~~ in rangelands to manage natural resources sustainably, reinforcing customary practices and promoting good governance. ~~A more robust participatory rangeland management process is likely to create enhanced~~It enhances opportunities for women and minority groups to contribute to decision-making ~~processes. Facilitated by the gender and stakeholder participatory plan, women and other minority groups will be provided with opportunities for active engagement in meetings and discussions with fellow community members.~~

~~131.~~90. ~~Similarly, the pastoralist~~. Pastoralist-led rangeland regeneration ~~reactivates tested~~ employs proven methods of range re-vegetation ~~that have proven to be more successful, cost-effective and more efficient~~

~~140 Ministry of Water Resources and Energy and UNEP-DHI, March 2022: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia https://www.unep.org/news-and-stories/story/reducing-impact-flash-floods-somalia-study~~

than programs based on planting of new seedlings. As explained by Otieno et al[141], native species in drylands adapt to stress conditions by producing many seeds with high levels of 'dormancy' to ensure germination is delayed and only happens when there is a threshold of soil moisture to boost survival of the germinates. This means that soils in drylands usually have good stocks of seeds of various plant species in the seed bank. Furthermore, tree stumps mask an entire root infrastructure, including nutrients that will have developed over the entire tree lifetime and remains robust for a long time after the above-ground tree is cut down. Shoots produced at the base of the tree (stump) establish and grow faster than planted seedlings. The pastoralists will therefore jump start, utilizing native species' adaptation to dryland conditions. It catalyzes the reestablishment of high value indigenous trees species in farmlands (fodder, fruits, fuelwood trees) and pasturelands by identifying regrowth from the stumps of felled trees and protecting the regrowth into new trees, as well as protecting new recruits of grass and and shrubs from the seeds in the seed banks. The regrown trees and shrubs help restore , enhancing soil structure and, fertility, inhibit soil erosion and soil moisture evaporation, rehabilitate springs and the water table, and increase control, water retention, and biodiversity..

c. Green infrastructure in urban areas

132. Green infrastructure is an interconnected network of, such as waterways, wetlands, and woodlands, wildlife habitats and other natural areas that supportsupports native species, maintain natural and ecological processes, sustain air and water resources and contribute to the health and quality of life for communities and people[142]. The use of green infrastructure has gained popularity in the last three decades as a proven adaptation technology, especially for urban areas, and has been widely piloted world-wide, including Africa. Widely acknowledged as nature's best defence against disasters, the use of green infrastructure is however not widespread in Somalia, making the country a good candidate for replicating this innovative NbS. The 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 city resilience plansscities identified several NbS measures to contribute towards resilience including establishment oflike riverine buffer forests, green parks, hedge grow to stem floods and soil loss from peri-urban crop fields and sustainable drainage and waste management systems. to enhance resilience against floods and improve environmental quality. Along with terraces and soil bunds on the rangelands, these innovative NbS measures have the potential to reduce the vulnerability of target measures not only protect rural and urban dwellerspopulations and their assets tofrom recurrent floods while providing co-flooding but also offer additional benefits in terms ofsuch as cleaner air and, improved water, green spaces quality, and habitats for biodiversity.

d. Carbon credit scheme

133. While land-use changes and agriculture are major sources of greenhouse gas emissions (accounting for more than 10% of the global GHG emissions), soil carbon sequestration is seen as one of the most cost effective and promising mitigation measures to combat climate change, with FAO estimating that soils can sequester more than 10% of the global anthropogenic greenhouse gas emissions[143]. Furthermore, globally, soils hold approximately 3.1 times more than the atmospheric carbon pool of 800 GT (second largest carbon pool after the ocean which holds about 38,400 GT of C, mostly in inorganic forms)[144]. Changes in land use, along with the application of sustainable management practices, are recognized as cornerstone strategies for terrestrial organic carbon sequestration (ibid).

134.91. Global trade in soil carbon is set to increase; with the Fortune Business Insights[145] predicting an

[141] ERICK OTIENO WANJIRA, JONATHAN MURIUKI & IRENE OJUOK, 2020: Farmer Managed Natural Regeneration in Kenya A Primer for Development Practitioners. https://fmnrhub.com.au/wp-content/uploads/2022/05/FMNR-KENYA-MANUAL.pdf

[142] https://www.epa.gov/green-infrastructure/what-green-infrastructure

[143] https://www.cgiar.org/news-events/news/technological-innovation-for-soil-carbon-sequestration-an-invitation-from-cgiar-scientists-and-pluton-bio/

[144] Ontl, T. A. & Schulte, L. A. (2012) Soil Carbon Storage. Nature Education Knowledge 3(10):35

[145] https://www.fortunebusinessinsights.com/industry-reports/carbon-capture-and-sequestration-market-100819

~~increase from $2.01 billion in 2021 to $7.00 billion by 2028. In the absence of appropriate regulation and policy~~ Integrating green infrastructure in Somalia ~~is unlikely to benefit from this surge in the carbon trade. At the global level, soil carbon faces challenges like scientific disagreement over the permanence of storage, fragility of smallholder land and thus credit rights, and inequity or difficulty of access to measurement technologies present obstacles for scientists and entrepreneurs alike[146]. The project presents an opportunity to develop a small scale soil carbon credit scheme by replicating successful pilots in the region and aims to contribute to ongoing initiatives that offer the country technical assistance to establish regulations on carbon trade. Simultaneously, it empowers resource poor communities to enhance soil organic carbon sequestration in their soils. This multifaceted approach aligns with three crucial global objectives: mitigating climate change, adapting to climate change, and improving food security~~could significantly bolster resilience and quality of life while promoting sustainable development in both rural and urban settings.

~~135. Locally, the communities will benefit from increased soil organic carbon because carbon gives structure and life to the soil and is essential for nutrient retention. Indeed, as explained by CGIAR, soil organic carbon is considered the most essential parameter for healthy soil. It is the "glue and sponge" of the soil as it sticks together soil aggregates, adsorbs and desorbs nutrients, retains water, and gives habitat and energy to soil micro-organisms[147]. An increase in SOC content in soils most often results in an increase in soil water holding capacity.~~

~~136. Through Components 1, 2, 3 and 4 the project will address the identified barriers promoting a more enabling environment for the adoption, replication and scale up of innovative NbS and hybrid solutions for adaptation in the target areas and Somalia more generally. By enhancing awareness and local and national level capacities to design and implement innovative adaptation solutions and generating evidence to inform policy and incentivize investment the project also contributes directly to results 3 and 4 of the AF Innovation Pillar, namely: (a) **Result 3: Access and capacities enhanced for designing and implementing innovation**; (b) **Result 4: Evidence base generated and shared (linkage with learning and sharing pillar).**~~

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

~~[146] Alliance Biodiversity, 2022: Technological Innovation for Soil Carbon Sequestration: an invitation from CGIAR scientists and Pluton Bio - https://alliancebioversityciat.org/stories/A4IP-soil-carbon-sequestration~~

~~[147] https://www.cgiar.org/news-events/news/technological-innovation-for-soil-carbon-sequestration-an-invitation-from-cgiar-scientists-and-pluton-bio/~~

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.

~~137.~~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.

~~138.~~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.

~~139.~~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.

~~140. NbS by definition address social, economic, and environmental challenges, effectively and adaptively, to simultaneously provide human well-being, ecosystem services, resilience, and biodiversity benefits[148]. The greatest benefit of the project is to reduce the vulnerability of people, productive assets and livelihoods to climate hazards, especially floods and drought. More specifically, the project will contribute to climate change adaptation and disaster risk reduction, climate change mitigation, provision of ecosystem services and biodiversity, as well as social and economic benefits for highly vulnerable populations. The section below presents the benefits per group of NbS measure~~

~~[148] Nature-Based Solutions Initiative | United Nations Environment Assembly agrees Nature-based Solutions definition (naturebasedsolutionsinitiative.org)~~

to be rolled out by the project, indicating whether these are short, medium or long term, wherever possible.

Environmental benefits

96. The environmental benefits from waterWater management structures (such as V-weirs, sand dams, terraces, and soil bunds) derive largely from slowing down the rate and velocity of water flow, which will reduce floods and soil erosion, while promoting water infiltration, benefiting about 15,750 people living in the three target watersheds. The notch weir and sand dam combination reduced 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 and promoted, while enhancing infiltration rates by up to 118% (at depths of 1.5 meter)meters and 156% (at 2 meters). These results span the short, medium and long-term. Sand dams increase 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 of the watershed, improving water availability throughout the year, promoting the establishment of, supporting vegetation around themgrowth and thebolstering ecosystem resilience of ecosystems to during drought. Terracing transforms steep slopes into an artificial sequence of relatively flat surfaces thereby decreasing slope length and gradient, increasing watershed area and significantly reducing sediment yield and runoff; indeed, terraces periods.

141.97. Terraces have been shown to reduce both rate of run-off and sediment load by up to 30% in drylands[149]. These technologies increase the quantity of water available for the environment and promote biodiversity. Increase in water and nutrientsThey transform steep slopes into manageable flat surfaces, thereby increasing water and nutrient retention in (for example) terraced fields improves the growing conditions for different species, which plays a crucial role in revegetation and/or maintaining vegetation in eroded, drylands ecosystems, where afforestation or reforestation programs are difficult to complete without other inputs, due to the poor condition of existing sites and harsh climatic conditions. Indeed, the biomass. 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 be 30% to 68% higher thansurpass that of noonnon-terraced lands under similar environmental conditions (ibid). Overall, by 30% to 68%, underscoring the efficacy of these NbS will enhance resilience of ecosystems to climate change variabilitytechniques in enhancing agricultural productivity and ecosystem health.

142. EstablishingFurthermore, initiatives such as establishing riverine buffer forests and hedge grow hedges, sustainable urban drainage networknetworks, and waste minimization will have additional environmental benefits, including water supply regulation, riverine flood mitigation, and water purification, reduction of erosion and stormwater control, and improved habitat for biodiversity benefiting aboutefforts will benefit approximately 10,500 people living in the three target neighbourhoods. Trees (and other vegetation in the catchment), intercept rainfall and increase infiltration, thus moderating both run-off into the river system and storage of water in the soil. The ability of soils in forest areas to store water and release it through seepage, transpiration and evaporation helps to regulate the water supply in the catchment. Trees and other vegetation protect water from pollution by trapping and/ or containing sediments, pollutants in sediments, soils and vegetation. They also protect groundwater from contamination by removing sediments, heavy metals and other pollutants. Vegetation reduces stormwater flow, relieving pressure on existing water treatment infrastructure. They also include regulating water supply, mitigating riverine floods, purifying water, reducing erosion, and creating habitats for biodiversity and carbon sequestration. Sustainable urban drainage network and waste minimization will contribute to reduction in floods and prevention of water pollution. Collectively, these NbS will reduce the impact of disaster risks and enhance climate resilience in urban areas, farmlands and rangelands and.

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

143.98. Community . These measures intercept rainfall, improve infiltration, and mitigate runoff, safeguarding water quality through sediment and pollutant filtration. Overall, community-based rangeland regeneration and the setting up of the soil carbon pilot initiative will promote ecosystem restoration of at leastinitiatives across 4,000 ha. 17,250 members of the communities in the three target watershed will experience the benefit in the maintenance and provisioning of hectares will enhance ecosystem services, including enhanced rangeland condition, with for 17,250 community members, promoting denser vegetation, higher number of species, increased soil organic matter, and soil carbon,improved water flow regulation, and erosion control, pollination and soil fertility. Enhanced carbon sequestration contributes to mitigation of climate change. Increasing organic carbon is seen as one of the most cost effective and promising mitigation measures to combat climate change[150]. These efforts will contribute significantly to climate resilience and carbon sequestration, offering sustainable solutions to environmental challenges in Somalia.

Economic benefits

144. The 26,250 vulnerable peopleThe 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 that serveserving them will experience several, the economic benefits including savingadvantages include preserving assets that would otherwise be destroyedfrom destruction by floods and droughts, savings from buying water and gains in health, reducing costs associated with purchasing water, and improving health outcomes due to better access to water. Additionally, these communities will benefit from wages earned from thethrough work for cash to beprograms used in the construction ofconstructing NbS measures and increased productivity of rangelands and agriculture, among others (see example in Box 5 in the Annex of Figures).

145. The 15,750 people living in. In the three target catchments, 15,750 people will benefit from increased quantities of accessible water, mitigating droughts and improvingwhich enhances household health. Research For instance, properly maintained sand dams in Somaliland[151] reported that with proper maintenance, the maximum extractable volume of water at the beginning of the dry season in professionally constructed sand dams is theoretically sufficient to can cover 100% of the minimum domestic water needs (20 l/p/dliters per person per day) during the 5-month dry season (150 days). Creating a. Introducing mini-water supply system by introducing systems with solar pumps, water storage, and reticulation tofor livestock and domestic use will cut downreduce reliance on trucked expensive trucked water and savings on reducedsave labor to collect water, particularly byfor girls and women.

99. 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.

146.100. An increase of one tonne of soil carbon in degraded cropland soils may increase crop yield by 10 to 20 kg ha-1 for maize[152]. Adoption of terraces in Kenya increased yields by approximately 50%[153] 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[154]. Including Intercropping legumes in crops and the rangeland will improvewith grasses improves soil fertility through the biological nitrogen fixation, leading to higher crop yields and higher and forage quality forage for a longer period of the year than grass-only pastures. The , with crude protein content of grasses intercropped with legumes increasedincreasing from 7.1 to 14.3, 11.9

[150] https://www.cgiar.org/news-events/news/technological-innovation-for-soil-carbon-sequestration-an-invitation-from-cgiar-scientists-and-pluton-bio/

[151] Paz Lopez-Rey, online: MSc Research dissertation Water, Engineering and Development Centre (WEDC)

[152][152] Sodhi and Ehrlich: Conservation Biology for All. http://ukcatalogue.oup.com/product/9780199554249.do

[153] 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

[154] 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

and 10.2%, respectively in a field trial in the drylands of Kenya[155]. Moreover, grasses intercropped with legumes had higher % to up to 14.3%[156]. This practice will enhance the digestibility contents than grasses in monoculture stands; adding organic residues via legumes improved the soil fertility status and hence the crude protein and digestibility of grasses. Benefits will therefore include reducedof grasses and reduces production costs within 3 to 5 years as a result of due to increased organic matter and nitrogen- fixing bacteria[157]. Nitrogen fixers can save a farmer US$, saving farmers between $20 to $48 (per hectare, and up to US$ $200 in the case offor specific legumes like Leucaena leucocephala) (ibid). .

147. The economic benefits expected for Urban populations, particularly the urban target population of aroundapproximately 10,500 people through the implementation of targeted for green infrastructure in cities have been detailed by WWF. These benefits include:

Generating Economic Value and Employment: The utilization ofprojects, will also gain economically. Utilizing previously developed, underused, or neglected land for green infrastructure projects promotes job creation across various stages, including planning, design, improvement, development, and ongoing management. The extension, rehabilitation, and maintenancerestoration of urban forests and wetlands specificallywill stimulate economic activities such aslike agriculture and forestry, thereby creating livelihood opportunities for the urban poor. This is complemented by direct income generated through the Cash for Work (CfW) program.

101. Resource Savings: GreenMoreover, green infrastructure is expected towill save resources that would otherwise be usedby reducing the need for repairing damaged assets and rehabilitating infrastructure. This presents, offering a more sustainable approach to urban development, minimizing the need for constant repairs and investments in traditional infrastructure..

148. The Coalition for Urban Transitions158 reported that: (i) By 2050, investment in urban climate interventions in major cities(threshold population of 250,000 people) 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; (ii) on an average annual basis, this represents 0.9%, 0.5% and 1.5% of the total GDP of all cities in Ethiopia, Kenya and South Africa, respectively. These benefits include energy savings and other avoided costs, such as reduced vehicle costs and lower material costs for construction, with wider economic benefits such as job and gross value added (GVA)159 creation; (ii) scaling up interventions to include smaller cities with populations of at least 50,000 would generate a total of 1,400,000 net jobs and US$29 billion in net GVA in Ethiopia, 67,000 net jobs and net GVA of US$12 billion in Kenya and 170,000 net jobs and net GVA of US$100 billion in South Africa to 2050; (iii) In Ethiopia, net new jobs generated by compact, clean and connected city investments are equivalent to 2.1% of the workforce in major cities, presenting an opportunity to address urban unemployment, which is currently 19%.

Box 2: Discounted Economic Gains from Improved Access to Water in Rural Areas of Somalia[160]

[155] 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

[156] 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

[157] 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.

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

[159] GVA represents the value of a sector's outputs minus its inputs and is a measure of a sector or region's contribution to overall GDP

[160] Source: 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

~~The WB reported positive discounted direct economic gains from improving access to water in rural areas of Somalia, via a cost benefit analysis under the Somalia Water for Agro-pastoral Productivity and Resilience project (2019 –)[161]. The benefits would be accrued over 15 years for 250,000 agro-pastoralists. They include: (i) savings from purchasing water – approximately US$27 million: (ii) reducing labor and time to collect water, mostly by women; US$37 million; (iii) – savings from improved health due to WASH services – approximately US$32 million per year; (iv) savings by the emergency response teams – approximately US$918,000 (by preventing instead of having to treat cholera and diarrhea); (v) avoided death of livestock – approximately US$92.7 million; (vi) overall discounted returns – approximately US$5.85 million for every million dollar invested in the development of water infrastructure and livelihood activities.~~

The social benefits ~~from the~~

~~149.~~ The project ~~will be reduced~~in Somalia aims to reduce flood and drought vulnerability ~~to floods and droughts, increased~~, increase year-round water availability ~~of water throughout the year,~~, enhance food production and ~~food~~ security, ~~benefits to heath due to increased access to water and~~ and improve health through better nutrition ~~from increased range~~ and ~~agriculture productivity and~~water access. Key benefits include reduced ~~temporary or permanent~~ displacement ~~of populations as a result of disasters and~~from climate ~~variability~~ impacts~~.~~

~~150.~~102. ~~In Somalia, women and children are typically responsible at the household level for collecting water. Access to~~ and improved water supply and sanitation ~~facilities is expected to contribute~~, contributing to poverty ~~reduction~~alleviation and ~~better~~ gender equality ~~among the beneficiary populations by addressing burdens borne by women~~. Women and ~~girls. This includes the benefits of reduced~~children, traditionally responsible for water collection, will significantly benefit, with improved water access reducing their time and effort spent ~~in collecting water, as well as associated benefits such as~~on this task. This change enhances personal security, health, and economic productivity. ~~Furthermore, this additional~~Additionally, water availability can~~, and often supports start-up and/or expansion of~~ support small-scale vegetable gardening, ~~increasing productivity of~~boosting land productivity and ~~rangelands, contributing to~~ food security. ~~Collectively, these measures will reduce the risk of permanent or temporary displacement of people due to floods and droughts, reduce the loss of assets (through flooding and droughts) and promote WASH and food security, significant contributors to social capital and resilience.~~

~~151. Additional social benefits from the~~The green infrastructure ~~for~~will benefit approximately 10,500 residents ~~include enhancing livelihoods and social well-being due to~~by creating safer residential ~~places secure from floods, improved aesthetic of neighbourhoods,~~areas, improving neighbourhood aesthetics, and providing cleaner air and ~~safer~~ water~~, contributing~~. These improvements are expected to ~~reduction in incidents~~decrease the incidence of ~~water-borne~~waterborne diseases such as cholera, malaria, ~~rift valley~~Rift Valley fever, and ~~diarrhoea. Others include promoting social cohesion and improving health and safety standards.~~

~~152.~~103. diarrhea. All ~~the~~26,250 project beneficiaries ~~(26,250 people)~~ will ~~benefit from~~receive training and capacity building to ~~deal~~engage effectively with local, regional, and national governments and regulators. ~~Governance~~The project will ~~improve due to empowered~~empower local committees and ~~strengthenings~~strengthen women's rights ~~by supporting women's capacities and abilities to participate meaningfully~~, enhancing their participation in decision-making ~~processes~~ and ~~hold~~ leadership ~~positions. These factors will support more~~roles. This empowerment is expected to lead to sustainable gender equality outcomes and ~~good~~better governance of rangelands~~, more~~. Additionally, inclusive participation of pastoralists in land-related decisions ~~pertaining to their lands and~~ will improve rangeland productivity.

104.

~~[161] 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~~

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

- ✓ Increased adoption of NbSNature-based Solutions (NbS) adaptation measures by communities outsidebeyond project intervention sites as a resultthrough the integration of mainstreaming NbS considerations ininto all relevant policies and programmes, increasing programs, accompanied by increased funding available for NbS, as well as a result of increased awareness due to the implementation of the public awareness raising campaign, as well as training of local authorities and technical officers of relevant line ministries.

✓105. initiatives. Improved water quantity and quality for downstream water users as a result ofby implementing interventions that reduce soil erosion while increasing and enhance soil infiltration into soil properties (e.g. rehabilitation of rangelands, enrichment planting with indigenous tree species, terracing, notch weirs and sand dams)..

106. Considerable Significant cost savings at the FMS and FGS levels by preventing losses from avoided loss due to droughts and floods. Droughts and floods impose significant cost at all levels. According to the WB, The destruction of the environmentcaused by the 2016-2017/182018 drought cost the economy an estimated1175was estimated at $1,175.5 million USD[162]. This figure did not include loss of lives , excluding human and asset losses and assets, or the cost of food distribution. Furthermore, the overall damages and losses arising from the costs[163]. The 2019 floods was estimatedled to be more than USover $260 million, with recovery needs of around US in damages, requiring $350 million; the economic losses were estimated to be US$72.0 million in the year immediately following the floods, US$39.0 million in the second year, US$35.1 million in the third year, US$31.6 million in the fourth year, and US$28.4 million in the fifth year for recovery[164]. It further reported that these losses are expected to endure beyond the first five years following the floods until the damage to the transportation sector and to crop production are fully restored (ibid). Reducing flood and drought impacts of floods and droughts accrues significant would redirect these savings to the economy, which can be directed to other development needs.priorities, enhancing economic resilience and sustainability.

154.107. **Equitable access to project benefits:** The project activities will address the differentiated climate change impacts on targeted men and women, boys and girls, and their differentiated capabilities to adapt to these, through the adoption of an inclusive , women, through a gender-responsive approach. Guided by the gender and social inclusion action plan developed under Outcomeoutcome 4, the project will ensure thatequitable access to theseproject benefits is guaranteed for all relevant. This includes marginalized groups, including like women, men, the physically challenged, the marginalised (such the ethnic minority groups)minorities and IDPs, as appropriate. The gender and social inclusion strategy will guide the project implementation to recognize the need for potential differential treatment that is fair and positively addresses any inherent. Strategies will mitigate biases and/or historical or social disadvantage based on social or gender roles or norms. Where possible and appropriate, the project will work to changedisadvantages, promoting fair treatment. Efforts to shift gendered power dynamics by addressing will target societal norms, and practices, attitudes, beliefs, and value systems that operate as structural barriers to women's, girls' and minority group's inclusion and access to project benefits. The most appropriate means of achieving this aim will be identified in the GASHPP and may include measures such as establishing membership and/or leadership . Potential actions include quotas (e.g., 50% women and, 30% youth, of whichwith 50% would be girls) in activity groups, as well as adopting enabling measures such asleadership and inclusive training approaches that increase their participationto enhance participation of underrepresented groups. Detailed strategies will be outlined in the GASHPP.

[162] World Bank, 2020: Diagnostic study on trends and threats for environmental and natural resources challenges
[163] World Bank, 2020: Diagnostic study on trends and threats for environmental and natural resources challenges
[164] 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

D. COST-EFFECTIVENESS OF THE PROPOSED PROJECT

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

~~155.~~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.

~~156. **Building on NbS measures that have been tested and proven to deliver on mitigating droughts and floods:** The project is built on the extensive investments undertaken by baseline projects in Somalia and elsewhere and selected measures proven to deliver on adaptation. These include the extensive investment by the partnership of the MWRE and UNEP-DHI that produced three products that inform the AF project: (a) identified NbS measures suitable for managing floods and droughts in the country, detailed in the catalogue (Table 1); (b) modelled a selected list of options with highest potential using hydrologic and hydraulic mathematical modelling, and recommended the combined notch weir and sand dams for upscaling and replication; (c) developed indicators for guiding future prioritization of the most suitable NbS, giving priority to indicators relating specifically to flood mitigation potential; (d) provided very clear recommendations on the next steps in the replication and upscaling process. The design also built on the extensive investments by the partnership of UN-Habitat, the Durable Solutions programme on one hand, and The Somalia Disaster Management Agency and Sadar on the other, who developed resilience plans for Beledweyne and Jowhar. These plans identified NbS measures which the project will replicate and upscale such as the establishment of riverine buffer forests, piloting of sustainable drainage system and waste minimization to reduce incidents of flooding. The project also builds on extensive investment by the JPLG, which developed an adaptation plan for LGs as part of their capacity building programme. Starting with known, well researched and formulated initiatives constitutes a huge saving of resources for the proposed project, thereby enhancing the cost-effectiveness of the AF investment in the project.~~

~~157. Building on extensive lessons generated by similar projects to incorporate lessons to enhance successful implementation with assured results: The design of the proposed AF project has taken into consideration these best practices and lessons in the upscaling and replication which have proven that it is possible to increase resilience of livelihoods while simultaneously enhancing ecosystems services (biodiversity, carbon sequestration, aesthetics, soil and water conservation) while increasing food security. By replicating these best practices, therefore, the project aims to create an enabling environment to scale-up ecosystem based adaptation to climate change, which will contribute, among other adaptation strategies, to reduce loss of life, displacement and economic losses due to increased frequency and magnitude of floods and droughts.~~

~~158. Choosing an implementation arrangement that will create partnerships that demonstrate comparative advantage, capacities and experience to deliver results cost-effectively: Project implementation will be coordinated closely with on-going initiatives to avoid duplication while maximizing synergies. Opportunities for these types of collaboration and coordination have been identified, and highlighted during project design, including collaboration with SWALIM to obtain the most up to date information required to further refine the notch weirs and sand dams for specific sites. It will collaborate with UN-Habitat on the implementation of the selected initiatives of the Jowhar, Beledweyne and Afgooye (the latter will be developed in 2024 by UN-Habitat). It will collaborate with BRCiS on the empowerment of communities, adopting tools and methods developed under BRCiS wherever appropriate. Furthermore, the project management unit will continuously seek similar partnerships and engage them, as relevant and appropriate, to improve cost-effectiveness of the project.~~

~~159. The project implementation will also build on the expertise, experiences and investments of the~~

Executing partner – Sadar. Based in Mogadishu, Sadar 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. Sadar is hosting and running the Somalia Resilience Innovation Hub (Somali RIHUB)[165] and is also part of the Global Response Innovation Lab (RI) network operating in country as the Somali Response Innovation Lab (SomRIL). SomRIL is an inter-agency partnership which co-creates and applies effective innovations to enhance the impact of interventions to improve the resilience of the Somali people. Sadar is implementing several community-based capacity building projects in Hirshabelle and South West States, including the US$ 17 million project financed by the GEF with IFAD as Implementing Agency[166] titled Adaptive Agriculture and Rangeland Rehabilitation Project (A2R2). The project objective is to enhance climate resilience of poor rural and urban households in Somalia through sustainable natural resources management on multiple levels: improved water resources and rangelands management; eco-agriculture and climate-proof livelihoods; forest/habitat rehabilitation; improved governance and information systems for land degradation and biodiversity.

160. Sadar will ensure that both the AF proposed project and the GEF project are coordinated to build on synergies such as shared project steering committee, lessons and experiences, where appropriate and relevant. Sadar will enter into contracts with other relevant partners for specific initiatives (e.g. UNEP-DHI and SWALIM for site assessment and refinement of the notch weir sand dams combined structure). These engagements will expand the project partnership, increasing the co-finance provided through the partners, totalling up to US$ 650,000, including Sadar's own in-kind contribution of US$ 300,000 (includes offices for the project, staff time of technical and advisory staff engaged in project implementation, preparing and submitting reports, organising and attending meetings). Partners such as UN-Habitat, UNEP-DHI, Jowhar Reservoir Programme and other members of the steering committee, via staff time dedicated to refinement of models and actual implementation of project activities, totalling about US$ 300,000. The close coordination and collaboration with the Local, Member and FGSs as well as local communities will increase co-finance totalling up to US$ 50,000, mainly in working hours and salaries of technical institutions. In addition to providing in-kind co-finance, this type of engagement will also ensure that the technology and adaptation models to be replicated will respond to practical needs and knowledge of stakeholders, including men, women, youth, other minorities, and demonstrate the potential of NbS in tacking droughts and floods. This will form a part of awareness raising, which will incentivise further replication.

161. **Selecting project initiatives that deliver results at less cost than alternatives (in the absence of the project).** The selected NbS offer a 'low risk' or 'no regret' option that provides more positive consequences than those that are engineering-based. Indeed, the World Resources Institute argues that, every dollar invested in adaptation yields net economic benefits ranging from $2 to $10[167]; while according to the WB, investing in climate adaptation leads to returns with an average benefit cost ratio of 4:1[168].

162. The WB reported that every million dollar invested in the development of water infrastructure and livelihood activities was estimated to generate a discounted return of US$5.85 million under the baseline assumptions, in Somalia (under the Water for Agro-pastoral Productivity and Resilience (Biyoole project)[169]. The gains were primarily from improving sustained access to water for an estimated 250,000 agro-pastoralists by constructing and rehabilitation of existing water infrastructure and small works, which is similar to the interventions of the proposed AF project (ibid).

[165] https://www.ranlab.org/

[166] https://www.thegef.org/projects-operations/projects/10792

[167] Global Comission on Adaptation, : Adapt now. A global call for leadership on climate resilience GlobalCommission_Report_FINAL.pdf (wri.org)

[168] Gold Standard, online, 2023: The Business Case for Climate Adaptation: Why It's a Profitable Investment https://www.goldstandard.org/blog-item/business-case-climate-adaptation-why-it%E2%80%99s-profitable-investment

[169] World Bank, 2019: https://www.worldbank.org/en/news/loans-credits/2019/07/01/somalia-water-for-agro-pastoral-productivity-and-resilience-biyoole-project

163. A comparison of the cost-effectiveness of nature-based and coastal adaptation in the Gulf Coast of the United States[170] found that the set of cost-effective adaptation measures (with benefit-to-cost ratios above 1) could prevent up to $57–101 billion in losses, which represents 42.8–57.2% of the total risk; and that NbS options could avert the cost of adaptation cost-effectively with average benefit-to-cost ratios above 3.5. Nature-based solutions therefore offer a cheaper long-term response to climate change, biodiversity loss, food and water insecurity, disaster risk and human health challenges. It integrates adaptation and mitigation to advance sustainable development for all. The project's cost-effectiveness measured against project alternative is presented in the Table 8.

[170] Borja et al, 2018: Comparing the cost effectiveness of nature-based and coastal adaptation: A case study from the Gulf Coast of the United States – https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0192132

109. ~~Table 8:~~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[171] 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[172], 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		

[171] 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.
[172] 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[176] : (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[177]. 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[174], 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.

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

[177] 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

[174] 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$260 million [173]). Additional loss will be averted by avoiding loss of assets and lives from floods, in both rural and urban areas; this cuts down the migration to the cities by rural people who lose their assets, becoming IDPs.	Intensify agricultural production through increased inputs of irrigation, pesticide, herbicide and fertilizer (crops) and veterinary drugs and store-bought processed feeds for livestock. Trade-offs: As stated above, the country has limited opportunities for large dams to support irrigation, other agricultural inputs of pesticides, herbicides and fertilizer, drugs and store-bought processed feeds are high cost. Effective use of these inputs requires intensive technical supervision and support from extension services, currently not available in the country, and which would have a huge cost implication for government if availed. Furthermore, very few households would afford these extensive options. Moreover, these options are increasingly portraying negative environmental impacts; and droughts and floods can still lead to failed crops and wipe off large numbers of livestock and assets. Common to all the above is the fact that the current level of economic development in the country, with huge
Restoration of rangelands increase productivity while controlling soil erosion – community based rangeland management, farmer/pastoralist managed regeneration, design of the soil carbon scheme that involves agreed improved management to	US$ 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[178]. 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 fields179; (ii) 30% to 68% higher biomass on terraced fields[180] 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 maize181;	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	

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

[178] 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

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

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

[181][181] 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[182]; (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[183], 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 faces175. Limited government revenues further restrict funding for adaptation.

[182] 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.
[183] 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
[175] 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

164. The proposed project is in linealigns with all the relevant national and sub-national development plans, poverty reduction strategies, national communication, and national adaptation programs of action. In addition to the policies outlined in the section describing baseline programmes and policies, the project is in line with the following:

- **The**Somalia's 9th National Development Plan (NDP-9) 2021-2024[184], is the overarching development framework defining the FGS's current development priorities. NDP-9 recognizes climate disasters as a one of the key drivers of poverty in the country, and specifically mentions land and water resource degradation of the Shabelle river basin. It elaborates a vision and direction for Somalia's socio-economic development and poverty reduction agenda. It also outlines associated financing needs and major sources of funding. The NDP-9 identifies climate change as a constraint to both Pillar 2 (Improved Security and Rule of Law) and Pillar 3 (Economic Development), and places climate change and recurrent drought as a major cause of poverty in the country. The National Development Plan , which emphasizes the need for climate-smart pastoralism and agriculturepractices, disaster management, water infrastructure development, and investments in renewable energy to mitigate the negative impacts of climate change.
- . It supports the National Adaptation Plan of Action (NAPA): The overarching vision for the NAPA is to make the Somali people more resilient to climate change, recognizing their high vulnerability in an economy that is dominated) by a high dependencefocusing on natural resources. The NAPA identified rangeland restoration, disaster risk reduction, sustainable land management, agroforestry, afforestation and clean energy investments as critical adaptation actions with the greatest mitigation co-benefit potential. The AF project's planned activities are fully consistent with the sectoral priorities identified in the NAPA for the 2020-2030 period, including the following sectors and priorities:
  - Agricultureenhancing agriculture and food security: developing irrigation systems including dams, channel & water reticulation system; build adaptation capacity in climate resilient agronomic practices for smallholder farmers; promote rainwater harvesting and conservation of water, including improved water use efficiency; implement integrated Water Resources Management strategy;
  - Disaster preparedness and management: increase resilience of communities, infrastructures and ecosystems to droughts and floods; livelihood support for the vulnerable groups
  - Forestry and environment: enhance the participation of women and youth in activities related to adaptation and environmental conservation; promote climate change resilient traditional and modern knowledge of sustainable pasture and range management systems
  - Climate change communication, education and public awareness raising: increase awareness among all stakeholder groups on the importance of adaptation to secure development gains in the face of uncertainties introduced . Somalia's NDC recognizes sustainable development, peacebuilding, and adaptation to climate change as top priorities. The project integrates these priorities by climate risks.
- **Intended Nationally Determined Contribution (INDC):** the country developed the first Intended Nationally Determined Contribution (INDC) in November 2015, which was updated to Nationally Determined Contribution (NDC) in 2021. Both policy documents recognize sustainable development, peace building and adaptation to climate change as the highest priorities for the Somali people and their governments at FGS, MS and LG. The overall adaptation objective of the NDC is therefore to enhance enhancing adaptive capacity, strengthen resilience and reduce vulnerability to climate change through mainstreaming climate adaptation to

[184] The Federal Republic of Somalia, 2020: Somalia National Development Plan 2020 to 2024.pdf (unescwa.org)

into sustainable development[185]. It should be noted that the updated 2021 NDC introduces a new point on gender mainstreaming. This recognizes that women and children are more affected by impacts due to lack of access to and control over critical resources, and that the promotion of gender equality is critical for effective climate adaptation and mitigation in Somalia. As a response to this challenge, the NDC calls for enhancing the participation of women and youth in activities related to adaptation and environmental conservation in order to empower them and enhance their adaptive capacity.

➢110. and resilience, particularly for vulnerable groups. It aligns with the National Disaster Management Policy: Somalia developed a National Disaster Management Policy, approved in 2018; whose implementation is driven by the FGS and MS levels) Disaster Management Committees, guided by the National and Disaster Risk Reduction (DRR) Strategy. The DRR strategy focuses on tackling underlying disaster risk drivers, among them the unsustainable use of natural resources, environment deterioration, conflict, poverty, unplanned and rapid urbanization, institutional arrangements and capacities for DRR. Use of by utilizing NbS measures and technologies are recognized as effective to mitigate flood and drought mitigation measures, hence DRR tools. The Somalia Disaster Management Agency is in the process of preparing a Framework for Flood-Specific Anticipatory Action in Somaliarisks.

➢ **The** Furthermore, the project supports the Somalia Resilience and Recovery Framework (RRF**) (2018)** helps Somalia progress from early drought recovery to), by focusing on long-term resilience and mitigation of disaster risk, with vulnerabilities caused by frequent climate-related issues. It aims to break the cycle of humanitarian crisis. The 3–5-year framework is primarily aimed at facilitating a more efficient financial response by the Somali government and its development and humanitarian partners, using current funding methods and aid coordination structures. The RRF prioritizes areas and outcomes in agriculture, food, water, sanitation and hygiene (WASH), education, transportation, the environment, social protection, gender, governance, and disaster management.

➢ **The** disaster risk reduction across various sectors. It also aligns with the National Biodiversity Strategy and Action Plan (NBSAP, December 2015) with the objective to create a shared understanding of biodiversity among the stakeholders at the national and regional levels in Somalia. The NBSAP recognises climate change as a major risk factor to rebuilding the country's biodiversity, while noting the importance of biodiversity in adaptation.

➢ Government of Somalia requested a Drought Impact and Needs Assessment (DINA) and subsequent Resilience and Recovery Framework (RRF) in August 2017 to identify the root causes of recurrent drought and develop a strategy for medium-term recovery and long-term resilience. The DINA and RRF align with the NDP and the National Disaster Management Policy, and they all call for measures to mitigate climate risks to build resilient livelihoods and economies.

➢ **The**), recognizing biodiversity's role in climate adaptation and resilience. Additionally, the project complements the National Youth Policy of the FGS of Somalia (2018), which aims to promote youth participation in all spheres of development;

➢*111.* **The Women's**and the Women's Charter for Somalia, adopted in March 2019, which calls for the women'sby promoting youth participation, women's economic empowerment, full participation and socioeconomic rights are cornerstones for equality and sustainable development.and gender equality.

1.

165.112. The Federal Government of Somalia has ratified several key Multilateral Environmental Agreements (MEAs). Key ones that have relevance to this project include the United Nations Framework Convention on Climate Change (ratified in), including the UNFCCC (April 2016), the Paris Climate Accord (April 2016), the Convention on Biological Diversity (September 2009), and the United Nations Convention to Combat DesertificationUNCCD (July 2002). This project will help Somaliasupports Somalia's to honor its commitments towards national, regional, and internationalthese agreements and conventions on three fronts.

[185] The Federal Republic of Somalia, 2021: Updated Nationally Determined Contribution (NDC) - Microsoft Word - Final Updated NDC for Somalia 2021.docx (unfccc.int)

First, the proposed approach (Nature-based Solutions) will contribute towards the protection, sustainable management, and restoration of critical ecosystems in Somalia. It will also aid in building the resilience and enhancing the adaptive capacity of vulnerable rural and urban populations to climate and other idiosyncratic shocks. The project interventions will also enable Somalia to fulfil its MEA obligations through improved policies, regulations, and incentives that accelerate the uptake and utilization of innovativeby promoting NbS for ecosystem management, resilience building, and policy improvement.

166. ThisThe project responds directly to theaddresses challenges, risks, and gaps identified in the United NationsUN Common Country Analysis (CCA). First, the CCA identifies), particularly climate change, environmental degradation, conflict, and insecurity as major threats to achieving all SDGs. Secondly, the analysis identifies. It targets the Shabelle River watersheds (which is highlighted in the targetCCA as an area for this project) as a priority area for intervention. The CCA further underscores the need forrequiring urgent action in designing climate resilient, gender responsive, and economically viable climate solutions to tackle Somalia's multiple and interlinked crises. The project will also contribute to the implementation of the United Nations. It is also aligned with outcome 3.2, 4.2 and 4.3 of the UN Cooperation Framework (UNCF) specifically Outcome 3.2 (Natural resources are sustainably managed and binding constraints addressed in key productive sector value chains, leading to enduring productivity gains, increased value addition, and enhanced opportunities for decent work), Outcome 4.2 (By 2025, the number of people impacted by climate change, natural disasters, and environmental degradation is reduced) and outcome 4.3 (By 2025, the proportion of vulnerable Somalis with scaled-up and sustained resilience against environmental and conflict-related shocks is increased, based on better management of life cycle risk, food security, and better nutrition outcomes). Lastly, component 4 will promote the sharing of experiences, lessons and best practices (one of the primary objectives of Voluntary National Reviews) and accelerate the integration of NbS in investment planning and national and sub-national policies.

167.113. To strengthen its engagement with the UN Resident Coordinator's Office and the UN Country Team (UNCT), . UNEP seconds, through a technical advisor to the resident coordinator's office of the UN in Somalia, and through this resource, which also coordinates and supports the UNEP programming, the project will be linked to the UNCT, the other sectors of the Resident, will ensure project coordination with the UN Resident Coordinator's Office, and across the other AF. The project will also link to the UN Country Team (UNCT), and SDG technical working groups in the country and will also be part of the UNCF and the submission through UNINFO. UNEP works in the country mainly through advocacy and technical support to the Federal Government of Somalia., leveraging Somalia's recent admission to the East African Community also presents enormous opportunities that the project will seize.

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

Alignment with national technical standards

168. Environmental policy and legislation in Somalia are currently under development in Somalia. Federal laws and regulations guiding environment for environmental and social impactsimpact assessments and providing a comprehensive framework for environmental management have are yet to be adopted. The FGS has developed a National Environmental Policy which was approved by the Cabinet on February 13, 2020. The, and the National Environmental Act has been drafted and was approved by the Cabinet on November 26, 2020. Both documents need to be approved by the, both pending Parliament in order to take effect. There are therefore approval. Thus, there are no relevant national technical standards applicable tofor the AF project interventions (V-weirs combination with sand dams, range rehabilitation, terracing, tree planting, sustainable drainage systems and waste minimization). As such, the . The project interventions will be in accordance withfollow locally accepted good international industry practices consistent with best practices of other international organizations working in the region. Safeguards standards will be followed throughout the AF project, namely the and adhere to the Environmental and Social Policy Frameworks of the Adaptation Fund and

the UNEP's Environmental, Social and Sustainability Framework[186].

169.114. At the FGS and MS levels, the Ministry of Environment and Climate Change is mandated to develop regulations and laws to guide the implementation of the national environment policies including establishing Environmental Quality Standards, Sectoral Environmental Assessments, Environmental Impact Assessments and Environmental Audits. Project implementation will therefore consciously track the emergence of approved relevant standards and ensure compliance. Project implementation will therefore be guided by the environment and social impacts management plan to be developed during the full project proposal development phase, using the UNEP's Environmental, Social and Sustainability Framework. Where required, additionalUNEP. Additional environmental impact assessment (EIA) and social impact assessments (SIA) will be carried out before the implementation of activities, to ensure the protection of the environment (particularly land and water) and maximise benefits to communities, which are the most important aspect of adaptation. Site selection measures will be taken into consideration concerning the local ecosystem fragility and vulnerability of the communities and environment.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.

170.115. There is no project duplication of the project with other funding. Moreover, the. The AF project design builds on the lessons learned from previous and on-goingongoing initiatives in the areas of innovative adaptation, use of NbS in adaptation, water resources management and community development globally and in Somalia. The design team consulted with all relevant governmental institutions (at communal, district, provincial and central level) and local partners (NGOs, international institutions, etc.) to ensure integration of lessons into the proposed project and synergies allowing economies of scale. Furthermore, the project will be implemented in close collaboration and coordination with the projects and programmes described under the baseline section, to identify synergies and avoid duplication and inefficiencies. The project steering committee and the Project management unit will utilize the M&E and KM systems to track other relevant investments which the project should collaborate and coordinate and ensure collaboration, avoiding duplication and waste of resources.. Table 96 summarises recently completed, on-going or upcoming projects with relevance to the proposed AF project in the country and identifies potential synergies. This list and the synergies will be elaborated on in the Full Project Proposal once the exact locations of the intervention sites are known.

[186] https://www.unep.org/about-un-environment/why-does-un-environment-matter/environmental-social-and-economic#:~:text=The%20revised%20Environmental%20and%20social,the%20life%20of%20a%20project.

Table 9:5: 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[187]	BRCiS adoptsuses a bottom- -up model of decision-makingapproach, which has built ahelped build strong foundation for empowering existing community structures and working through them to ensure thatshape programming is fully informed by and is based uponon the needs of vulnerable populations. Phase 3 will focus on five areas: i) improve the: improving health, food security, and nutrition status of marginalized communities by restoring vital ecosystem services through community-led regeneration and strengthened, more inclusive natural resource management; ii) increase demand for and sustainable; promoting local food production of nutritious food; iii) engage members of marginalized communities in diverse market-based; enhancing livelihoods and financial inclusion initiatives; iv) increase access to financial assets, meet basic needs and increase investment in collective and individual; building resilience capacities; v) engage local leaders and community-led structures to become more inclusive and better understand, advocate for and manage community priorities. through access to assets; and fostering inclusive community leadership. By 2022, BRCiS had established 194 Community Resilience Committees (CRCs) across 34 districts. It had also established community basedCRC and implemented early warning systems that effectively provide alerts to emerging for climate hazards, which	The two projects focus on reducing vulnerability of local communities, thereby creating resilient livelihoods and economies. However, it is unlikely that the two projects will overlap in the same geographic area, even though they addresseach addressing different aspects of resilience, albeit while sharing one intervention –community-led regeneration and strengthened, more 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 the awareness and BRCiS's previous community mobilization carried out by previous phases of the BRCiS, and the bottom-approach, usingefforts and utilize existing committees wherever appropriate. The AF projectwhere suitable. It will also adopt training tools and methods developed by the BRCiS consortium, wherever as appropriate. The two projectsKnowledge exchange will share knowledge and experience (lesson learned) on joinedoccur through platforms such aslike the IGAD Support on Durable Solutions Platform188, Somalia NGO Consortium189, the, and peer learning and exchange on the challenges and opportunities associated with forums on national adaptation planning and action190,. Participation in the Sadar supported SomaliaSomali Resilience Innovation Hub (Somali RIHUB)191 and the), Somali Response Innovation Lab (SomRIL)192. Other forums include , and PANORAMA – Solutions for a Healthy Planet, an online platform of examples of "replicable solutions" across a range of conservation and sustainable development topics, now comprising more than 1100 solutions‡will facilitate sharing lessons and experiences.

[187] 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)

[188] https://igad.int/the-igad-support-platform-launched-at-refugee-forum-is-proof-of-commitment-to-progressive-refugee-policies-by-djibouti-ethiopia-kenya-somalia-south-sudan-sudan-and-uganda/

[189] http://somaliangoconsortium.org/services/information-sharing/

[190] https://napglobalnetwork.org/activities/peer-learning-and-exchange/

[191] https://www.ranlab.org/

[192] https://www.somrep.org/somril

	~~enables targeted anticipatory action and effective early response. BRCiS 3rd phase has a strong emphasis on natural resources management to restore ecosystems services as a basis of securing ecosystems services sustainably~~ across 34 districts.	
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 ~~require~~gather information from SWALIM to refine ~~the models and design of the~~ designs for notch weirs ~~and,~~ sand dams, terraces, and soil bunds~~. It will also rely on SWALIM's reports on river breakages in order to~~ , and identify suitable areas ~~appropriate~~ for ~~the establishment of the~~ riverine buffer zones ~~and,~~ hedgerows ~~as well as suitable areas for~~ , and urban tree planting ~~trees in the city areas.~~ ~~Furthermore, the AF project will seek cooperation~~. Collaboration with SWALIM ~~to share~~ will also focus on sharing knowledge ~~and to learn and share approaches/plans and results/experience on the~~ on NbS ~~implementation, particularly the use of the~~ such as notch ~~weir~~weirs and sand dams~~. Knowledge/lessons sharing will be conducted through the~~ across different platforms ~~outlined above.~~ .
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 objective of the project is~~ The project targets degraded areas in 5 districts including Beledweyne, and Hirshabelle State, aiming to ~~contribute to~~restore land ~~restoration,~~, conserve biodiversity ~~conservation and restoration of degraded ecosystems, as well as improvement of~~, and enhance adaptive capacity ~~of vulnerable smallholder households,~~ through climate ~~-~~	~~The two~~Both projects ~~have a lot in common. They both seek~~aim to enhance ~~the~~ climate resilience ~~of~~in poor rural households through sustainable natural resources management ~~through improved~~ , focusing on water management and rangeland restoration ~~of rangelands for resilience. However, the geographical locations are unlikely to~~ . While they won't overlap~~;~~ geographically, the ~~full~~AF project will collaborate in its development phase ~~will collaborate with the project to ensure~~to maximize synergies ~~and~~

	resilient ~~sustainable~~ natural resource management~~193. The project targets five districts where natural resources are seriously degraded (Beledweyne, Hirshabelle State) among others194. The project will improve~~. It focuses on improving water resources ~~and adaptive farm and pastureland management;~~, eco-agriculture, and livelihoods, alongside forest restoration and ~~climate-proof livelihoods; forest/habitat restoration; improved~~ governance ~~and information systems~~ for land degradation and biodiversity~~?~~. One of the project outcomes ~~will equip vulnerable households to implement nature-based solutions and climate-resilient technologies and practices across productive landscapes (farm and pasture lands).~~is focused on NbS	~~complementarities. The AF project~~. It will learn ~~lessons~~ from ~~the~~ IFAD's ~~project implementation of the outcome on equipping households to implement nature-based solutions~~experience in implementing NbS and climate-resilient technologies ~~and practices across productive landscape. Learning and lessons~~, knowledge exchange will ~~be exchanged~~occur through ~~the platforms outlined under collaboration~~partnerships with BRCiS.
Sustainable Flood Management and Risk Reduction Action: Applicability of NbS for Flood and Drought Management in Somalia: Phase II.	The completed project ~~developed~~created a catalogue of NbS ~~measures~~ for ~~managing floods~~flood and ~~droughts: it recommended the use of the~~drought management, highlighting notch ~~weir in combination~~weirs with sand dams ~~as the most effective method managing floods~~for flood control and ~~promoting~~ aquifer recharge~~, via modeling.~~. A new phase ~~of the project is currently being developed, which is expected to focus on further~~will expand research ~~into the~~on NbS ~~measures~~ for water management ~~to reduce flooding.~~, emphasizing flood reduction. It will ~~implement many of the~~integrate previous recommendations ~~of the completed phase, including further~~ , using updated modeling with refined ~~and updated~~ 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: ~~Too~~To develop water, agriculture and environmental catchment services among agro-pastoralist communities in dry-land areas of Somalia, focusing on Puntland, Galmudug and ~~South West~~Southwest States. Component 1. Support development of multiple-use water sources, ~~1.1 construction of thirty (30) new community water points and 1.2 rehabilitation of ten (10) community water points;~~ Component 2. Institutional and Capacity development, ~~2.1 national institutional capacity building and 2.2 community development and demand~~	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

~~193 IFAD, undated – Adaptive Agriculture and Rangeland Rehabilitation Project (A2R2) – Somalia (Jan 2023 to Dec 2027): GEF ID 10792.~~

~~194 The other districts are Baydhaba, Gaalkacyo and Dhuusamarreeb (South West State), and Cabudwaaq (Galmudug State)~~

	~~mobilization;~~ Component 3. Supporting sustainable land management and livelihoods development ~~around water points. 3.1 integrated landscape management and 3.2 Agriculture and livestock support;.~~ Component 4. Project management, M&E, KM and learning and contingent emergency response.	
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 goal is~~	The ~~goal of the programme is to improve the performance of LGs in order~~program aims to enhance local governance and service delivery ~~for the benefit of the Somali people – thus contributing to the establishment of a functional local governance institution in the country. It has 3 outcomes:~~ ~~policy~~in Somalia, focusing on Policy Reform, ~~which seeks to finalize policy, legal and regulatory frameworks on local governance;~~ ~~capacity~~Capacity Development ~~where LGs have the capacity to deliver equitable and sustainable services, promote economic development and peace;~~ , and Inclusion ~~where LGs are able to demonstrate improved engagement of citizens~~, with ~~an~~ emphasis on women and marginalized groups. A core component of the ~~later is the formation of~~program includes forming District Councils~~, establishing systems for local governance structures,~~ and strengthening ~~their capacity to promote democratic and accountable LGs that provide better basic services for stability and enhanced peace.~~governance systems. In 2023, the JPLG developed an adaptation plan for ~~LGs, which emphasized the use of~~local governments, emphasizing NbS ~~measures~~ to mitigate climate hazards ~~such as~~like floods and droughts.	JPLG Phase 4 is ~~currently being developed.~~ under development. Synergies ~~and complimentary~~ with the JPLG project are ~~foreseen~~anticipated in ~~outcome 3,~~ policy reviews and ~~the~~ implementation of ~~the JPLG Adaptation Plans for~~ LG~~, although this work is~~ adaptation plans, though currently ~~not funded. However, the~~unfunded. The adaptation plan has ~~already informed~~influenced the design of the proposed AF project. ~~The project team will coordinate~~ Coordination with ~~the~~ JPLG during ~~the~~AF project formulation ~~of the full AF project, to~~ will update ~~potential~~ synergies, ~~informed by the objectives of the 4th phase (noting that phases 1 to 3 have kept focus~~aligned with Phase 4 goals (focused on ~~developing~~LG capacity ~~of LGs, it is likely that this~~development). Collaboration will ~~also be the focus in the 4th phase). This collaboration will be maintained~~continue during ~~the~~ implementation ~~of the AF project,~~ 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	Objective: ~~To~~Innovatively address Somalia's internal displacement challenges ~~in an innovative manner,~~by seeking ~~durable solutions that are~~ affordable and sustainable ~~through addressing specific inter-related systemic blockages, challenges, and opportunities. To~~ durable solutions. Pilot initiatives will be ~~piloted~~implemented in Baidoa ~~in South West State~~, Beledweyne ~~in (~~Hirshabelle State~~,),~~ and Bossaso ~~in Puntland State.~~	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.

Development Cooperation UN-Habitat	.Components: ~~Strengthening (~~Strengthen local authorities' technical and institutional~~)~~ capacities ~~of local authorities~~ to ~~address~~manage urban displacement~~ and capacities of IDPs to participate in processes of inclusive urban development~~ ~~Improving;~~ Enhance IDPs' tenure security~~ for IDPs to reduce risks of displacements and forced evictions~~ ~~Enhancing the~~; Improve institutional ~~framework within the three~~ frameworks in target cities to ~~apply~~implement a land value capture approach. ~~The project will build on experiences and lessons learned from previous durable solutions projects in Somalia – especially Midnimo, which developed the resilience plans for Beledweyne, Jowhar (with Afgooye set to be done in 2024).~~	

H. LEARNING AND KNOWLEDGE MANAGEMENT

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

~~171.~~116. Output 4.2 ~~will systematize learning. The objective~~ of the ~~KM plan will be to improve~~project focuses on systematizing learning. The Knowledge Management Plan will enhance the project's ~~ability~~capacity to generate, ~~use~~utilize, and ~~share~~disseminate knowledge ~~to: (i) achieve high quality project performance and results; (ii)~~effectively. It will support evidence-based policy ~~revisions~~making, scaling up ~~and partnership building; (iii) build~~efforts, and fostering partnerships. Additionally, the KM plan will increase stakeholder awareness ~~of the project among stakeholders; (iv) raise~~ and visibility of project results and ~~impact. Lessons will be learned from within the project as well as from other projects and their experiences. The project KM system will also encourage exchange of indigenous and expert knowledge and innovations~~impacts.

~~172. To promote robust in-country learning (community, district region and national levels), the project will organize biennial~~Biennial forums ~~for exchange of knowledge and learning on resilience and best practices. These forums will take place~~ at ~~the~~ district ~~or~~and regional ~~level with~~ levels will facilitate knowledge exchange among stakeholders including Community Committees ~~and include exchange of experiences and ideas among the relevant stakeholders, including community leaders~~, government officials, ~~and other implementing~~ NGOs~~. Evidence and lessons will be documented and shared widely, targeting the following groups: project beneficiaries, NbS and~~ , and community leaders on resilience and adaptation ~~communities at the country and global levels, relevant government ministries and the general public. Indeed, lessons generated will inform the public awareness and policy advocacy campaigns. Evidence and lessons will~~experiences. A key focus will be conducting cost-benefit analyses specifically ~~be generated around the topics listed below. The list is not exhaustive and will be expanded during full project formulation as well as continuously during project implementation. Furthermore, some topics maybe interrelated, providing a measure of triangulation:~~

➢117. ~~Cost benefit analysis of the selected~~ tailored to innovative NbS and hybrid solutions~~: The WB has produced cost benefit analysis of~~ , building on existing analyses for improved water access ~~to water in Somalia, which this project design used to quantify benefits and demonstrate averted losses (Section II D on economics benefits). However, those values are not specific to NbS measures. The project will therefore carry out cost benefit analysis on the selected innovative NbS and hybrid solutions.~~in Somalia. This information will ~~be used in~~inform policy advocacy and ~~to incentivize~~attract financing from development partners and ~~investment of~~ the private sector~~, as appropriate~~.

➢ ~~Understanding optimum conditions for the successful implementation of NbS measures:~~ The project will ~~invest in~~evaluate NbS interventions ~~spanning hundreds of hectares with specific measures piloted in~~across different ~~settings, including the design of the soil carbon scheme. It is unlikely that all the measures perform optimally. The KM~~landscapes, employing rigorous monitoring and ~~learning plan~~evaluation to assess performance. Lessons learned will ~~be used, together with the project M&E system to interrogate the project dynamics that create success or failure~~guide adaptive management and ~~capture and disseminate these lessons to~~ contribute to ~~the~~ global ~~discourse~~discussions on NbS and adaptation~~. The lessons will include~~ strategies. Specific recommendations ~~on optimum conditions~~will be developed for ~~an operational~~operationalizing carbon ~~credits system specific to~~ credit systems in Somalia~~.~~

➢118. ~~Sustainability~~ and ensuring sustainable management of ~~NbS~~ measures ~~to sustain functionality and benefits: The nature of NbS measures is such that permanence is not guaranteed without active maintenance, even more so than gray infrastructure. For example planted trees may not survive long enough to provide benefits, since seedlings survival in arid lands is notoriously low, especially if they are not indigenous and are not actively protected. Furthermore, if trees re-planted in later stages of the project, it will be difficult to~~

assess the success of alike tree planting intervention. Similarly, terraces need to be maintained; else the full potential benefits may not be realized. The KM and learning plan will be used to combine assessment of similar completed projects and experience from its own implementation to understand the critical issues that would incentivize sustained maintenance of the NbS measures and capture these in the protocols to guide implementation of outcome 2and terracing.

- 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 be the product of Outcome 3 and will be the core inputfeed into the policy advocacy strategy.

173.119. The project staff will produce knowledge Knowledge products such as policy briefs, articles for journals, impact stories, adaptation/environmental material for primary and secondary schools and communities and other key messages for different audiences, whichand educational materials will be disseminated through the communication systems including radio, TVs, websitetelevision, websites, and social media (as detailed under output 3.3). Globally, the knowledge platforms. These products will be shared widelyglobally on established platforms such aslike the Adaptation Learning platform, FEBA, UNEP Global Adaptation Network, and NbS knowledge platforms such as the South-South learning platform and Ecosystem-based Adaptation for Food Security in Africa platform, PANORAMA – Solutions for a Healthy Planet, an online platform of examples of "replicable solutions" across a range of conservation and sustainable development topics, now comprising more than 1100 solutions, Network Nature, a European Commission funded "resource for the nature-based solutions community" that aims to increase cooperation at various levels for greater NbS impact and reachto facilitate knowledge exchange and replication of successful NbS practices.

120. The project will in particular partnerPartnerships with international and Somali institutions of higher learning (e.g. universities), includinginstitutions will support research for Master's Degree, to carry out the assessments and generate evidence on NbS cost – benefit analysis of NbS, conditions necessary for, effectiveness conditions, and sustainability, quantifying proven benefits, etc. To ensure effective. Effective implementation of thisthe KM plan, the project will designatebe overseen by a staff member to the role ofdesignated M&E, Communication, and KM Specialist. On KM, the staff member will fulfil the tasks outlined in Box 6 in the Annex of Figures. within the project team.

174.

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.

175. A wide range of stakeholders have been consulted during the During the development of the AF project proposal, in extensive consultations were conducted in two stages, both led by under the leadership of Sadar, in partnership with UNEP: (i) Stage one consulted a broad range of stakeholders at the FGS, MS, LG and community levels. The first stage, culminating in a draft Concept Note submitted to the AF in September 2021. The AF Secretariat provided a Technical Review Sheet containing 30 questions for clarification and a request for a gender analysis. The concept formulation picked up again in July 2023, which set off the second stage of consultations. This was necessitated by the fact that a great deal had changed to the baseline situation between 2021 and 2023, and the concept needed to be updated substantially, including identifying explicitly innovative NbS measures for replication and upscaling. All consultations used both in-depth individual interviews and group discussions/meetings.

176.121. During the first stage of consultations, several workshops , involved broad stakeholder engagement at various levels, including federal, state, local government, and community levels. Workshops were conducted in Mogadishu and Jowhar. At the federal level, the project engaged, engaging the Directorate of Environment at the Office of the Prime Minister, MOWER, MinisterMinistry of Foreign Affairs and

International Cooperation, Ministry of Humanitarian Affairs and Disaster Management, and Ministry of Agriculture. Consultations held at the MS level engaged Ministries in charge of Environment and Disaster Management. Although every effort was made to include both men and women in the consultations, the consultations with At the government and civil society groups reached aboutgroup consultations, the gender participation ratio was approximately 25% female and 75% male on average, due to the particle nature of gender in public workplaces. .

177.122. Community Consultationconsultations were held infrom July (27 to 29 July, 2021) with a select group of communities, in Jowhar, preceded by involving local authorities, community members, women, youth, and indigenous groups. These consultations included training on formulationsessions to formulate local resilience action plans. Participants included local authorities and members of the communities including women, youth and indigenous groups. 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 expressedhighlighted the necessity of building capacity for refining theto refine local resilience plans as well as providing and the need for financial resources to implement the interventions necessary to buildaimed at building adaptive capacity. These consultations were held in both separately and in mixed groups. The proposed meetings time and location were comfortable for both men and women. The ratio of women to men at these meetings was 35%/65%.

178. Further consultations were held with development partners, International Non-governmental Organizations (NGOs), National and Local NGOs, Community Based Organisations, private sector, academic, and research institutions. In association with United Nations Disaster Risk Reduction Office, the project's components were informed by the priorities set out during the National Consultations on DRR and Climate Change Adaptation and National DRR. Further consultations were held with WB, IFAD, WFP, FAO, United Nations Mission in SomaliaFurther 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), Africa Development Bank, Intergovernmental Authority of Development (IGAD) Drought Disaster ResilienceAfDB, and Sustainability Initiative (IDDRSI). ConsultationIGAD. The gender ratio for these consultations was 50:50. Additionally, consultations were held with international organisations and development partners reached about 50:50 female/male.

179. The project also engaged non-governmental organizations (INGOs,), including World Vision International led the Somalia Resilience Program (SomRep). SomRep is a) consortium of seven international agencies (Oxfam, ADRA ACF, Danish Refugee Council, Care, Cooper and World Vision International) to build resilience across Somalia. Similar consultations were made with the Norwegian Refugees Council (NRC) led consortiumand the Building Resilient Communities in Somalia consortium (BRCiS). The five other organisations of BRCiS Consortium are the Norwegian Refugees Council (NRC), Save the Children International (SCI), International Rescue Committee (IRC), Concern Worldwide and CESVI.

180.123. The project made additional consultations with national(BRCiS) consortium. National and local NGOs under the Somalia NGO Consortium, hosting over 80 NGOs operating in Somalia. Specific consultations were made with national and local NGOs working with vulnerable groups such as displacement affected communities, women, and people with disabilities, such as Save Somali Women and Children (SSWC), Wajir South Development Association (WASDA), WARDI Relief and Development Initiative (WARDI), Gargar Relief and development Organisation (GREDO), Humanitarian Initiative Just Relief Aid (HIJRA) and Somali Women Studies Centre (SWSC). The project also engaged research, academics and think Tanks, including Somali Research and Education Network (SomaliREN) (a consortium of 14 leading Somali universities), Sadar Development and Resilience Institute (Sadar), United Nations University for Peace (UPEACE) and The Somali Institute for Environmental Peace (SIEP). Additional consultations were made with the private sector operating in agriculture, banking and micro-finance. Consultations involved the Somali Banker's Association and micro-finance institutions such as Bushra Micro-finance and Sagal Micro-finance supporting farmers and young entrepreneurs, and Somali Women Studies Centre (SWSC), were also engaged.

181. The second stage of consultation was undertaken by the project design team with a smaller group of stakeholders. Itconsultations 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 MinistryMinistries of Environment and Climate Change, UNEP-DHI, BRCiS, Sadar, UN Habitat, and SWALIM. As stated earlier the purpose of this round of discussions was to update the baseline scenario since 2021 andThese consultations aimed to gather information to update the concept.

124. The consultations were focused on developing develop a detailed understanding of the impacts of climate hazards on livelihoods, current policies and incentives for the uptake of NbS measures in adaptation, current levels of and the challenges and opportunities associated with the use of NbS in adaptation.

182. Key concerns raised during the consultations included increased frequency and incidence of droughts and floods, the lack of adequate understanding theand capacity among communities to handle climate hazards and challenges hindering or promoting the use NbS in adaptation. The main concerns that emerged from the consultation process with stakeholders were that: (i) climate change is evident and it is believed to be intensifying droughts and floods, with dire consequences on livelihoods; (ii) communities felt they did not understand the climate change phenomena adequately and that they lacked capacities to deal with the climate intensified hazards; (iii) development partners, international organizations, academia and civil society felt that while NbS might have potential to provide a low cost, and effective adaptation technology, there was misconceptions about the conceptNbS and the lack of evidence of itsregarding their effectiveness was lacking.

183.125. . These concerns have been integrated into the design of the project with a focus on providing knowledge (skills, information, technical assistance), finances (via mainstreaming of NbS and piloting innovative carbon credit scheme) and actual project resources to demonstrate the effectiveness of selected NbS by replicating and upscaling technologies that have been proven to work effectively in other areas in the country and beyond. .

184. The consultation process at the local level will be completed during the inception phase and baseline assessment once the actual project sites are selected.

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

185.126. 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 draws 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 theUN-Habitat's work on resilient cities by UN-Habitat in partnership with the governments of the LGs of Jowhar and Beledweyne. As detailed in the baseline section, the objective of the MWRE research by MWRE and UNEP-DHI was to establish evidence-based documentation of effective strategies for focused on flood management. For this purpose, UNEP-DHI was tasked to provide data, information and tools to carry out strategies, flash flood risk assessment; and, conduct research on applicability of Nature-based Solutions (assessments, and NbS) for flood and drought mitigation. The research delivered three products that have informed the choice of NbS measures to be upscaled and replicated by the project, namely: (i)This research yielded a catalogue of tested NbS measures targeting flood and drought in the Somalia context; (ii) Further work on modelling, identified the hybrid NbS measure of using the notch weirweirs and sand dams

~~combination~~ as ~~the most~~highly effective ~~mix~~ for ~~promoting~~ aquifer recharge and ~~slowing down peak flow of flush floods, hence mitigating both floods and drought, simultaneously; (iii) indicators for guiding future~~flood mitigation, and developed prioritization ~~of the most suitable NbS, giving priority to~~ indicators ~~relating specifically to~~for NbS based on flood mitigation potential. ~~Measures to protect livelihoods and assets under outcome 2 have been~~These findings have directly influenced ~~by these three results~~the project's NbS measures.

~~➢ The UN-Habitat in partnership with the governments of the LGs of Jowhar and Beledweyne undertook risk analysis of the people, infrastructure and other assets of the two cities, including IDP areas, prioritizing areas of the city with a very high or high risk of flood losses and damage. They approached the analysis from two pillars: (i) Risk reduction (focused on reducing exposure and vulnerability; and (ii) Increasing capacity (management and response). They used the results to propose integral plans of reducing vulnerabilities while increasing resilience with recommendations on interventions at several scales from the territorial scale (peri-urban areas surrounding the cities), to interventions inside the cities, through to the neighbourhood and building scale. They recommended implementation in the short, medium and long term, for and with the most vulnerable people. The project interventions under outcome 2 have been chosen from the recommended short-term measures for the most vulnerable people.~~

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 ~~of~~from partner ~~organisations and institutions (~~organizations, including ~~staff of~~ line ministries ~~at all levels~~, development partners, SWALIM, ~~local~~ and ~~international~~ NGOs~~, such as~~ like Sadar~~):~~ ~~Input from these groups took the form of sharing incites~~, provided inputs based on their knowledge of ~~the country, challenges from~~ climate change ~~and other externalities~~ challenges and adaptation in ~~general, and, where applicable, the role of NbS in adaptation and its potential in the current context of the country.~~ 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~~, given the current set of circumstances: highly exposed to effects of climate hazards with very low adaptive capacity exacerbated by limited resources for adaptation – skills, information, financial – against a backdrop of high levels of poverty and acute needs in other spheres of government services such as health, education, security, etc. Furthermore, given this set of circumstances, it is prudent to replicate/upscale measures that have proven to deliver benefits rather than experiment.~~ .

Lessons from other projects:

➢130. The project ~~design~~ has been informed by ~~numerous~~several lessons ~~generated by~~from similar ~~projects, which have allowed it to take into consideration the best innovative interventions. The experience of earning~~initiatives, particularly focusing on generating carbon credits from soil carbon ~~is a good example of this. The project will build on the~~. It will leverage experiences ~~(both positive and negative) of~~from initiatives such as the Northern Rangeland Trust of Kenya[195], and Boomitra[196] ~~and many other schemes to be identified and interrogated~~, during the ~~full project~~project's formulation and implementation phases. ~~–~~The ~~overall objective of the~~ scheme ~~will be~~has two ~~fold~~ objectives: (i) to empower ~~the~~ resource ~~-~~poor pastoralists and agro ~~-~~pastoralists ~~and their local governance institutions~~by enabling them to build and sell carbon ~~assets in~~assetsin a manner that regenerates land and soils~~,~~ while providing financial incentives for ~~sustaining improved~~sustainable practices~~:~~, and (ii) ~~provide an opportunity for~~to assist the Ministry of Environment and Climate Change ~~and~~, along with other relevant ~~partner~~ institutions ~~and groups to use~~, in establishing the ~~set up process to determine and start putting in place the~~necessary conditions and policies ~~necessary for the country to regulate~~for effective carbon trading ~~effectively. It is noted that since~~ regulation. Given the long-term nature of soil carbon projects ~~are very long term~~ (30+ years~~);~~), the ~~AF~~ project will ~~only support the~~

[195] 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)
[196] https://boomitra.com/soil-carbon-removal-project-kenya-smallholder-farmers/

~~design of~~primarily focus on designing the scheme ~~(output 3.2) and facilitate the relevant~~and facilitating stakeholders to ~~formulate~~develop a forward-looking strategy ~~to carry the scheme forward~~.

Communities: ~~vulnerable~~

131. Vulnerable communities have ~~contributed variously to identification of~~played a significant role in identifying innovative adaptation measures ~~in various projects~~ that have~~,~~ in turn~~, contributed to lessons that have~~ informed the design of ~~the AF project. The two research pieces cited above had communities participate in the choice and testing of interventions. Furthermore, the draft~~this project. Draft community resilience plans, formulated with technical support from Sadar during the initial project design phase, will ~~inform~~guide the formulation of ~~the~~ watershed/catchment plans under Outcome 2~~,~~ once ~~actual project~~ intervention ~~villages/catchments~~areas are identified. ~~In particular, the design of this AF~~

➢132. The project design has particularly been informed by the ~~work of~~ Building Resilient Communities in Somalia (BRCiS) program, which ~~has engaged in~~emphasizes a learning-by-doing ~~mode of implementation, promoting~~ approach and community-led ~~pace of~~ interventions. ~~As explained in the baseline section, since the beginning,~~ BRCiS ~~consortium was~~ has committed to a bottom~~-~~up ~~model of~~ decision-making ~~and has built a strong foundation for working through~~model, empowering existing community structures~~, which it has empowered~~ to ensure that programming ~~is fully informed by and is based upon~~addresses the needs of vulnerable populations. By the end of ~~the~~its second Phase in 2022[197]~~, the consortium~~, BRCiS had established 194 Community Resilience Committees (CRCs) across 34 districts[198]. These CRCs ~~act~~serve as the ~~nucleus~~core for ~~establishing~~ volunteer committees and associations ~~that represent~~, representing community members in decision-making~~, making the programme~~ processes. This approach has made the program flexible and responsive to ~~learning and~~ community needs and experiences. ~~Implementation of this~~This project will~~, wherever relevant, applicable and appropriate,~~ adopt ~~the~~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.

~~186.~~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.

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

Baseline (without AF Resources):

~~187.~~134. The Shabelle basin, ~~one of the country's most productive areas and considered a national food basket, is also prone to repeated cycles of drought and floods. The 2050 and 2070 climate-driven projected changes~~an important agricultural area in ~~rainfall, temperature and PET scenarios show that Somalia's~~ Somalia, faces recurrent droughts and floods. Climate projections for 2050 and 2070 indicate increased threats to development and livelihoods ~~will in future face increased threats of~~ due to climate extremes ~~unless effective~~, underscoring the urgent need for climate~~-~~smart adaptation ~~systems form integral components of~~in

[197] ~~Norwegian Refugee Council, 2022: End Term Evaluation Report for – Building Resilient Communities in Somalia, Phase 2.~~
198 Norwegian Refugee Council, 2022: End Term Evaluation Report for – Building Resilient Communities in Somalia, Phase 2.

national ~~development~~ strategies[199]~~. This is particularly so because evidence shows that a level of~~. The basin's climate change ~~is locked into the global climate system, regardless of efforts to mitigate future emissions (ibid). In the Shabelle basin,~~ impacts ~~of climate change~~ are ~~compounded~~worsened by insecurity and land ~~and rangeland~~ degradation~~. The latter is~~ , driven by ~~a set of complex drivers, including~~ droughts, floods, unsustainable ~~and inappropriate natural resources~~resource exploitation ~~systems~~, overgrazing, tree cutting ~~for fuel wood and charcoal production, poorly designed~~, poor agronomic practices, ~~all enabled by~~ and uncertain land tenure ~~and exacerbated by climate hazards.~~ .

~~188. Although the~~The entire Somali population ~~of Somalia~~ is vulnerable to climate hazards, with women and children ~~are~~being the most affected ~~by climate driven poverty and food and nutrition insecurity~~ due to ~~the fact that culture and~~cultural norms ~~confer low~~ that limit their social status ~~to them and largely restricts their lives to the "private domain"~~[200]~~. This reduces women's role in~~, decision-making roles, and ~~limits their~~ access to ~~assets and~~ resources. Minority groups in the South, such as the Bantu, Benadiri, and Occupational Groups ~~are~~, also ~~highly vulnerable.~~

~~189.~~135. ~~Somalia is one of the countries where~~face high vulnerability. NbS and hybrid measures ~~can contribute greatly to tackling~~are vital for addressing climate hazards ~~and variability~~in Somalia, given the high ~~levels of~~ dependency on natural resources ~~combined with~~and low ~~capacities to adopt~~capacity for costly ~~adaptation measures~~adaptations. However, ~~the effective upscaling and replication of readily available~~scaling up and replicating NbS ~~and hybrid measures to reduce the vulnerability to climate hazards is hampered by~~ is challenging due to inadequate technical capacities ~~to support knowledge/scientific based~~for planning, implementation, and maintenance ~~of NbS measures. The country~~. This is ~~in~~exacerbated by the ~~process~~loss of ~~rebuilding~~ capacities ~~lost over the two~~due to decades of instability (1991—2012). Newer states like Hirsabelle and the ~~South West are among the newly formed States, where capacity is much~~Southwest have lower ~~than the~~ capacities compared to older ~~States~~[201]~~. Like in many other parts of the world, the information on NbS available remains within~~ states. Additionally, NbS knowledge is confined to a few institutions and ~~international organizations and~~ has not ~~trickled down adequately to~~reached decision-makers, ~~natural resources~~resource managers ~~and~~, or communities~~. The use of NbS in the Shabelle basin is therefore hampered by the fact that critical stakeholders lack practical knowledge and skills to improve upon traditional practices to make NbS effective in mitigation of climate risks~~ 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 ~~and community institutions, relevant~~, government institutions, ~~relevant~~ civil society ~~organisations~~organizations, and academia ~~stakeholder's~~ to replicate and upscale proven NbS to mitigate flood and drought impacts ~~of floods and droughts on livelihoods~~, benefiting about 26,250 people in ~~both~~ rural and urban areas. Skills and information will ~~be provided and used to facilitate~~ support stakeholders in rural communities to develop action plans for ~~an~~ integrated ~~approach to~~runoff control ~~run off~~, soil erosion prevention, improved infiltration, soil moisture management, and ~~more~~ resilient grazing lands in ~~the~~ three target rural catchments. ~~The set of activities under this Component~~

~~190.~~137. Activities will result in ~~the development of~~ technical protocols and a local enabling framework ~~that will guide the~~guiding Component 2's implementation ~~of activities in Component 2. Similarly,~~. Urban communities ~~in selected vulnerable urban areas will be facilitated to~~ will refine ~~the~~ city ~~resilient~~resilience plans and develop action plans ~~for implementing selected measures~~ to control urban flooding ~~in the cities.~~. To ~~enhance~~ensure effective community participation ~~of representative communities~~, 12-15 community committees will be empowered with ~~relevant~~ structures, awareness, and knowhow ~~to lead effective~~

~~199 World Bank 2020: Somalia Country Environment Assessment Report.~~

~~200 Source?~~

~~201 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 (partner with other relevant stakeholders effectively) infor planning, implementationimplementing, and monitoring of catchment/watershed and urban greening plans (preferably building on, incorporating existing committees). Wherever where possible and appropriate, existing committees will be incorporated into the project, new ones only created where necessary.. A GASHPP will guide the entire project to ensure, ensuring equitable contributioncontributions and of 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:

191. The livelihoods of the communities in the Shabelle basin are largely dependentcommunities depend heavily on rain-fed agriculture (from crop farming and agropastoralism to pure pastoralism) and are therefore, making them highly exposedvulnerable to climate hazards. Indeed, the impacts of climate change are already evident including Climate change impacts, such as declining water resources, and reduced agricultural productivity, loss of productive assets, livelihoods and lives[202].

138. Climate hazards pose even greater risks to the urbanare already evident[203]. Urban populations, especially in the riverine areas oflike Beledweyne, Jowhar, and Afgooye. These urban areas, concentrate potential impacts from climate hazards face heightened risks due to the aggregation ofconcentrated people, infrastructure and assets. Furthermore, the country is urbanizing rapidly. Beledweyne, Jowhar and Afgooye cities are expected to continue a high rate of growth over the next years, as a result of both natural growth and influx of IDPs. The three districts currently host , and assets. Rapid urbanization and large numbers of IDPs and are still receiving peopleinternally displaced by drought and conflict, therefore constant growth, often unplanned settlements.persons (IDPs) exacerbate these risks. By September 2023, Beledweyne was had 91 IDP sites hosting 9,110 households or 53,840 individuals204; 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 individuals205. Beledweyne city was affected by major historical river

192.139. Historical floods have significantly impacted these cities, with major events recorded in Beledweyne in 1961, 1977, 1981, 1997, 2005, 2006, and most recently 2016, 2018, and 2019. In Jowhar, where river management and related disaster prevention and mitigation are almost completely absent, clogged river channels are largely clogged by the accumulation over the past 30 years of high levels of silt and rubbish, which turns even a small rain eventand poor river management have turned even minor rains into a flood. At the same time,floods, while dry season'sseason water flows in the river have become lower and lower, sometimes failing altogether,are diminished due to upstream damming and over-use upstream. It is clear that without ensuring adaptation measures to attenuate floods, control soil erosion and enhance drought resilience, rural and urban communities will still be at risk from such climate hazards which affect food and nutrition security, health, accumulation of assets and often lead to loss of lives. overuse.

193.140. Adaptation to climate hazards is part of day-to-day life in Somalia;measures, particularly NbS has always been a part of adaptation, especially in the resource-poor communities in the rural areas., can help in mitigating floods, controlling soil erosion, and enhancing drought resilience. However, much traditional knowledge on the use of NbS has been lost (due to the young nature of the country's population where about diminished, especially as 60% of the population is below the age of 35), and/or has been rendered ineffective due to the increased intensity and severity of climate hazards with ever declining recovery period in between

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

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

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

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

hazards. Whileunder 35. Effective adaptation requires a combination of both technical/scientific and traditional/indigenous practices would provide the most effective adaptation measures, both types of technologies are inadequately being applied, and the , yet both are currently underutilized, and evidence forof their effectiveness is limited.

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

194. The AF investment will implement the concrete NbS measures outlined in the plans and protocols formulated under Componentunder component 2 benefiting at least 26,250 people in total (15,750 in rural areas and about, 10,500 in urban areas). The sevenSeven combined V-shaped weirs and sand dams build and made functional will control floods while simultaneously promoting infiltration and water storage. The combined technology reducedwill control floods, reducing peak flow of water by 38% - 60%, depending on location and severity of the flush flood. Furthermore, they increased % and increasing infiltration by up to 118% (at 1.5 meter) and 156% (at 2 meters). Indeed, the maximum extractable volume of water at the beginning of the dry season in professionally constructed sand %. These dams is theoretically sufficient to coverwill meet 100% of the minimum domestic water needs (20 l/p/d) during the 5-month dry season (150 days).

195.141. The solar. Solar pumps provided will enable water harvesting and storage into elevated tanks from where it will be distributed by gravity to households harvest and store water for domestic use, livestock, and mini irrigation, increasing water availability for households, livestock and agriculture use.

196.142. The minimum 4,000 ha of rangelands put under climate smart management practices will enhance ecosystems functionality with higher provisioning abilities. Incorporating measures such as optimal grazing intensity, adopting silvopasture practices for animal nutrition, selective enrichment planting, shade and fencing, incorporating legumes into planted pasture and improving feed quality will regenerate rangelands, improving rangeland condition and productivity. Communities will identify strategic areas to establish terraces and soil bunds to control soil erosion and enhance soil organic matter build up (up to 200 ha within the 4,000 ha).. Benefits from thesesuch measures have been demonstrated under similar conditions, showing up to 30% reduction in sediment load in the run-off on terraced fields206; 30% to 68% higher biomass on terraced fields207;. 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 maize208. 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.

197. The adoption of farmer/pastoralist led regeneration of rangelands will encourage revegetation with high value species, including trees, shrubs and grasses. An increase in vegetation improves flora biodiversity, which in turn creates better habitat fauna biodiversity. Enrichment planting with indigenous and high value species such as legumes improves quantity and quality of pasture for livestock. The crude protein content of grasses intercropped with legumes can increase from 7.1 to 14.3, 11.9[209]. Furthermore, increased organic matter and nitrogen fixing bacteria[210] reduces the cost of production: nitrogen fixers can save a farmer US$ 20–48 (and up to US$ 200 in the case of Leucaena leucocephala).

198. In the urban areas, sustainable urban drainage network will be demonstrated by the establishment of at least 130 ha of strategically placed ditches, detention basins, retention ponds, water tanks for roof runoff and urban water harvesting structures. Waste minimization and its positive effect on reduced

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

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

[208][208] [208] Sodhi and Ehrlich: Conservation Biology for All. http://ukcatalogue.oup.com/product/9780199554249.do

[209] 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

[210] 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.

flooding by up to 50% will be demonstrated in at least two neighbourhoods, where residents will be facilitated to rethink, reduce, reuse, recycle and refuse the use of single-use items, to derive maximum value from waste. Furthermore, at least 100 ha of flood control forests and 130 ha of hedge grow network in riverine areas will be established (and/or reforested) in strategic locations, including riverine buffer forests, trees in open areas/streets, hedge grow fences around cropping areas. Urban forest systems (trees, soil, and groundcover) help manage stormwater runoff by reducing stormwater volume, slowing rainfall intensity, delaying runoff, improving infiltration into soil, and increasing water storage capacity in soils. Benefits of green infrastructure in cities have been demonstrated widely, although data on benefits in Africa is very limited. A 2023 global review of the role of green infrastructure in adaptation found that 17 SDGs and 74 (44%) of its 169 targets may be achieved through a single strategy; the implementation of nature in the city and the use of the ecosystem services that the environment provides to its advantage[211]. Tree canopy in cities has been shown to tree canopies delay stormwater run-off and increase the time it takes runoff to concentrate at the outlet of a catchment or drainage area (e.g., a storm drain or bioretention practice) by runoff by up to 3 hours, depending on rainfall volume and intensity as well as tree species[212]. Trees in cities in Iran have been shown to increase soil infiltration of water into the soil by 69 to 354 percent (compared to soil not under the canopy), depending on soil texture[213].

143. %. Collectively, these measures will reduce theflood severity of floods in urban and rural areas, increase , enhance water availability during droughts, with benefits in increased, and increase rangeland productivity of rangelands in both livestock and food production. These results will lead to actual savings by communities.. Although cost benefit analysis will be undertaken to confirm and provide evidence, the WB estimated overall discounted returns of USWorld Bank estimates a return of $5.85 million for everyper $1 million dollar invested in the development of water infrastructure and livelihood activities in a similar project in Somalia). Critically, the measures will increaseprojects. These efforts will boost adaptive capacity of the beneficiaries and enhance the, resilience of livelihoods and economies at the target area levels, contributing to , and reduce climate-related displacement and the associated humanitarian assistance costs.

199.

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

Baseline without AF investment: an

200.144. 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 elements of both private and public benefits, meaning that market forces alone are unlikely to result in a societally optimal adoption of even the most promising approaches[214]. Despite being recognised for theirrecognizing the potential of NbS in mitigating climate hazards in the urban areas, the implementation of NBS in urban areas is limited globally and even less utilized in Somalia. Moreover, the upfront costs and short-term risks and uncertainty associated with a transition to nature-based agricultural practices pose a significant barrier to adoption. This is, Somalia struggles with widespread poverty, particularly the case for poor urban dwellers and farmers, many of whom are women, who face significant resource constraints — including for capital, land, access to fisheries, and labor and frequently are unable to insure themselves against the risks of crop, livestock or fish production failure. Even local authorities lack the requisite resources to implement

[211] 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

[212] Asadian, Y.; Weiler, M. 2009. A new approach in measuring rainfall intercepted by urban trees in coastal British Columbia. Water Quality Research Journal of Canada. 44: 16-25

[213] Zadeh, M.K.; Sepaskhah, A.R. 2016. Effect of tree roots on water infiltration rate into the soil. Iran Agricultural Research. 35(1): 13-20

[214] 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

adaptation measures. For example the two city resilient plans for Jowhar and Beledweyne are not yet fully implemented due to lack of financial and other resources, exacerbated by the poor regulatory framework and weak capacities for urban planningaffecting 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.

201. Replication of NbS is further hampered by financial constraints at all levels of society – from individuals to households to local, Member and FGSs. Somalia is a least developed country with unique circumstances; poverty is widespread, particularly in rural households and IDP settlements. Nearly 70% of Somalis live below the poverty line of US$ 1.90 per day and 90% live in multidimensional poverty that includes great need for education of children and adults, improved access to water, improved sanitation, and access to electricity[215]; the NDC reported that the country requires US$ 58.5 billion to implement its adaptation priorities for the period 2021–2030, stating that the country continues to be faced with significant financial, technical, technological, and capacity constraints[216]. Furthermore, FGS funding for climate change is scarce: in fact, adaptation to climate change, although a recognised concern, is not high on the list of government priorities given the multitude of immediate threats the country faces[217].

202.145. Mainstreaming the use of NbS in mitigating climate risks presents an opportunity to increase funding for replication. However, mainstreaming is currently hampered by Moreover, inadequate policies and incentives hinder the adoption of NbS. There is limited awareness of the importance and availability of cost-effective NbS measures for adaptation and inadequate cross-and insufficient collaboration across governmental departments, inadequate political. Political will and long-term commitment: while NbS generally have long-term and more uncertain outcomes, politicians tend to prioritize based on tangibility and immediacy of the outcome. Furthermore, the country does not yet have such smart policies or incentive packages to encourage adoption of NbS in relevant sectors and programmes. 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 will facilitate creation ofaims to establish policies, incentives, and better coordination mechanisms across departments (vertical and horizontal) thereby promoting availability of resourcessectors to sustain thesupport sustained use of NbS in adaptation. The reviewReviews of relevant FGS, MSfederal, member state, and LGs'local government policies will identify shortfalls,gaps and opportunities and entry points for mainstreaming the use and financing offor integrating NbS and hybrid measures ininto relevant projects and programmes. Policies to be reviewed. Key policy areas include Environment and Climate Change, Public Works and Reconstruction, Planning, Investment and Economic Development, Agriculture and Irrigation, Water and Energy, Livestock, and Education. Recommendations will then be formulated that will form part of thefrom these reviews will inform advocacy campaigns. The soil carbon credit scheme designed will demonstrateprovide financial incentives for NbS and provide an opportunity for the Ministry of Environment and Climate Change to identify policy measures to regulate and promote adoption and enable policy development for carbon credits trading in the country. While the public. Public awareness raising campaigns and policy advocacy strategy rolled outstrategies will promote

[215] World Bank, 2022: https://www.worldbank.org/en/news/feature/2022/11/29/somalia-economic-update-investing-in-social-protection-to-boost-resilience-for-economic-growth

[216] The Federal Republic of Somalia, 2021: UPDATED NATIONALLY DETERMINED CONTRIBUTION (NDC) – Microsoft Word – Final Updated NDC for Somalia 2021.docx (unfccc.int)

[217] 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

~~adoption of~~ NbS ~~mainstreaming~~ friendly ~~policy~~ reforms~~, including mainstreaming NbS considerations in relevant coordination / governance mechanisms for inter and intra collaboration (vertical and horizontal)[218]. Like other project initiatives, these reviews and piloting will be guided by the stakeholder~~ and enhance collaboration among departments. Stakeholder participation and gender strategies~~, to~~ will ensure ~~that view points and needs of all relevant social groups are heard and the consequent~~diverse perspectives are considered, shaping inclusive policy and ~~incentives~~incentive packages ~~formulated and later implemented respond to the~~that meet societal needs ~~of the whole society, as appropriate.~~.

~~203.~~

Component 4: M&E and learning:

~~204.~~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[219]. 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[220]. However, as reported by UNEP, scepticism about NbS still lingers globally[221], 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[222]. 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

~~205.~~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, 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.

~~206.~~149. The project results and impacts will be sustainable in all institutional/policy, social, environmental, technical and economic dimensions as explained bellow.

Institutional sustainability: ~~Activities under Outcome 1 will build~~

~~218 Including district disaster management committees, basin management committee, National Floodand Drought Task Force, national adaptation task force and other relevant ones to be identified during implementation~~

219 United Nations Environment Programme (2022). Nature-based Solutions: Opportunities and Challenges for Scaling Up. Nairobi

220 Ministry of Water Resources and Energy and UNEP-DHI, March 2022: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia

221. United Nations Environment Programme (2022). Nature-based Solutions: Opportunities and Challenges for Scaling Up. Nairobi

222

207. The project aims to enhance 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 in order to promote sustainability of the project results and further replication of these innovative measures in the country. The resources provided under the Outcome will focus on planning to ensure a thorough assessment of the capacities requiredSomalia to implement and sustain the NbS measures upscaled by the project. The identify capacity gaps, on the basis of which it will design and implement the capacity building programme which will include. Under Outcome 1, resources will be allocated to assess and address capacity gaps necessary for scaling up NbS measures. This includes community mobilization, training of relevant groups (largelyfor community groups, and technical staff offrom relevant line ministries and civil society organizations). Under output. Output 1.4, the project will empower focuses on empowering 12-15 community committees with relevant the skills and structures, awareness and knowhow to lead needed for effective community participation (partner with other relevant stakeholders effectively) in planning, implementationimplementing, and monitoring of catchment/watershed and urban greening plans (preferably building on existing committees).

208.150. Moreover, the project will assess and put in place, where appropriate conditions necessary to implement a 30+ years scheme, empowering . Additionally, the project plans to enable resource poor pastoralists and agro pastoralists and their local governance institutions to build and sell to participate in a 30+ year scheme, involving the sale of carbon assets in a manner that regeneratesto regenerate land and soils, while providing financial incentives for sustaining improved practices (details in the description of outcome 3). Furthermore, project implementation will be guided by a. A stakeholder participation plan which will ensure that ensures consultation, continuous engagement and buy-in of all relevant social groups are consulted and engaged withthroughout project formulation and implementation, generatingfostering ownership in support ofand sustainability. Linkages will be establishedCollaborations with criticalkey institutions such aslike SWALIM and institutions of higher learning to universities will provide ongoing support and information that can be maintained maintenance post project. Furthermore, a specifican exit strategy will be carefully planned in order to guarantee sustainability of the infrastructure established under the CfW after the project ends, as part of the overall exit strategy of the project (to be designed under Outcomeoutcome 4). The exit strategy) will detail howensure the ecologicalsustainability of infrastructure developed duringunder the project, detailing how ecological assets will be maintained throughover time. This comprehensive approach will promote long-term sustainability and replication of NbS initiatives across Somalia.

209.151. **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.

210.152. **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[223]. 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.

~~211. **Social and economic sustainability:** The project design is aimed at empowering communities to identify climate risks and identify and drive NbS and hybrid measures to address these risks, with technical and financial support from the Adaptation Fund and technical institutions (UNEP, Government, and Sadar). Within this context, the building blocks of social sustainability are inclusive, just, and resilient societies where citizens have voice and governments listen and respond[224]. This project follows this school of thought closely by ensuring that the project design and selected mode of implementation promote the building blocks of social sustainability. The identification of the project initiatives was based on a broad consultative process (described in the Section on Stakeholder Consultation), ensuring that all sections of the society informed the nature of the project, and that the relevant stakeholders understood the importance of the project. Implementation of the project will be informed by three critical strategies, which will enmesh social sustainability: (i) a stakeholder participation plan; (ii) a gender mainstreaming plan; and, (iii) an ESMP. All three plans will be designed during the formulation of the detailed and full project document, and will form an integral part of the full project document. These instruments will ensure that:~~

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 ~~and vulnerable people~~groups (IDPs, indigenous ~~groups, the physically challenged~~, disabled, women, ~~the~~ youth) are equipped ~~with tools that enable them~~ to overcome ~~obstacles that prevent them from fully participating in society under normal circumstances and that they are recognized and~~barriers, participate ~~in the~~fully, and influence project processes, ~~creating opportunities for all people and~~ addressing ~~deep rooted~~ systemic inequalities and ~~fulfilling a core element of social sustainability (i.e.~~promoting inclusivity~~);~~.

b) The ESMP will ~~provide an opportunity for a thorough analysis and evaluation of the project's documents and of the social context and likely~~ evaluate social impacts~~, both~~ (positive and negative~~, identifying opportunities and challenges of an all-inclusive project implementation process, providing budgetary provisions to~~), and ensure ~~that project~~inclusive implementation ~~and beneficiation are all-inclusive; that they empower~~, empowering community committees ~~to enable them to represent community viewpoints in the project decision-making organs, ensuring that community views are heard and acted upon, fulfilling another core element of social sustainability; that they contribute to wealth creation at the local level, which contributes to poverty alleviation, a core element of social and economic sustainability.~~ 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 ~~to ensure that these employment opportunities are available to marginalized people. The project will draw on experiences from best~~ .

[223] 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

~~[224] The World Bank, 2020: Five Things You Need to Know About Social Sustainability and Inclusion, Online. https://www.worldbank.org/en/news/feature/2020/09/02/five-things-about-social-sustainability-and-inclusion~~

b) Drawing on international best practices on securing social sustainability to ensure that the project contributes to global practices on creating more inclusive societies, enhancing the empowerment of citizens, and , the project aims to enhance social sustainability by fostering moreinclusive societies, empowering citizens, and building resilient and cohesive 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 is designedaims to decrease theenhance resilience and reduce vulnerability, and increase resilience of targeted communities, in particular the most vulnerable and among marginalized groups such aslike women, the disabled, and youth. The project area is host to several , and historically marginalized groupscommunities such as Bantu, Benadiri, Occupational Groupsoccupational groups, and IDPs in camps. It will be very important that the project promotesprioritize equitable participation of all the groups residing in the target communities/areas. The project will therefore be implemented in athrough gender- responsive, participatory and inclusive manner,approaches guided by a stakeholder participation and gender mainstreaming and stakeholder participatory plans, which will be designed either during the project inception phase. These guidelines will promote the fair distribution of and the project resources and benefits, with no discrimination or favoritism of any groups, and that the project will pay special attention to include women, men, the youth, minorities and IDPs, equitably, as relevant. The cash . Cash-for- work, in particular, initiatives will be guided by theadhere to Somalia Cash Consortium guidelines and internationally accepted guidelines to ensure equitable access by all relevant groups. The guidelines include and international guidelines, including the Mercy CopsCorps Guide to Cash-for-Work Programming[225] and FAO's Cash-for-work in Somalia: Linking Relief to Recovery[226]. . Furthermore, the community committees to be formed and empowered under Outcome 1 will ensure thatrepresentation of all community groups are well represented in the project implementation processes, including in the review of policies and identification of policy reviews and the development of incentives packages to promote further upscaling offor scaling up NbS. Moreover, the project was designed to include other relevant groups in the society, such as academia, civil society and the private sector, who will be represented in the project steering committee. interventions. These efforts will promote broad community engagement and benefit distribution.
ESP 3 Marginalized and Vulnerable Groups		While acknowledging that the entire population of Somalia is vulnerable to the impacts of climate change, the NAPA[227] identified women, youth, IDPs and the rural population, particularly the pastoralists, as highly vulnerable. The rural population, including women and children, are the most affected by climate-driven poverty and food and nutrition insecurity due to the fact that culture and norms confer low social status to them and

[225] https://www.calpnetwork.org/wp-content/uploads/2020/01/mercy-corps-guide-to-ctp.pdf (accessed on 27th Sept 2023).
[226] https://www.calpnetwork.org/wp-content/uploads/2020/01/full-report-602-1.pdf (accessed on 27th Sept 2023).
[227] Federal Republic of Somalia Ministry of National Resources, 2023. National Adaptation Action Plan

		~~largely restricts their lives to the "private domain"[228]. This reduces women's role in decision-making and limits their access to assets and resources.~~ 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.		~~Guided by the~~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 will ensure women's integration in all planned activities: water resources; agricultural production, NbS subprojects.~~. The project ~~will also ensure the integration of~~aims to include women ~~into the~~in local decision-making bodies ~~of local communities.~~ and project governance. The gender mainstreaming plan will identify ~~pitfalls and~~ opportunities ~~for integrating specific requirements~~and challenges to ensure ~~the~~ full participation of women and ~~other~~ marginalized groups, with child-friendly schedules, culturally respectful consultations, and women's inclusion in project ~~activities and~~ leadership and staffing. These efforts seek equitable access to ~~the~~ project benefits~~. These measures will include child-friendly schedules of activities where women of childbearing ages are involved; organizing consultation in a manner that respects cultural norms while providing all~~ and enhance gender ~~groups an opportunity to be heard; ensuring that women are included in the governance structures of the project, such as the community committees and even include women in the~~ equality in project ~~staff complement.~~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. ~~The project will respect, promote, and realize the principles mentioned in the ILO Declaration of Fundamental Principles and Rights at Work, and ensure that they are respected and realized in good faith by the Executing Entity and other contractors.~~ ~~The project activities will not involve aspects where forced labor and/or child labor will be used~~
ESP 7 Indigenous Peoples		The World Directory of Minorities and Indigenous Peoples229 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

[228] ~~Source?~~

[229] 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]

		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[230]. ~~Although many of these groups have been absorbed into Somali clans, they are still considered as "other" and face discrimination in many aspects of livelihoods and economic development (ibid). It is therefore extremely important that~~ The project ~~implementation be guided by~~ will prioritize stakeholder participation in line with the stakeholder ~~participation~~ engagement plan ~~that will be formulated~~to address discrimination faced by minority groups integrated into Somali clans. This Plan, developed during ~~the detailed~~ project design ~~phase. This~~, will be ~~complemented (and enforced)~~reinforced by the ESMP ~~plan. The two~~. Both plans will ~~be based on a thorough assessment of the~~assess stakeholders ~~relevant to the project in the target areas and the challenges and opportunities of engaging all the relevant gender and community~~, engage diverse groups ~~as well as the potential environment~~, and mitigate environmental and social impacts ~~and their mitigation measures.~~ 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 ~~not expected~~designed to ~~have any~~avoid negative ~~impact~~impacts on critical natural habitats, including ~~those that are (a)~~ legally protected~~; (b) officially~~ areas, proposed ~~for protection; (c) recognized by authoritative sources for their~~protected areas, high conservation value~~, including as~~ sites, and habitats protected by indigenous communities. The ESMP will identify and monitor critical habitat~~; or (d) recognized as protected by traditional or indigenous local communities.~~ ~~However, as part of the ESMP, the~~ areas to ensure project ~~will identify the critical habitat areas and monitor that the project will not fund in the target areas any intervention that~~ activities do not encroach ~~in to any declared or proposed protected area of~~upon or convert natural habitats ~~or that result in the conversion of natural habitat to other purposes. The project will develop guidelines~~. Guidelines and selection criteria ~~that~~will exclude interventions near protected areas. ~~The subprojects~~Subprojects will ~~not~~ be located ~~within, or in the vicinity of, areas protected or~~away from areas designated for ~~their~~ biological conservation ~~values or~~or potential critical habitat, in alignment with ~~the potential to qualify as critical habitat (as defined under~~ IFC PS6 (IFC, 2012).
ESP 10 Conservation of Biological Diversity		Somalia ~~became the 193rd Party to~~joined the Convention on Biological Diversity as its 193rd Party in December 2009. The project will ~~be implemented in accordance~~align with the CBD and ~~with the~~Somalia's 2015 National Biodiversity Strategy and Action Plan ~~adopted in 2015.~~ ~~Although the project is~~. While not ~~designed with a focus~~focused on biodiversity conservation, NbS measures ~~tend to improve habitat for~~ in the project will enhance habitats without harming biodiversity ~~and avoid any overt damages to any existing biodiversity. Revegetation of~~. Activities such as revegetating riverine forests~~, establishment of~~ and installing terraces, check dams, and weirs ~~all~~will promote

[230] https:// minorityrights.org/country/somalia/#:~:text=Most%20conventional%20descriptions%20of%20Somali, part%20of%20the%20Dir%20clan

		vegetation regeneration ~~of vegetation, improving~~ and improve micro-ecosystems ~~and contributing to the~~, supporting biodiversity recovery ~~and conservation of biodiversity.~~. Indigenous, non-invasive species will be ~~selected~~prioritized for ~~NbS involving~~ planting ~~of trees, shrubs and other vegetation.~~ ~~The impact of excavation~~. Excavation and sediment removal ~~associated with the establishment of~~linked to project components like V-weirs, sand dams, terraces, and soil bunds ~~is considered~~will have minimal ~~since the project will not be implemented in any areas targeted as~~ impact, avoiding protected areas ~~or areas of importance for biodiversity, This issue will be examined more closely during the formulation of the ESMP, which will provide specific~~and biodiversity hotspots. Detailed mitigation measures ~~to reduce any potential negative impacts on biodiversity.~~ ~~Moreover, the project~~ will be ~~in line with the FGS of Somalia's priorities in the NDC.~~outlined in the ESMP.
ESP 11 Climate Change		The project ~~is designed~~aims to ~~provide~~equip communities with tools and resources ~~for communities~~ to ~~tackle~~manage climate-intensified floods and droughts~~. It will therefore not promote any drivers of~~ without promoting climate change ~~(emission of carbon dioxide gas from the use of fossil fuel and from changes in land use, methane and nitrous oxide emissions from agriculture, emission of hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, other halocarbons, aerosols, and ozone).~~ ~~Project activities are aligned to~~drivers. Activities align with priorities ~~defined~~ in the NAPA and ~~the~~ NDC ~~which focus mainly~~, focusing on~~:~~ sustainable land management ~~and~~, food security ~~through enhanced productivity~~, integrated water management, and reducing risk ~~among of~~for vulnerable populations from natural disasters. The ~~Project is~~project directly ~~implementing the~~implements adaptation measures ~~recommended~~outlined in the NAPA for Agriculture ~~and~~, Food Security, Water, and Natural Disasters sectors. However, ~~it is recognized that~~ further changes in the climate~~,~~ ~~even realization of projected changes in the country,~~ could reduce the positive impacts of NbS on reducing the vulnerability of people, productive assets and livelihoods to the intense climate hazards. ~~For this reason, to the greatest extent possible, climate change projections based on the latest available data will be considered in the design and location of the NbS and hybrid measures.~~
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		~~The project is expected to have an overall beneficial impact on the public health with improved, healthier and more resilient natural environments, especially in urban areas and selected IDP settlements. Improved access~~Access to safe water ~~supply~~ from ~~the~~ sand dam reservoirs will directly benefit health by providing clean water for drinking, cooking, and hygiene ~~purposes will have direct benefits on health and nutrition. Health benefits The~~. NbS ~~measures~~ will ~~also contribute to higher~~increase food production ~~therefore improved~~, improving food security and nutrition. ~~No negative impacts on public health have been identified.~~ ~~Due to the still present~~However, potential COVID-19 ~~and regular~~ outbreaks, along with regular occurrences of cholera and measles in Somalia, ~~there is an increased risk to public health that is beyond the control of the project and may affect communities' participation or the operational capacity of the project personnel. Should~~ pose health

		risks. Contingency plans will address these challenges, including alternative approaches to large ~~public~~ gatherings ~~not be possible, then suitable alternatives will be sought that are in compliance with best~~that adhere to infection prevention practices ~~in reducing the risk of infection~~, ensuring the project's continuity and community safety.
ESP 14 Physical and Cultural Heritage	.	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 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. ~~Somalia ratified the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, the 1972 World Heritage Convention, and the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage.~~ 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.