

Breaking The Climate Conflict Cycle in Hirshabelle State

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

MATABAN DISTRICT



MAIN CONTENTS

	Introduction
1.	Environmental Baseline Data
2.	Identification of Environmental Hazards
3.	Mapping of Natural Resources
4.	Assessment of Water Resources
5.	Land Degradation and Desertification Assessment
6.	Biodiversity Assessment
7.	Assessment of Water Resources
8.	Land Degradation and Desertification Assessment
9.	Biodiversity Assessment
10.	Climate Change Impact Assessment
11.	Infrastructure Impact Assessment
12.	Socioeconomic and Livelihood Impacts
13.	Community Engagement and Consultation
14.	Environmental Risk Mitigation Strategies
15.	Policy Recommendations
16.	Capacity Building
17.	Integration with Development Plans

CONTENTS

INTRODUC	CTION		8
	BACK	GROUND AND CONTEXT	8
	RATIO	NAL AND OBJECTIVES OF THE ASSESSMENT	9
	DETAIL	LS OF EXPONENTS	10
	POLIC	Y, LEGAL AND ADMINISTRATIVE FRAMEWORKS	10
1.	ENVIR	ONMENTAL BASELINE DATA	14
	1 PHYS	sical environment	
	1.1Ge	ography	15
	1.2Top	ography	15
	1.3Ge	ology	15
	1.4Soil	l	16
	1.5Seis	smicity	17
	1.6Clir	mate	17
	2.ENV	IRONMENTAL MONITORING	20
	OUTCO QUEST	OMES OF THE ANALYSIS OF PHYSICAL ENVIRONMEN TONNAIRES SURVEY)	VT (AS PER 20
	Geolo)gy	21
	3. ECC	DLOGICAL ENVIRONMENT	30
	4.SOC	IOECONOMIC ENVIRONMENT	35
	5.Politi	ical and Administrative setup	35
	6.PHYS	SICAL CULTURAL RESOURCES	36
	7.DEM	IOGRAPHIC PROFILE	41
2	MAPP	ING OF NATURAL RESOURCES	57
	2.1	GENERAL	57
	2.2	THE STUDY AREA	57
	2.3	OUTCOMES OF RESOURCE MAPPING	58
3	WATER	R RESOURCES AND BIODIVERSITY ASSESSMENT	59

	3.1	CURRENT STATUS OF WATER RESOURCES IN STUDY ARE.	A60
	3.2	CURRENT STATUS OF BIODIVERSITY ASSESSMENT IN STU 60	DYAREA
4 STRATEGIES	STRATEGI	C ENVIRONMENTAL ISSUES AND PROPOSED RISK MITI	GATION 63
	4.1.1Matr	ices showing key risks and opportunities	63
	4.1.2GIS c	or Other Spatial Analyses	64
	4.1.3Trend	d analyses	64
	4.2CHAR	ACTERISTICS OF IMPACTS	64
	4.3IDENTI	FICATION OF MAJOR IMPACTS	66
	4.3.11den areas	tification of Environmental Hazards related to newly li	berated 67
	4.3.2Lanc Food Sec	l Degradation and Desertification (Impacts on Agricult urity)	ure and 78
	4.3.3Clime projection	ate change impacts on newly liberated areas and	d future 84
	4.3.4Infra	structure impact on newly built or rehabilitated areas	89
	4.3.5Socio	peconomic and Livelihood Impacts	93
5	ENVIRON	MENTAL MANAGEMENT PLAN	95
	5.1GENER	2AL	95
	5.2STRUC	TURE OF EMP	95
	5.3MITIGA	TION MANAGEMENT MATRIX (MMM)	95
	5.4INSTITU	tional arrangements for implementation of em	P 109
	5.5POLIC	y recommendations	109
	5.6CAPA	CITY BUILDING	109
	5.7INTEG	ration with development plans	110
6	COMMUN	ITY ENGAGEMENT AND CONSULTATION	112
	6.1GENER	2AL	112
	6.2IDENTI	FICATION OF STAKEHOLDERS	112
	6.3CONS	JLTATION WITH THE AFFECTED AND WIDER COMMUNITY	´ 113
ANNEXURES.			117

LIST OF TABLES

Table 1-1: Presence of Government & Private Offices in Mataban District	36
Table 1-2: Schools in Mataban District	36
Table 1-3: Madrassa in Mataban District	37
Table 1-4: Presence of Hospitals in Mataban District	38
Table 1-5: Availability of Shopping Centres at Mataban District	40
Table 1-6: Occupation opportunities in Mataban District	47
Table 1-7: Constructed Buildings in Mataban District	52
Table 4-1, Impact Characterization	65
Table 5-1: Mitigation Management Matrix for Strategic Development Plan for Matal	oan District 96
Table 6-1, Views & Concerns of the Affected & Wider Community	114

LIST OF FIGURES

Figure 1-1: Topographic Map of Mataban District	15
Figure 1-2: Geological Map of Somalian	16
Figure 1-3: Seismic Map of Somalia with highest earthquake regions	17
Figure 1-4: Seasonal Mean Temperature	18
Figure 1-5, Somalia rainfall	19
Figure 1-6:Currently Available Water Resources in Mataban District	19
Figure 1-7: Type of Area	21
Figure 1-8: Type of rocks	22
Figure 1-9: Type of Soil	22
Figure 1-10: Flood & Droughts in Mataban District	23
Figure 1-11: Faults & Fractures in Mataban District	23
Figure 1-12: Past Flood Records	24
Figure 1-13: Availability of Water	24
Figure 1-14: Presence of Drinking water	25
Figure 1-15: Quality of Surface and groundwater	25
Figure 1-16: Air Quality (Visual Pollution)	26
Figure 1-17: Sources of Traffic Pollution	26
Figure 1-18: Liquid Effluents	27
Figure 1-19: Effluent Treatment Systems in Mataban District	27
Figure 1-20: Management of Solid Waste	28
Figure 1-21: Poor Management of Solid Waste	28
Figure 1-22: Generation of Hospital Waste	29
Figure 1-23: Waste Disposal Systems	29
Figure 1-24: Sources of Noise Pollution	30
Figure 1-25: Protected Areas in Mataban District	30
Figure 1-26: Parks/ Buffer zones in Mataban District	31
Figure 1-27: Aquatic ecosystems	31
Figure 1-28: Presence of Fruit Trees	32
Figure 1-29: Presence of Non-Fruit Trees	32

Figure 1-30: Endangered plants in Mataban District	33
Figure 1-31: Declining Fauna Diversity	33
Figure 1-32: Deforestation in Mataban District	34
Figure 1-33: Migratory Birds in Mataban District	34
Figure 1-34: Presence of Common Wild Animals	35
Figure 1-35: Availability of Educational Facilities Mataban District	37
Figure 1-36: Availability of Health Facilities of Mataban District	38
Figure 37 Social Health Workers in Mataban District	39
Figure 38 Hospitals and Dispensaries in Mataban District	39
Figure 39 Diseases Reported in Mataban District	40
Figure 1-40: Scale of Industries in Mataban District	41
Figure 1-41: Availability of cottage industries in Mataban District	41
Figure 1-42: Gender Ratio (men/women) in Mataban District	42
Figure 1-43: Population Density in Mataban District	42
Figure 44 Cultural Values in Mataban District	43
Figure 45 Acceptance of Foreigners in Mataban District	43
Figure 46 Indigenous People in Mataban District	44
Figure 47 Relocation of Groups in Mataban District	44
Figure 1-48: Religion of local community of Mataban District	45
Figure 1-49: Depiction of Economic Status of Mataban District	46
Figure 1-50: Availability of Basic needs in District Mataban	46
Figure 1-51: Employment opportunities in Mataban District	47
Figure 52 Means of Transportation (Conservative/Modern)	48
Figure 53 Means of Transportation (Special Trade)	49
Figure 54 Availability of Roads in Mataban District	49
Figure 1-55: Water Supply in Mataban District	50
Figure 1-56: Sanitation Conditions in Mataban District	50
Figure 1-57: Availability of Power & Transmission Lines	51
Figure 1-58: Availability of Electrical Supply	51
Figure 1-59: Availability of Electrical Sources	52
Figure 1-60: Presence of Cemented House	53
Figure 1-61: Presence of Somali Houses in Mataban District	53
Figure 1-62: Government Ownership	54
Figure 1-63: Presence of Parks in Mataban District	55

Figure 1-64: Presence of Stadium in Mataban District	55
Figure 1-65: Archaeological/Historical sites in Mataban District	56
Figure 2-1: Flowchart showing the methodology towards natural resource mapping	58
Figure 3-1. Currently Available Water Resources in Mataban District	60
Figure 3-2, Common Flora Species found in Mataban District	60
Figure 3-3, Common Fauna Species found in Mataban District	61
Figure 3-4, Non- Fruit Trees Species Found in Mataban District	61
Figure 3-5, Endangered Animal Species found in Mataban District	61
Figure 3-6, Common wild life Species Found in Mataban District	62
Figure 3-7, vulnerable Animals Species found in Mataban District	62
Figure 4-1: Timeline of conflict and extreme weather events in Somalia	89

INTRODUCTION

BACKGROUND AND CONTEXT

The Environmental Assessment Report has been prepared in accordance with the Terms of Reference (TOR) for supporting the United Nations Environment Program (UNEP) in addressing the climate conflict cycle in Hirshabelle State, Somalia, under the Ministry of Environment and Climate Change, delivering the International Organization for Migration (IOM) breaking the climate conflict cycle in Hirshabelle State. Hirshabelle, officially Hirshabelle State of Somalia, is a Federal Member State in south-central Somalia. The present focused is on newly liberated area of Hirshabelle State i.e., Maraban District, which has previously been at the centre of conflict between al-Shabaab and the Somali Government.

Mataban is the capital of Mataban District and is situated approximately 400 kilometers north of Somalia's capital, Mogadishu. Mataban has 38 mapped villages with 6,953 Baxnaano targetted households, a total of 07 mapped health and nutrition centers (HNC) and 05 schools. It lies on the main road that connects Hirshabelle and Galmudug States of Somalia. The tarmac road connects South, Central and Northern regions of Somalia, including Puntland, Galmudug, Southwest and Banadir. Most public infrastructure services in Mataban have not been upgraded for a long time due to the drought and previous internal conflict between the communities in the district. Notably, Unemployment rates within the town are high and local agriculture has been deeply affected by the current drought.

In environmental sector, the collapse of the State and governance structures as well as the lack of security, with resulting chronic conflict, low rule of law and an environment has placed enormous obstacles to the consistent and sustainable management of environmental resources. This has led to rapid deforestation creating the conditions for desertification in semi-arid livelihood zones. This condition is felt very acute where forests have been depleted due to uncontrolled or managed charcoal production for export, despite a ban, and a growing domestic as charcoal remains the primary domestic cooking fuel. Equally, pastures and rivers are being unsustainably 0 Introduction exploited, diminishing economic opportunities they could provide and diminishing essential resources required by the agricultural sector to manage times of crisis or stress. There is a lack of up-to-date information on the state of the environment, including lack of accurate data on the impact of climate change, deforestation, desertification, land degradation, overgrazing, and shortage of reliable source on the country' s population as well as lack of awareness and political support on environmental governance in Somalia.

There is a significant need of development being one of the main priorities of the United Nations. Development is a multidimensional undertaking to achieve a higher quality of life for all people. Economic development, social development and environmental protection are interdependent and mutually reinforcing components of sustainable development. For this purpose, this environmental assessment has been conducted providing critical information to inform sustainable development, humanitarian efforts, and post-conflict recovery.

The Ministry of Environment and Climate Change of Hirshabelle State, Somalia, has introduced the Hirshabelle State Environmental Policy for 2023. As a rule of thumb, environmental assessments should adhere to country-specific guidelines, but they were found to be lacking at the national level due to the volatile political situation. Thus, the study predominantly used the international environmental assessment guidelines of the UNEP, World Bank, FAO complemented with some specific local indicators proposed by IUCN for harmonizing the environmental impact thresholds.

RATIONAL AND OBJECTIVES OF THE ASSESSMENT

The undertaking of environmental assessments in the newly liberated areas of Hirshabelle State in Somalia is a crucial initiative that aligns with the Ministry of Environment and Climate Change of Hirshabelle State, Somalia, and the United Nations Environment Programme (UNEP). The collaboration with an experienced nongovernmental organization (NGO) specializing in environmental assessments and dialogue workshops in the Mataban district reflects a commitment to comprehensive data collection and analysis. The anticipated outputs, comprising a high-quality environmental assessment meeting international standard, will contribute significantly to informed decision-making. The assessment aim to provide a thorough understanding of the environmental baseline, hazards, natural resources, water availability, land degradation, biodiversity, climate change impact, infrastructure effects, and socioeconomic implications. The integration of community engagement, risk mitigation strategies, policy recommendations, capacity building, and alignment with development plans underscores a holistic approach. The final summarized report will serve as a valuable resource for sustainable development, humanitarian efforts, and post-conflict recovery, facilitating collaboration with government agencies, international organizations, and local communities for effective environmental management and protection.

DETAILS OF EXPONENTS

United Nations Environment Programme (UNEP) UNEP coordinates United Nations environmental activities, assisting developing countries in implementing environmentally sound policies and practices. It was founded as a result of the United Nations Conference on the Human Environment in June 1972. Its mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing and enabling nations and peoples to improve their quality of life without compromising that of future generations.

The International Organization for Migration (IOM) is the principal United Nations agency working in the field of migration. The organization implements operational assistance programmes for migrants, including internally displaced persons, refugees, and migrant workers





POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

1. African Development Banks Environmental and Social Safeguards Policies

The AfDB Environmental and Social Safeguards Policies recommends five key operational safeguards (OS) Policies designed to ensure projects financed by the Bank are both environmentally and socially sustainable and their positive impacts outweigh their adverse effects. The SRCIP has identified four out of five of these OS policies i.e.

- **Operational Safeguard 1:** Environmental and Social Assessments; where SRCIP falls is classified as a category one infrastructure development project which require mandatory ESIA therefore OS1 is triggered.
- **Operational Safeguard 2:** Involuntary Resettlement; under which SRCIP is considered to lead to involuntary displacement of more than 200 project affected persons (PAPs) thus OS 2 is triggered.
- **Operational Safeguard 3:** Biodiversity and Ecosystem Services; under this category, OS3 is not triggered since SRCIP will not cause biodiversity and ecosystem disruptions.
- **Operational Safeguard 4:** Pollution Prevention and Control, Hazardous Materials and Resource efficiency; and the implementation of SRCIP is likely to cause different types of pollution hence triggering OS4.
- **Operational Safeguard 5:** Labour Conditions, Health and Safety; Workers involved in this Project will face health and safety risks and as such OS 5 is triggered.

2. Somali National and State Laws

Somalia's current constitution addresses the management of the environment. Particularly articles recognize the followings:

- Article 24 guarantees fair labour relation and provides protection against abuse of environment;
- Article 25 states that "[every Somali] has the right to an environment that is not harmful to their health and well-being, and to be protected from pollution and harmful materials." Further indicating "[every Somali] has the right to have a share of the natural resources of the country, whilst being protected from excessive and damaging exploitation of these natural resources
- The right to own property and the right to compensation is addressed in Sections 1 and 2 of Article 26 which state:
 - I. Every person has the right to own, use, enjoy, sell, and transfer property;
 - II. The state may compulsorily acquire property only if doing so is in the public interest; Any person whose property has been acquired in the name of public interest has the right to just compensation from the State as agreed by the parties or decided by a court.

- Article 43 provides guidelines for policy development designed to ensure " land is utilized without causing harm to the land"
- Article 45 highlights the government's responsibility in prioritizing "the protection, conservation, and preservation of the environment against anything that may cause harm to natural biodiversity and the ecosystem." This article also mentions the duty of the people "to safeguard and enhance the environment and participate in the development, execution, management, conservation and protection of the natural resources and environment."

The specific laws that contain aspects which provide social and environmental protection include: a. Law No. 65 of 18 October 1972 to promulgate the Labour Code. b. Somali Fisheries Law (Law No. 23 of November 30, 1985) c. Somali national Water Law of 11 November 2017

Among the Federal Member States traversed by the corridors, Hirshabelle has promulgated numerous environmental laws. Article 14 of the State's constitution specifically delineates environmental protection, encompassing critical facets such as deforestation, soil erosion, pollution, and the proscription of urbanization on unsuitable lands. Furthermore, the Hirshabelle government has implemented a suite of environmental regulations, policies, and strategies:

- I. Environmental Policy (2014);
- II. Environmental Management Act (2014);
- III. EIA Act and Regulation (2014); and
- IV. Somalia National Climate Change Policy (2020).

3. International Treaties and Conventions

At the international level Somalia has ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto protocol. Other important international conventions to which the country is signatory include:

- a) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- b) Convention for the protection, Management and Development of the Marine and Coastal; Environment of the Eastern Africa Region (Nairobi Convention);
- c) UN Convention on the Law of the Sea;

- d) Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment; and
- e) Convention on the Conservation of Migratory Species of Wild Animals

1. ENVIRONMENTAL BASELINE DATA

Establishing an environmental baseline is crucial for any city aiming to initiate sustainable development efforts, especially at the policy level. This initial environmental overview provides an in-depth look at the city's current ecological, social, and economic status. Such fundamental data is essential for shaping policies as it offers a clear understanding of the city's environmental issues, resource distribution, and areas that require attention. By conducting a comprehensive initial evaluation, urban planners and policymakers can identify key concerns like air and water quality, waste management, biodiversity, and the impact of urbanization. This knowledge forms the basis for making decisions assisted by evidence which leads to targeted policies addressing specific environmental challenges. Furthermore, the baseline environment is necessary for tracking changes over time, assessing policy effectiveness, and developing adaptive strategies to meet evolving needs. Consequently, a robust foundational environment isn't just where things begin; it's a prerequisite for well-informer, sustainable and resilient urban development at the policy level.

The initial evaluation for Mataban District has been carried out, using a variety of approaches to fully understand the environmental, social, and economic aspects of the region. The assessment is based on in-depth focus group discussions with local communities to gather qualitative insights about the environment. This participatory method ensures that community input is incorporated into the assessment findings. In addition, extensive surveys have been conducted to systematically collect quantitative data for analysis. Monitoring systems have also been established to track changes in the environment over time specifically for air quality. By integrating these diverse methods, a comprehensive baseline has been established for Mataban District, equipping policymakers with accurate information for targeted development strategies tailored to meet the specific needs of both the community and district's environmental preservation efforts.

District	Area (sq km)	Population
Mataban	10	24,600

1 ENVIRONMENTAL BASELINE DATA

PHYSICAL ENVIRONMENT

Geography

Somalia is situated in the eastern tip of the African continent known as the "Horn of Africa." It has been the Gateway to Africa for business and trade for millennia. Somalia's unique geographic location makes it a dynamic meeting place where East meets West and North melts into South. Its historic trading partners border Somalia; Kenya in the southwest, Ethiopia in the North West, Djibouti, and the Red Sea to the North, and the vast Indian Ocean waves meet Somalia's long coastline to the East and South. With a landmass of 637,000 sq. km and the longest coastline in all of Africa, Somalia is more than twice the size of Italy with less than one-third of its Population. Somalia lies on the Horn of Africa and has nearly 2,000 miles of coastland, giving Somalia an ideal vantage point for all trade that passes from the Western Hemisphere to the Eastern Hemisphere through the Indian Ocean.

Mataban District is a district in the central Hiran region of Hirshabelle state (federal member state) of Somalia. It is 75km away from Baldweyne, the capital city of Hiran. Its latitude is 5° 12' 14" N and its longitude is 45° 32' 0" E.

Topography

The average elevation of Mataban is 433m, the minimum elevation is 420m and the maximum elevation is 456m. Mataban's terrain consists mainly of plateaux, plains, and highlands. In the far north, however, the rugged E–W ranges of the Karkaar Mountains lie at varying distances from the Gulf of Aden coast.



Figure 1-1: Topographic Map of Mataban District

Geology

Most of Somalia lies within the transitional zone between the great arch of East Africa and the deep sedimentary basin defined by geophysical investigations in the Indian Ocean. Metamorphic and magmatic complexes, probably Late Precambrian - Early Paleozoic, crop out in uplifted blocks. Two areas of such rocks are known, one in northern Somalia, and the other west of Mogadishu, in the Bur region.



Figure 1-2: Geological Map of Somalian

These areas of ancient rocks are structurally different and belong to the different major structural units of Africa. Natural resources include unexploited reserves of uranium, iron, tin, gypsum, bauxite, copper, and salt. Metamorphic and magmatic complexes, probably Late Precambrian–Early Paleozoic, crop out in uplifted blocks. Two areas of such rocks are known, one in northern Somalia, and the other west of Mogadishu, in the Bur region. These areas of ancient rocks are structurally different and belong to the different major structural units of Africa. The Bur region belongs to a large zone known as the Mozambique Belt and consists of Precambrian strata. The northern area is part of an extensive Early Paleozoic fold belt, which occurs along the coasts of both the Red Sea and the Gulf of Aden.

Soil

Somalia has various soil types, primarily according to climate and the parent rock. The northern part of the country (Somaliland and Puntland) has shallow sandy and/or stony soils and some deeper lime-rich soils. In the highlands around Hargeisa, relatively high rainfall has raised the organic content in the sandy calcareous soils characteristic of the northern plains. This soil supports some rain-fed farming. South of Hargeisa begins the "Haud" region whose red calcareous soils continue into the Ethiopian Ogaden and support vegetation, which is ideal for camel grazing. Deep clay soils are found south of Gebiley in Somaliland. The central part of the country is dominated by sandy soils along the coast and deep loamy soils with a high content of calcium carbonate and/or gypsum further inland. Prominent in southern Somalia are low-lying

alluvial plains, associated with the Juba and Shebelle Rivers. These plains mainly have clayey soils, some of which have poor drainage and/or high content of salts. Some of the riverine areas are also liable to flooding. The inter-riverine areas have both shallow soils (particularly towards the border with Ethiopia) and deep loamy and clayey soils. Mataban has Sandy soil, calcareous strata soil type.

Seismicity

Three fault systems are recognized and classified according to their trends: (i) the Red Sea system (N–NE), (ii) the Gulf of Aden system (E–NE), and (iii) the East African system (N–NE). All three systems have determined the block structure of Somalia. Tectonic activity was most active in the northern part of the country. Earthquake hazard in Somalia is classified as medium; this means that there is a 10% chance of potentially damaging earthquake shaking in Mataban District in the next 50 years.



Figure 1-3: Seismic Map of Somalia with highest earthquake regions

Climate

Somalia is the second most climate-vulnerable country in the world. The country has seen an increase in severe climatic events since 1990, with three major droughts since 2010, recurring flooding, and more regular locust swarms that destroy crops. The weather is hot throughout the year, except at higher elevations in the north. Rainfall is sparse and most of Somalia has a semi-arid to arid environment, suitable only for the nomadic pastoralism practiced by well over half the population. Only in limited areas of moderate rainfall in the north-west, and particularly in the south-west, where the country's two perennial rivers are found, is agriculture practiced to any extent. Somalia is generally arid and semi-arid with two seasonal rainfall seasons. The annual

mean temperature is close to 30°C throughout the country. Average monthly temperatures reach their maximum during the months of April through June. June to September are the hottest months in the north, while December to March mark the hottest weather for the south. Precipitation is generally low across the country and takes the form of showers or localized torrential rains, subject to high spatial and temporal variability. The average annual rainfall is about 200 mm in most parts of the country. Only the northern coastline receives significantly less rainfall (only up to 50 mm). Rainfall in the south is higher at approximately 400 mm and highest in the southwest with around 600 mm rainfall on an annual average. The Gu rain season starts as early as the second half of March. Precipitation intensifies in April across the country, except for the north-eastern coastline which receives the least amount of rainfall during this season. In June, rainfall starts to reduce in most parts of Somalia. The southern coastline continues to receive little rainfall. Significant rains occur from July through August. The second rainy season (Deyr) is characterized by a shorter duration and less amounts of precipitation in the months of October to the end of November.

• Temperature

Somalia is generally hot and dry, with two rainy seasons. Mean temperatures in Somalia are amongst the highest worldwide. Hot conditions prevail throughout the year, particularly in the southwest near the border to Ethiopia; where annual mean temperatures surpass 29 °C. The main rainy season is from April to June, and the second rainy season is from October to December.



Figure 1-4: Seasonal Mean Temperature

• Rainfall

Annual precipitation in the hot and arid northern area mostly amounts to under 250 mm and decreases to less than 100 mm in the very northeast. The central plateau receives between 200 and 300 mm of precipitation, while it increases toward the South to around 400 to 500 mm of rainfall annually. Southwestern and northwestern regions receive the most precipitation, with an average between 500 and 700 mm.



Figure 1-5, Somalia rainfall

• Water resources

A comprehensive assessment of water resources in Mataban District was conducted through FGD and Questionnaire based surveys, revealing a there is a lack of diverse landscape of essential water infrastructure to meet the community's needs. Key water resources were identified, including strategically drilled boreholes tapping into groundwater reservoirs. These boreholes are crucial sources of freshwater and significantly contribute to the local supply. Additionally, filtration plants have been documented along with strategic deployment of water tanks to enhance storage capacity and resilience. This collective information underscores an integrated approach to water resource management in Mataban District, reflecting commitment to sustainable and accessible water supply for the local population.

Sr. No.	Supply Amenities	Number
1.	Boreholes	
2.	Water Tanks	05
3.	Filtration Plant	01

Figure 1-6:Currently Available Water Resources in Mataban District

ENVIRONMENTAL MONITORING

The environmental monitoring of ambient air quality for the Air Quality Index and PM (2.5 &10), HCHO and TVOC in Mataban District has been conducted to analyze and assess the prevailing air quality conditions in and around the study area. The pictorial evidences of the results of air quality monitoring are given below:





Hence, the results showed that the Air Quality Index (AQI) in excellent. Whereas other parameters are also in compliance with respect to World Health Organization (WHO) Standards.

1.1 OUTCOMES OF THE ANALYSIS OF PHYSICAL ENVIRONMENT (AS PER QUESTIONNAIRES SURVEY)

For physical environment both primary and secondary data was consulted. For secondary data, questionnaires were used whose outcomes of the analysis are given below:

1.3.1 Geology

Like the physical conditions of Somalia, District Mataban is also an arid and semi-arid place characterized by a scarcity of water, with limited precipitation and high evaporation rates, creating an environment that often appears dry, barren, and inhospitable. The air, hot and dry, carries with it the essence of parched soil and resilient flora. The participants in our survey responded with mixed opinions in this regard as 67% accepted that Mataban district is a Semi-arid region while 33% claimed that it is an arid region.





Figure 1-7: Type of Area

1.3.2 Rocks

Respondents from Mataban District reported the presence of sedimentary rocks, these rocks are formed through the accumulation and cementation of mineral and organic particles over time. These sediments undergo compaction and cementation, solidifying into rock.



Figure 1-8: Type of rocks

1.3.3 Soil

The type of soil in Mataban District is a mixture of sand, silt, clay, gravel, and clayey, according to 67% of people who took part in the baseline survey. Contrary 37% of people claimed that the soil type here is mostly sandy.



Figure 1-9: Type of Soil

1.3.4 Floods & Droughts

Mataban District is under the stress of drought due to temperature increase is depicted in the following graph as 89% of respondents accepted the presence of drought in their region while 11% claimed the occurrence of floods in their region.



Figure 1-10: Flood & Droughts in Mataban District

1.3.5 Faults & Fractures

78% of respondents in the survey accepted the presence of faults and fractures in their area which shows that there are records of Earthquakes in Mataban District; however, 22% of people are unaware of the presence of faults and fractures.



Figure 1-11: Faults & Fractures in Mataban District

1.3.6 Flood Records

When people were asked about the presence of flood records, they reported the absence of flooding in Mataban District.



Figure 1-12: Past Flood Records

1.3.7 Surface & Groundwater

100% of respondents accepted the presence of surface & and groundwater in Mataban District which shows that water is present to support the water demand of the residents.





1.3.8 Ground Water Quality (Potable Water)

Despite having groundwater people are not satisfied with it as the water is not suitable for drinking purposes.



Figure 1-14: Presence of Drinking water

1.3.9 Surface Water Quality

People in Mataban District are not satisfied with the quality of water in their area as 100% of respondents claimed that the quality of Surface water and the groundwater is bad. This water is affecting their health as well.



Figure 1-15: Quality of Surface and groundwater

1.3.10 Air Quality (Visual Pollution)

People are satisfied with the quality of air in Mataban District, as they responded with a complete absence of visual pollution in their area.



Figure 1-16: Air Quality (Visual Pollution)

1.3.11 Traffic Pollution

There are no sources of traffic pollution in Mataban District, which means that the air quality is very good for the residents, but at the same time, they are facing difficulties in commuting.



Figure 1-17: Sources of Traffic Pollution

1.3.12 Wastewater (Liquid Effluent)

About 67% of respondents claimed that liquid effluents are a major water pollution issue. On the other hand, 33% responded with the absence of liquid effluents.



Figure 1-18: Liquid Effluents

1.3.13 Effluent Treatment Systems

There are no effluent treatment systems in Mataban District which is evident from the response of 100% of people who claimed that there are no treatment plants for waste water.



Figure 1-19: Effluent Treatment Systems in Mataban District

1.3.14 Solid Wast

About 89% of respondents are not satisfied with the management of solid waste in Mataban District. They have claimed that the management conditions are poor in their area.



Figure 1-20: Management of Solid Waste

Responsibility for Poor Management

When people were asked about the responsibility for poor management of solid waste in Mataban District they responded that 11% of poor management is due to people and concerned authorities while 89% replied that some other factors hinder the management of waste these are lack of resources, infrastructure, and facilities to through garbage in landfills or dustbins.



Figure 1-21: Poor Management of Solid Waste

• Hospital Waste

In Mataban District only two hospitals are functional and the residents claimed that there is no generation of hospital waste in Mataban District.



Figure 1-22: Generation of Hospital Waste

Waste Management

About 100% of the respondents reported the absence of waste disposal systems in Mataban District. People demanded better facilities to manage the waste.





1.3.15 Sources of Noise Pollution

Due to the lack of resources and poor infrastructure in Mataban District people completely nullified the presence of noise pollution as they claimed that no noise is created from sources like traffic, industry, commercial, or any other activities.



Figure 1-24: Sources of Noise Pollution

1.2 ECOLOGICAL ENVIRONMENT

1.4.1 Protected Areas

About 78% of respondents denied the presence of protected areas or buffer zones in Mataban District while 22% claimed that such zones are present.



Figure 1-25: Protected Areas in Mataban District

1.4.2 Parks

About 78% of respondents denied the presence of parks or buffer zones in Mataban District while 22% claimed that such zones are present.



Figure 1-26: Parks/ Buffer zones in Mataban District

1.4.3 Aquatic Ecosystems

100% of people responded that there are no aquatic ecosystems like rivers, canals, seas and oceans in Mataban District.





1.4.4 Fruit Trees

About 56% claimed that there are no fruit trees in Mataban District while 44% identified the presence of fruit trees in Mataban District.



Figure 1-28: Presence of Fruit Trees

1.4.5 Non-Fruit Trees

78% claimed that the trees that are mostly present in Mataban District are non-fruit trees; however, 22% of them denied this fact.



Figure 1-29: Presence of Non-Fruit Trees

1.4 6 Endangered Plants

When people were asked about the presence of endangered plants in Mataban Disrtrict 89% of the respondents claimed that there are no such trees or plants that are rare or are endangered.



Figure 1-30: Endangered plants in Mataban District

1.4.7 Endangered Animals

When people were asked about the presence of endangered animals in Mataban District 44% of the respondents claimed that there are no such animals that are rare or endangered. Contrary, 56% of the respondents claimed that the population of some animals like Deer (*Gerenuk*) in Mataban District is declining mainly due to drought.



Figure 1-31: Declining Fauna Diversity

1.4.8 Loss of Tree Cover

When people were asked about the loss of plant or tree cover in Mataban District 78% of the respondents claimed that there were no signs of declining tree cover as a result of deforestation.



Figure 1-32: Deforestation in Mataban District

1.4.9 Migratory Birds

About 33% of the people accepted that Mataban District hosts different migratory birds or is a route of traveling that are coming from cold regions, whereas, 67% denied this fact.





1.4.10 Common Wild Animals

67% of the people accepted the presence of common wild animals in their area, while 33% claimed that no wild animals are present in Mataban District.



Figure 1-34: Presence of Common Wild Animals

1.3 SOCIOECONOMIC ENVIRONMENT

This section deals with the social conditions of the study area. During the desk/ office study, available reports/ documents were comprehensively studied. During the field visit different stakeholders were consulted i.e. residents, shopkeepers, affectees, local communities and relevant departments. Observations were taken after giving dueconsideration to the desk/ office study results.

1.5.1 Political and Administrative setup

Mataban District has a small setup of local government. The whole region is administered by the Governor of District Mataban, furthermore, deputy commissioners for community affairs, security and politics, and finance are present for the welfare of the residents. There is a small number of corporations responsible for educational and medical facilities, public services, and infrastructure development. The entire district and all of its three villages are controlled by the government to provide support to the locals of Mataban. The role of the private sector in the district is inadequate.
• Offices

The following government offices are present within the study area, these are:

Table	1-1:	Presence	of	Government	&	Private	Offices i	in	Mataban Distri	ct
-------	------	----------	----	------------	---	---------	-----------	----	----------------	----

Sr. No.	Office	Private/ Government
1.	Governor of Mataban district	Government
2.	Deputy Commissioner of District Community Affairs	Government
3.	Deputy Commissioner for Security and Politics	Government
4.	Deputy Commissioner of Finance	Government
5.	Medical coordinator	Government
6.	Educational coordinator	Government



1.4 PHYSICAL CULTURAL RESOURCES

A very minor number of sensitive receptors are present in Mataban District, which highlights that infrastructure like mosques, graveyards, schools, and hospitals have been found in Mataban District.

1.6.1 Educational Facilities

Our survey team revealed that three schools are presently offering primary and secondary education in Mataban District, but the available educational facilities are insufficient. About, 40 Madrassas in Mataban District are imparting religious education from the level of mosque.

Sr. No.	Name of Institution	Education Level	For Boys/Girls
1.	Abdullahi Isse Primary and Secondary School Mataban	Primary/Secondary	
2.	UGAS NUR (Mataban) Primary and Secondary School	Primary/Secondary	Co- education
3.	Al-Ma'muun School Mataban	Primary/Secondary	
4.	Takaraale Primary School	Primary	

Table 1-2: Schools in Mataban District

5.	Madartun Garcade	Pre- School	

Table 1-3: Madrassa in Mataban District

Sr. No	Madrassa
1.	40

The survey results indicated a significant inadequacy in educational facilities across schools providing primary and secondary education in Mataban District. Notably, 61% of respondents in Mataban District reported low educational facilities, while 39% of respondents expressed satisfaction with the available facilities. In summary, the survey graph highlights a widespread deficiency in educational facilities across the Mataban District.



Figure 1-35: Availability of Educational Facilities Mataban District

1.6.2 Health Facilities

In Mataban District, healthcare facilities are inadequate. The respondents have revealed that they have to travel far away to get medical treatment; however, a single maternal-child hospital is present in the district for patients.



Table 1-4: Presence of Hospitals in Mataban District

Sr. No.	Health Facilities	Private/Government
1.	Mataban MCH, Mataban	Government
2.	Mataban General Hospital	Government
3.	Bergadiid Health Centre	Government

Almost 72% survey respondents claimed that health facilities are present in Mataban District, while about 28% people are not satisfied with the available health facilities.



Figure 1-36: Availability of Health Facilities of Mataban District

• Social Health Workers

About 56% of the respondents have reported that social health workers are present in Mataban District, while 44% have reported the absence of social health workers.



Figure 37 Social Health Workers in Mataban District

• Hospitals/ Dispensaries

All of the respondents of the survey have reported complete absence of hospitals and dispensaries in Mataban District.



Figure 38 Hospitals and Dispensaries in Mataban District

• Diseases Reported

The respondents of the survey have reported that 39% of diseases are reported in Mataban District like Typhoid, Malaria and diarrhoea, while 61% of the people claimed that there are no diseases in Mataban District.



Figure 39 Diseases Reported in Mataban District

1.6.3 Shopping centres

For the provision of basic amenities like food, hygiene, and household supplies there is a superstore in Mataban District where locals can get basic materials of living.

Table 1-5: Availability of Shopping Centres at Mataban District

Sr. No.	Malls/ shopping centres/ Superstores	Number
1.	Superstore	01

1.6.4 Industries

• As Small and Big Industrial units

Our survey respondents revealed that, there are no small and big industries in Mataban District. About 100% of respondents have voted that there is no availability of any kind of industry.



Figure 1-40: Scale of Industries in Mataban District

• Home Industries

The results of the baseline survey indicated that there is complete absence of home industries in the entire District of Mataban.



Figure 1-41: Availability of cottage industries in Mataban District

1.5 DEMOGRAPHIC PROFILE

1.5.1 Gender Ratio of Respondents

Based on the data, the majority of survey participants from Mataban District depicted that the ratio of women is greater than men across the whole district. The average gender ratio reported, is shown in the following figure:



Figure 1-42: Gender Ratio (men/women) in Mataban District

According to the above-mentioned data, the estimated gender ratio (men/women) of the responded is divided into four groups for instance (a) 0-30 (b) 31-60 and (c) 61-100. The analysis of the results showed that majority of the men fall under group a and b (0-60) where as women comes under group b and c (61-100), conceding that women are more as compare to men.

1.5.2 Population Density

The population density in Mataban District is extremely low, as about 89% of people responded low population density with 11% of people claiming that they feel the population density is moderate here.



Figure 1-43: Population Density in Mataban District

1.5.3 Cultural Values

About 62% of survey participants stated that the cultural values in Mataban District combine modern and conservative elements, while 94% said they are not entirely modern, and 72% indicated that they are not purely conservative.



Figure 44 Cultural Values in Mataban District

1.5.4 Acceptance of Foreigners

The acceptance rate of Foreigners in Mataban District is about 83%. On the other hand, 11% revealed that they don't accept outsiders; while 6% gave no response.



Figure 45 Acceptance of Foreigners in Mataban District

1.5.5 Indigenous people

For about 33% of indigenous people are present in Mataban District as reported by the respondents. On the other hand, 61% of the respondents revealed that there are no indigenous people in Mataban District.



Figure 46 Indigenous People in Mataban District

1.5.6 Relocation of Groups

Despite conflict, majority of the people have not migrated somewhere for instance current survey reveals that only 39% of people have relocated themselves.



Figure 47 Relocation of Groups in Mataban District

1.5.7 Role of Women

The role of women in the socioeconomic activities in Mataban District is very minimum as revealed by the respondents of the survey. According to 94% of people mostly women are doing household activities while only 6% women are involved in business activities.

		Percentage			
Sr. No.	Type of Activities	Yes	No	No response	
1	Household activities	94	6	0	
2	Business activities	6	94	0	
3	Private/ Government	0	100	0	
4	Electoral activities	0	100	0	

1.5.8 Religion

Being an Islamic country, the religion of the local population in Mataban District is Isla hence, it is evident in our survey as 100% of people who took part in this survey claimed that the practicing religion in Mataban District is Islam.



Figure 1-48: Religion of local community of Mataban District

1.5.9 Poverty

The entire Mataban Distt is below the line of poverty, indicating that the income is insufficient to support the basic needs of the local community.



Figure 1-49: Depiction of Economic Status of Mataban District

1.5.10 Availability of Basic needs

The residents of Mataban District have experienced a two-decade-conflict that has significantly impacted their quality of life by depriving them of essential necessities such as water, food, and housing. The people throughout the district are completely unsatisfied with the accessibility of basic facilities.



Figure 1-50: Availability of Basic needs in District Mataban

1.5.11 Income Status

People in Mataban District are not economically well off, this is depicted through our survey findings as 94% people claimed that they are not well-off. On the other hand, only 6% of respondents have shown satisfaction with their economic status.



Figure 1-Income status of Mataban District

1.5.12 Employment Opportunities

All of the respondents have completely shown their dissatisfaction with the available employment opportunities in Mataban District. Almost 100% respondents reported the absence of job opportunities in Mataban District which is also evident in the graph as well.



Figure 1-51: Employment opportunities in Mataban District

1.5.13 Occupation

Table 1-6: Occupation opportunities in Mataban District

Sr. No.	Type of occupation	Percentage
1.	Domestic workers	13%

2.	Farmers	25%		
3.	Community Leader	10%		
4.	Government Officers	13%		
5.	Private Business	4%		
6.	Herdsmen	35%		
	Total	100%		

1.5.14 Social Amenities

• Means of Transportation (Conservative/Modern)

The survey revealed that about 33% of the participants opted for a conservative/modern mode of transport in Mataban District as their primary mode of transportation, these include donkey carts, camels and cars while 67% of people have no access to transportation facilities.



Figure 52 Means of Transportation (Conservative/Modern)

• Means of Transportation (Special Trade)

Our survey findings revealed that only 11% of the respondents in Mataban District have access to special trade of transport, while 89% of people are devoid of special means of trade.



Figure 53 Means of Transportation (Special Trade)

1.6 Infrastructure Development

1.6.1 Roads Availability

The basic infrastructure in Mataban District was insufficient because of the conflict. While 22% of respondents confirmed the presence of roads, 78% indicated that there are no roads in Mataban District.



Figure 54 Availability of Roads in Mataban District

1.6.2 Water Supply

The survey findings revealed that about 89% of people have no access to water supply in Mataban District while 11% of people have access to water supply.



Figure 1-55: Water Supply in Mataban District

1.6.3 Sanitation Conditions

Sanitation conditions in Mataban District are not adequate this is evident from our survey findings, as 83% of people claimed that basic hygiene amenities are absent for the residents. Contrary, 17% of people are satisfied with the conditions.



Figure 1-56: Sanitation Conditions in Mataban District

1.6.4 Power & Transmission Lines

About 94% of respondents from Mataban District reported that they have no access to electricity at their homes, as there are no Grid or sub-stations in their villages. Contrary, 6% of people claimed the presence of grid/sub-stations in Mataban District.



Figure 1-57: Availability of Power & Transmission Lines

1.6.5 Electrical Supply

Respondents from Mataban District reported that they have no access to electricity in their homes, as they have no transmission lines or electricity stations in their villages to provide electricity.



Figure 1-58: Availability of Electrical Supply

1.6.6 Other Electrical Sources

In Mataban District, people have no access to other means of electrical supply like generators, batteries or solar panels. They need investment to get electricity from other energy sources like solar or wind energy.



Figure 1-59: Availability of Electrical Sources

1.7 Housing Profile Land ownerships and other physical amenities

Table 1	-7:	Constructed	Buildings	in	Mataban	District
---------	-----	-------------	------------------	----	---------	-----------------

Sr. No.	Type of Building	Numbers
1.	Residential	500
2.	Commercial	40
3.	Religious	05
4.	Communal Property	0
	Total	545

Hence, limited residential, commercial and religious buildings are present in Mataban District.

a. Cemented Houses

People in Mataban District are living in poor economic conditions which is evident from their housing profile as about 72% of people have claimed that there are no cemented houses while 28% of them gave no response.





Figure 1-60: Presence of Cemented House

b. Huts (Somali houses)

Mataban District has houses (Somali huts) made up of congregated iron sheets, as about 72% of people have claimed that they are living in congregated iron houses (Somali huts) while 28% of them gave no response.



Figure 1-61: Presence of Somali Houses in Mataban District

c. Government Ownership

About 28% of people in Mataban District have reported the presence of governmentowned lands, while 67% of the participants claimed the absence of government proprietorship while 5% gave no response showing that they are unaware.



Figure 1-62: Government Ownership

d. Private Lands

Almost 67% of respondents in Mataban District accepted that the people have their private property in terms of land, while 28% denied the presence of private property, while the rest of 5% remain unresponsive in this regard.



Figure 1-Availability of Private land in Mataban District

e. Parks

The presence of parks in any country enhances its scenic beauty, but in Mataban District the people are not able to rejoice in natural beauty as there are no parks in this district.



Figure 1-63: Presence of Parks in Mataban District

f. Stadiums

When people were asked about the presence of any recreational spots in Mataban District, they reported the presence of a stadium in this district, which is open for all the residents. About 61% of people reported the presence of a stadium while the rest of the 41% denied it.



Figure 1-64: Presence of Stadium in Mataban District

1 ENVIRONMENTAL BASELINE DATA

g. Archaeological sites

About 11% people in Mataban District reported that there are some Archaeological or historical sites in their area, but 89% denied the presence of such sites.



Figure 1-65: Archaeological/Historical sites in Mataban District

2 MAPPING OF NATURAL RESOURCES

2.1 GENERAL

In the context of environmental assessment, natural resource mapping plays a crucial role in understanding and evaluating the potential impact of human activities or projects on the environment. Environmental assessment involves the systematic examination of the potential environmental consequences of proposed developments, such as infrastructure projects, industrial activities, or land-use changes. Natural resource mapping within the environmental assessment process helps identify, assess, and manage the various natural resources that may be affected by a project.

2.2 THE STUDY AREA

The study area is Mataban District. The study area map is given in figure 3-1:

Map 2-1, Location of Study Area – Mataban District

Source: The Consultant

RESOURCES MAPPING-METHDOLOGY

Natural resource mapping involves the systematic collection, analysis, and representation of data to understand the distribution, abundance, and characteristics of various natural resources in a specific area. The methodology for natural resource mapping typically involves several key steps:

Compile resource area names from survey data Identify most commonly used resource area Identify key informants from local community

visit resource area and log waypoints of boundries and point of interest Use aerial imagery to digitize resource area polygones

Figure 2-1: Flowchart showing the methodology towards natural resource mapping

2.3 OUTCOMES OF RESOURCE MAPPING

To provide a comprehensive understanding of the natural resources in Mataban district, a detailed environmental assessment has been conducted as outlined in the UNEP initiative. This assessment has identified lack of existing resources such as forest, agriculture areas, wetland and fisheries due to following reasons:

- **Geographical Features:** Mataban district is located in an arid or semi-arid region, and hence facing challenges related to water scarcity and soil fertility, impacting the availability of natural resources.
- Climate Conditions: Harsh climatic conditions, such as extreme temperatures or irregular precipitation patterns, has affected the growth of vegetation and agricultural productivity, influencing the perception of available natural resources.
- Land Use Practices: Unsustainable land use practices, deforestation, or overexploitation of resources by local communities or external factors causes natural resources depletion.
- Conflict and Instability: Mataban District have experienced conflict and instability in the sustainable management of natural resources, potentially leading to their degradation.
- Lack of Exploration or Documentation: The absence of documented information on natural resources also contribute to the perception that they are not present. Limited exploration or research in the area also lead to gaps in understanding.

3 WATER RESOURCES AND BIODIVERSITY ASSESSMENT

The term assessment is similar to evaluation or making judgment about the status of some object or activity of interest. It involves gathering and analysing qualitative and/or quantitative empirical data from many diverse sources on parameters of interest in order to understand the status of that object. It differs from Inventory which requires more extensive collection, collation and analysis of core (baseline) information on all components and aspects. It also differs from monitoring which necessarily involves collection of information at specific sites (locations) and at regular intervals for ascertaining any changes which may occur over time and to establish trends of change. Thus, the assessment of water resources and biodiversity involves collection and analysis of qualitative and/or quantitative information on the occurrence of various kinds resources available in an area along with their current status.

Purposes of water Resources Assessment

Water resource assessments are essential tools for fostering sustainable development, safeguarding ecosystems, and addressing the complex challenges associated with water availability and quality. These assessments are often conducted at various spatial and temporal scales to provide comprehensive insights into the dynamics of water resources in a given region.

Purposes of Biodiversity Assessment

A biodiversity assessment is required for many purposes. It has been assessed over past centuries simply for preparing catalogues of what exists in particular areas of geographical interest or in particular habitats. The habitats may be a pond, a lake, a certain river stretch, a forest, an agricultural field or a patch of grassland. The geographical area may extend from a village or town to a district, state or country or even a continent. Such assessments have often been made for only one kind of organisms; e.g., algae, invertebrates, fish, birds, flowering plants (or only aquatic macrophytes), and there too only one or more taxonomic group (such as blue-green algae, diatoms, rotifers, molluscs, or grasses). Geographical assessments sometimes include information on the broad habitat type, and qualitative information on abundance (rare or common). Estimates of density of constituent species are also made in recent studies but readily turned into indices of diversity, thereby losing useful information.

3.1 CURRENT STATUS OF WATER RESOURCES IN STUDY AREA

A comprehensive assessment of water resources in Mataban District was conducted through FGD and Questionnaire based surveys, revealing a there is a lack of diverse landscape of essential water infrastructure to meet the community's needs. Key water resources were identified, including strategically drilled boreholes tapping into groundwater reservoirs. These boreholes are crucial sources of freshwater and significantly contribute to the local supply. Additionally, filtration plants have been documented along with strategic deployment of water tanks to enhance storage capacity and resilience. This collective information underscores an integrated approach to water resource management in Mataban District, reflecting commitment to sustainable and accessible water supply for the local population.

Sr. No.	Supply Amenities	Number
4.	Boreholes	
5.	Water Tanks	05
6.	Filtration Plant	01

Figure 3-1. Currently Available Water Resources in Mataban District

3.2 CURRENT STATUS OF BIODIVERSITY ASSESSMENT IN STUDYAREA

A comprehensive biodiversity assessment through FGD and Questionnaire based surveys in Mataban District has revealed the presence of endangered species, highlighting the district's significance as a habitat for rare and vulnerable fauna. Notable findings include common wild animals alongside critically endangered species, emphasizing the need for conservation efforts in the region. The documentation covers not only fauna but also a variety of flora. The presence of vulnerable species emphasizes the delicate balance that conservation initiatives must strike to protect the diverse interconnected web of life in this region. This biodiversity assessment forms a valuable foundation for implementing targeted conservation strategies to ensure the preservation of Mataban District's unique and ecologically important natural heritage.

Sr. No.	Common Name	Scientific Name
1.	Umbrella thorn	Acacia tortilis
2.	Yeheb Bush (Gud)	Cordeauxia edulis
3.	Garas	Dobera Glabra

Figure 3-2, Common Flora Species found in Mataban District

4.	Gum Arabic tree	Acacia Nilotica
5.	Coastal she-oak,	Casuarina equisetifolia
6.	Neem Tree	Azadirachta indica

Figure 3-3, Common Fauna Species found in Mataban District

Sr. No.	Common Name	Scientific Name
1.	Goats	Capra hircus
2.	Camel	Camelus dromedarius
3.	Gerenuk	Litocranius walleri
4.	Gemsbok	Oryx gazella
5.	Brown snake eagle	Circaetus cinereus
6.	Cows	Bos taurus
7.	Sheep	Ovis aries

Figure 3-4, Non- Fruit Trees Species Found in Mataban District

Sr. No.	Common Name	Scientific Name
1.	Umbrella thorn	Acacia tortilis
2.	Yeheb Bush (Gud)	Cordeauxia edulis
3.	Garas	Dobera Glabra
4.	Gum Arabic tree	Acacia Nilotica
5.	Coastal she-oak,	Casuarina equisetifolia
6.	Neem Tree	Azadirachta indica

Sr. No.	Common Name	Scientific Name	Local Name
1.	Gerenuk (deer)	Litocranius walleri	Deero
2.	Gemsbok	Oryx gazella	Biciid
3.	Brown snake eagle	Circaetus cinereus	Gorgor

Figure 3-5, Endangered Animal Species found in Mataban District

Sr. No.	Common Wild Animals	Scientific Name
1.	Striped hyena	H. hyaena
2.	Gemsbok	Oryx gazella
3.	Cheetah	Acinonyx jubatus
4.	African Wolf	Canis lupaster
5.	Gerenuk (Deero)	Litocranius walleri
6.	Abyssinian hare	Lepus habessinicus

Figure 3-6, Common wild life Species Found in Mataban District

Figure 3-7, vulnerable Animals Species found in Mataban District

Sr. No.	Common Name	Scientific Name
1.	African Elephant	Loxodonta africana
2.	Ammodile	Ammodillus imbellis
3.	Beira Antelope	Dorcatragus megalotis
4.	Cheetah	Acinonyx jubatus
5.	Dibatag	Ammodorcas clarkei
6.	Dorcas Gazelle	Gazella dorcas
7.	Dugong	Dugong dugon
8.	Greenwood's Shrew	Crocidura greenwoodi
9.	Lion	Panthera leo
10.	Mouse-tailed Bat Species	Rhinopoma macinnesi
11.	Red Bush Squirrel	Paraxerus palliatus
12.	Silver Dikdik	Madoqua piacentinii
13.	Soemmerring's Gazelle	Gazella soemmerringii
14.	Speke's Gazelle	Gazella spekei

4 STRATEGIC ENVIRONMENTAL ISSUES AND PROPOSED RISK MITIGATION STRATEGIES

For impact identification, various EIA methodologies are available including the checklists, interaction matrices, networks, overlays, expert judgment, modelling simulation and networks etc. Among these following methods are used for assessing the strategic level issues and impacts.

4.1.1 Matrices showing key risks and opportunities

Interaction Matrices are used for identification of impacts. Interaction matrix is a twodimensional matrix wherein the project actions are placed along one axis (i.e., along y-axis) and on the other axis there are different environmental parameters likely to be affected by the proposed project actions grouped into categories i.e. Physical, Ecological & Socio-economic Environment. Interaction matrix is used in this project due to the following reasons. It provides cause-effect relationship between the project actions and resulting consequences of the impacts.

It provides nature (+ve or -ve) and weighting of different impacts.

It provides cumulative impacts of a project.

Matrix groups project actions into temporal phases. For the impact assessment, project interaction matrix is used by dividing the project action into different phases (Preconstruction, construction and operation). The environmental impacts are divided into three main categories including physical, ecological and socioeconomic domains. The environmental impacts of the project actions are identified and weighed into the following categories:

- +3 = Extremely Beneficial
- +2 = Potentially Positive
- +1 = Slightly Positive
- 0 = Insignificant

- -1 = Slightly Negative
- -2 = Potentially Negative
- -3 = Extremely Negative

The assignment of a typical numerical value is based on the previous knowledge and professional judgment of EIA team experts. It may be noted that the environmental parameters, which are not related to the implementation of the projects, have not been considered in the matrix.

4.1.2 GIS or Other Spatial Analyses

These methods illustrate the spatial distribution of relevant issues and impacts. They are undertaken through a preparation of maps with different information which is relevant to the EIA. These maps are then laid over each other. Spatial analyses can be based on manual elaboration of transparent maps (overlay mapping) or elaboration and processing of electronic maps (Geographical Information Systems, GIS).

4.1.3 Trend analyses

Trend analysis and extrapolation helps to interpret environmental pressures and changes over time. In this Report, previous data was taken especially for physical components like temperature, rainfall, precipitation etc to foresee the future projections of temperature, rainfall, sea-level rise and extreme weather rise.

Trends are analysed over a correct temporal scale. The presentation of trends can be fairly simple, e.g., a line graph, or complex graphs correlating trends in the environment with the changes in their drivers. It also assists predictions of future impacts as some trends can be safely extrapolated on the assumption that the trend is going to continue in the same dynamic.

4.2 CHARACTERISTICS OF IMPACTS

The predicted impacts have been characterized; various aspects of the impact characterized include:

Nature (direct/indirect)

Duration of impact (Short term, medium term, Long term)

Geological extent (local, regional)

Timing (Project phase)

Reversibility of impact (Reversible/Irreversible)

Likelihood of the impact (certain, likely, unlikely, rare)

Impact consequence severity (major, moderate, minor)

Significance of impact (High, medium, low)

The above aspects of environmental characterization are defined in Table below-:

 Table 4-1, Impact Characterization

	Direct: The environmental parameter is directly changed by the		
Nature	project.		
	Indirect: The environmental parameter changes as a result of		
	change in another parameter.		
	Short-term: lasting only for the duration of the project such as noise		
	from the construction activities.		
	Medium-term: Lasting for a period of few months to a year before		
Duration of Impacts	vegetation due to clearing of campsite, contamination of soil or		
Duration of impacts	water by fuels or oil		
	Long-term: lasting for a period much areater than medium term		
	impact before naturally reverting to the original condition such as		
	loss of soil due to soil erosion.		
Geographical Extent	Local, regional (spatial dimension)		
Timing	Construction and Operation		
	Reversible: when a receptor resumes its pre-project condition.		
Reversibility of Impact	Irreversible: when a receptor does not or cannot resume its pre-		
	project condition.		
	Almost Certain: Impact expected to occur under most		
	circumstances.		
Likelihood of the	Likely: Impact will probably occur under most circumstances.		
Impact	Possibly: Impact may possibly occur at some time.		
	Pare: Impact may occur but only under exceptional		
	circumstances.		
	Major: When an activity causes irreversible damage to a unique		
	environmental feature; causes a decline in abundance or change		
	in distribution over more than one generation of an entire		
Impact	population of species of flora and fauna: has long term effects		
Consequences	(period of years) on socioeconomic activities of significance on		
severity	regional level.		
	Moderate: When an activity causes long-term (period of years),		
	reversible damage to a unique environmental teature; causes		
	reversible damage or change in abundance or distribution over		
	one generation of a population of hora of launa, have short-left		

	effects (period of years) on socioeconomic activities of	
	significance on regional level.	
	Minor: When an activity causes short-term (period of a few	
	months), reversible damage to a unique environmental feature;	
	slight reversible damage to a few species of flora or fauna within a	
	population over a short period; has short-term (period of months)	
effects on socioeconomic activities of local significance.		
	Negligible: when no measurable damage to physical,	
	socioeconomic, or biological environment above the existing level	
	of impact occurs.	
	Categorized as High, Medium, Low	
Significance of Impact	Based on the consequence, likelihood, reversibility, geographical	
significance of impact	extent, and duration: level of public concern: and conformance	
	with legislative of statutory requirements.	

4.3 IDENTIFICATION OF MAJOR IMPACTS

An environmental assessment in newly liberated areas of Hirshabelle State in Somalia identified following key impact areas on Mataban District:

Environmental hazards and risks in the newly liberated areas, such as unexploded ordnance, landmines, and other remnants of war that can pose threats to both the environment and human health.

Land degradation and desertification risks, particularly relevant in arid and semi-arid regions like Somalia and its impact on agriculture and food security.

Potential impact of climate change on the newly liberated areas, including projections for temperature and precipitation changes, sea-level rise, and extreme weather events.

Impact of newly built or rehabilitated infrastructure, such as roads, bridges, and buildings.

Effects on the livelihoods of the local population, including the availability of natural resources for agriculture, grazing, and fishing.

These issues have been discussed and the concrete actions with mitigations measures have been given in following sections in order to mitigate these issues.

4.3.1 Identification of Environmental Hazards related to newly liberated areas

Warfare is inherently deadly and destructive. This section primarily outlines Identification of potential environmental hazards and risks in the newly liberated areas, such as unexploded ordnance, landmines, and other remnants of war that can pose threats to both the environment and human health. Of particular concern are: environmental modifications that release dangerous forces; forest clearing chemicals and devices; and anti-personnel land mines. Mitigating the impacts of infrastructure destruction, contamination, and the release of toxic substances during conflict is crucial for protecting both the environment and human health.

I. Unexploded ordnance

Unexploded ordnance (UXO) refers to explosive weapons that have been deployed but failed to function as intended, posing a risk of detonation. The presence of UXO can have significant impacts on both the environment and human health. UXO sometimes referred to as energetic materials, and metals, can be released into the environment leading to toxicological and ecological risks. XO often contains hazardous materials, such as heavy metals and toxic chemicals. When UXO corrodes or deteriorates, these substances can leach into the soil and water, contaminating the environment. The environmental impact of a single detonation of an individual item is minor. However, significant impact can be caused when multiple detonations or disposal activities are carried out in one place over a prolonged period of time, a scenario that can lead to residue loading in the environment. Equally, UXO abandoned for long periods of time will corrode and potentially leach significant quantities of explosive into the environment.

Impacts on infrastructure

- The destruction of infrastructure by explosive weapons results in hazardous dust and debris; such debris remains in the area for long periods
- Damage to such infrastructure, including water supply and treatment infrastructure, often leaves water supplies contaminated, impacting the environment and human health
- The bombardment of essential and industrial infrastructure and the displacement of key workers often results in the release of further toxic chemicals, causing water, air and soil pollution.

• Oil facilities have frequently been targeted in bombardment during conflict which has lasting ramifications for local populations and habitats.

Mitigation Measures

- Establish emergency response teams to quickly clean up and remove hazardous debris to minimize exposure and environmental impact.
- Encourage the use of construction materials that are less likely to produce hazardous dust and debris in the event of infrastructure damage.
- Implement rapid response measures to treat and purify water supplies immediately after infrastructure damage to prevent the spread of waterborne diseases.
- Establish monitoring systems to regularly assess the quality of water sources and ensure timely response to contamination events.
- Develop mechanisms for identifying and reporting the release of toxic chemicals, enabling prompt response and containment.
- Implement proper disposal protocols for hazardous materials to prevent longterm pollution.
- Enhance protection measures for critical infrastructure, including oil facilities, to reduce the likelihood of being targeted during conflicts.
- Promote the development and use of renewable energy sources as alternatives to reduce dependence on vulnerable facilities.
- Develop training programs to increase the capacity of local communities to manage and maintain essential infrastructure during and after conflicts.
- Ensure that workers involved in infrastructure maintenance have the necessary safety equipment and conditions to minimize the risks of accidents and exposure to toxic substances.
- Advocate for adherence to international conventions and treaties that regulate the use of explosive weapons and protect critical infrastructure during armed conflicts.
- Educate local communities about the risks associated with infrastructure damage and contamination, promoting proactive measures and community involvement.
- Conduct regular drills to prepare communities for rapid and efficient responses to infrastructure-related emergencies.

Impacts on Agriculture land

- The use of explosive weapons harms agriculture; contaminating the land and displacing farmers and other key workers
- Explosive weapons damage irrigation networks, hampering agricultural efforts
- Explosive weapons can kill livestock directly, force owners to butcher livestock early, force farmers and herders to flee or otherwise interrupt livestock production
- Damage to large livestock infrastructure by explosive weapons can also expose the environment to harmful chemicals
- Explosive weapon use in agricultural land can also cause fires or prevent fire from being put out due to fear of UXO

Mitigation Measures

- Provide immediate humanitarian aid, including food, water, and shelter, to displaced farmers and other key workers.
- Implement programs to support displaced farmers in finding alternative livelihoods and income sources, such as vocational training and employment opportunities.
- Establish emergency response teams to quickly repair and restore damaged irrigation networks to enable farmers to resume agricultural activities.
- Encourage the development of alternative water sources and irrigation methods that are less vulnerable to explosive weapon damage.
- Implement insurance programs for livestock owners to compensate for losses caused by explosive weapon impacts, encouraging sustainable livestock production.
- Establish temporary shelters for livestock during conflicts to protect them from direct harm and ensure their well-being.
- Implement protective measures for large livestock infrastructure, such as reinforced shelters or underground facilities, to minimize the impact of explosive weapons.
- Implement swift and systematic clearance of unexploded ordnance from agricultural land to enable safe access for farmers and prevent accidental explosions.

4 Strategic Environmental Issues and Proposed Risk Mitigation Strategies

- Provide training to communities on fire safety measures, including firefighting techniques and the proper use of firefighting equipment.
- Advocate for peaceful conflict resolution and adherence to international laws and treaties regulating the use of explosive weapons, especially in agricultural areas.
- Support community-based conflict resolution initiatives to address underlying issues and reduce the likelihood of future conflicts affecting agriculture.

Impacts on Flora and fauna

- Bombardment can force animals into other areas as they flee explosive violence or the consequences of displacement for example.
- In some instances, the human displacement caused by explosive weapons may result in a rise in some animal populations, though this may exacerbate conflict between humans and these animals
- Those displaced by explosive violence often rely on the local environment for resources such as firewood which can also have significant impacts on local environments
- The displacement caused by explosive weapons often results in the abandonment of pets and increases the numbers of strayed animals

Mitigation Measures

- Establish and protect wildlife corridors that allow animals to move safely between habitats, reducing the impact of explosive weapons on their natural behavior.
- Implement programs for the restoration of habitats affected by explosive violence to encourage the return of displaced animals to their original areas.
- Develop and implement wildlife management plans that include education programs to inform communities about the behavior of displaced animals and promote coexistence strategies.
- Facilitate community-based conflict resolution mechanisms that involve local authorities, wildlife experts, and affected communities to address conflicts peacefully.
- Implement policies promoting alternative energy sources to reduce the reliance on firewood, thus mitigating the environmental impact of resource extraction.

- Engage local communities in sustainable resource management practices, emphasizing the importance of preserving the local environment for long-term well-being.
- Develop and enforce comprehensive animal welfare legislation to ensure the humane treatment of pets and prevent their abandonment during conflicts.
- Establish programs for the rescue, rehabilitation, and rehoming of abandoned pets and stray animals, involving partnerships with animal welfare organizations.
- Implement policies that provide alternative livelihood options for displaced populations, reducing their dependence on local environments for resources.
- Promote the use of energy-efficient and alternative cooking solutions, reducing the demand for firewood and mitigating environmental degradation.
- Develop and implement training programs that enhance the resilience of communities to cope with the consequences of explosive violence, including strategies for coexisting with displaced animals and managing resources sustainably.
- Integrate animal welfare considerations into emergency response plans to address the needs of both humans and animals during and after conflict situations.

II. Landmines

Anti-Personnel (AP) Landmines pose a serious threat to environment, livelihood and process of sustainable development, affecting not only present but also future generations. They prejudice economic development by disrupting the biosphere's life support systems and diminishing the capacity of the environment to supply the raw materials and natural resources. Mines deny access to natural resources, promote the rapid and unsustainable exploitation of marginal and ecologically fragile environments, deplete biological diversity by destroying flora and fauna, contaminate the surrounding soil and water with highly toxic substances, and destroy the ecosystem itself by disrupting soil and water processes. Estimates suggest that over 110 million landmines are still in place. AP landmines were a constant threat even to the faction who laid them. Nobody kept full records of the mines laid and it is almost impossible to do so for the mines dropped from aircraft. Use of landmines have denied land to farmers, pastoral communities and returning refugees and have
covered large tracts of the earth's surface with non-biodegradable and toxic garbage. Mines are a major contributor to economic and social impoverishment. The use of land mines results in loss of productivity of farmlands, removal of vast tracts of arable land from safe use for decades, and disruption of transportation and agricultural markets.

Impacts on Crops and Vegetation

Mines can destroy flora and damage the soil structure, leading to reduced soil productivity. They also cause irreversible harm to ecosystems by directly damaging the soil through shattering and displacement, destroying its structure, and increasing its vulnerability to water and wind erosion.

Additionally, reduced water retention in mountainous areas leads to floods and soil erosion on coastal plains. The disturbance of soil structure worsens the erosion issue, resulting in higher sediment load in the drainage system. This elevated sedimentation can negatively impact marine habitats for fish and prawns. Widespread landmine deployment also accelerates deforestation. In regions where agricultural and grazing land is affected by mines often become the only source of fuel and livelihood.

Valuable forests and fruit trees are rapidly stripped and felled for firewood and building material. Deforestation adversely affects drainage systems, water tables, wetlands, coastal mangroves, and dunes. Ecosystem services can be disrupted over both distance and time.

Mitigation Measures

- Allocate resources and funding for comprehensive demining programs to clear affected areas of landmines and unexploded ordnance.
- Foster international collaboration and support for mine clearance efforts through partnerships with organizations specializing in demining.
- Implement soil conservation programs to restore and protect soil structure in affected areas, incorporating measures such as reforestation and erosion control.
- Launch initiatives to plant trees and restore vegetation in mined areas to stabilize soil, reduce erosion, and enhance overall ecosystem health.
- Develop and implement watershed management plans in mountainous areas to regulate water retention and reduce the risk of floods and erosion.

- Construct erosion control structures, such as check dams and retaining walls, to minimize sedimentation in drainage systems.
- Implement integrated coastal zone management plans to protect marine habitats from sedimentation and other impacts resulting from landmines.
- Establish marine conservation areas to safeguard the habitats of fish and prawns, promoting sustainable fishing practices.
- Introduce programs that provide alternative livelihoods to communities affected by landmines, reducing dependence on deforested areas for fuel and livelihood.
- Enforce regulations on timber harvesting to prevent illegal logging and promote sustainable forestry practices.
- Develop and implement large-scale ecosystem restoration programs to restore disrupted ecosystems over both distance and time.

Impacts on Livestock

Landmines not only pose a significant threat to the welfare of livestock, but also cause devastating economic and social impacts in subsistence pastoral and agricultural societies where livestock is crucial for wealth. Furthermore, mines also represent a serious threat to rare and endangered species that inhabit affected areas.

Mitigation Measures

- Establish compensation programs for farmers and herders who lose livestock due to landmine-related incidents, providing financial support to mitigate economic losses.
- Develop and implement livestock insurance schemes to provide financial protection for livestock owners in landmine-affected areas.
- Prioritize the detection and clearance of landmines along known livestock routes to ensure the safety of herders and their animals.
- Develop and implement biodiversity conservation plans that specifically address the protection of rare and endangered species in landmine-affected areas.
- Establish and manage protected areas that are free from landmines to provide safe habitats for rare and endangered species.

- Empower local communities to take an active role in wildlife conservation by training community members as wildlife rangers to monitor and protect endangered species.
- Incentives for Conservation: Provide economic incentives for communities that actively participate in and contribute to the protection of rare and endangered species.

<u>Wildlife</u>

Landmines often kill wildlife, and they have a direct and immediate impact. The retrieval of landmines also has a detrimental effect on the environment as bomb disposal units could plough up large areas of the desert, damaging fragile vegetation and destroying habitat for numerous animal species. Indiscriminate land mining leads to an environment hostile towards many forms of life, with entire species at risk of being wiped out. Critical natural habitat and biodiversity have been steadily diminishing in wars around the world.

Mitigation Measures

- Invest in and promote the use of precision demining technologies that minimize the ecological impact, such as advanced metal detectors and groundpenetrating radar.
- Develop and use explosives with minimal environmental impact for demining operations, reducing disturbance to fragile ecosystems.
- Implement comprehensive habitat restoration programs following demining activities, including replanting native vegetation and restoring ecosystems to support wildlife.
- Develop and implement ecosystem management plans that prioritize the recovery of habitats impacted by landmines, ensuring the preservation of biodiversity.
- Establish dedicated wildlife conservation units within demining organizations to monitor and protect animal species during and after the retrieval process.
- Collaborate with conservation organizations to integrate wildlife protection measures into demining operations and habitat restoration initiatives.
- Designate and protect areas cleared of landmines as wildlife sanctuaries or protected zones, allowing for the recovery of biodiversity.

• Implement zoning regulations that prioritize conservation in demined regions, allowing for the coexistence of human and wildlife populations.

<u>Pollution</u>

Landmines also introduce poisonous substances into the environment as their casing corrode and decay. Mines commonly use 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX, or "Cyclonite"); and these substances can leach into the surrounding soil and water as the metal or timber casings disintegrate. These substances, and the compounds derived from them as they decompose, are soluble in water, long-lived, carcinogenic, and quite toxic, even in small quantities.

Chemicals	Targeted Species
Trinitrotoluene (TNT), hexahydro-1,3,5- trinitro-1,3,5-triazine (RDX, or "Cyclonite")	Mammals, Aquatic microorganisms and fishes.
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX, or "Cyclonite")	Mammals

The use of cluster bombs and Depleted Uranium artillery, contained in missiles, has devastating consequences for the environment and civilian population. Depleted uranium is a by-product of nuclear power and weapons production, known for its density and pyrophoric nature. Its fine particles can spread over large areas and pose significant health risks upon ingestion or inhalation, including an increased risk of cancer. Additionally, the chemical by-products from detonated bombs as well as war-related activities like herbicides or chemical weapons have long-lasting harmful effects on future generations.

Hence, Landmines cause pollution which leads to environmental degradation and ecological disruption, threatening human health and well-being. They may be the most toxic and widespread form of pollution facing mankind today. Uncleared landmines pose a malignant threat that requires physical cleansing of the earth to eliminate.

Mitigation Measures

 Collaborate with international organizations to safely and effectively dispose of chemical weapons, ensuring the elimination of long-lasting harmful effects on the environment.

- Establish robust verification and monitoring systems to ensure compliance with international agreements on the disposal of chemical weapons.
- Implement health monitoring programs for populations living in or near areas affected by landmines and chemical pollution, providing early detection and intervention for potential health issues.
- Develop and implement rehabilitation programs for areas contaminated by toxic substances, including soil remediation and replanting initiatives.
- Encourage sustainable agricultural practices that minimize the use of chemical inputs in areas with a history of landmine contamination.
- Invest in capacity-building programs for local communities and governments to effectively participate in the cleanup and restoration of areas affected by landmines and chemical pollution.
- Support research initiatives focused on understanding and addressing the long-term environmental impacts of landmines and chemical weapons, guiding future policy decisions.

Human health impacts

Landmines, unexploded ordnance (UXO), and other war remnants pose significant threats to human health, causing a range of immediate and long-term impacts such as:

- Landmines and UXO often cause severe traumatic injuries, including loss of limbs (amputations), fractures, and penetrating wounds, leading to immediate physical and psychological consequences.
- Explosive remnants can result in fatalities, causing immediate loss of life during accidental encounters or while attempting to handle or move them.
- UXO may detonate unexpectedly upon contact or disturbance, causing additional injuries and fatalities among civilians, including those involved in clearance efforts or unsuspecting individuals.
- Landmines and UXO often lead to displacement of communities, disrupting livelihoods, agriculture, and local economies. Fear of encountering remnants may limit access to resources and hinder economic activities.
- Explosive remnants may contain toxic substances, such as heavy metals or chemical residues, leading to long-term health issues if individuals are exposed to or come in contact with contaminated soil, air, or water.

 Children are particularly vulnerable to the physical and psychological impacts of landmines and remnants. Additionally, vulnerable groups such as the elderly and individuals with disabilities may face increased challenges in avoiding and recovering from injuries.

Mitigation measures

- Support global efforts to control arms proliferation, disarmament, and the reduction of explosive remnants to prevent their use in conflicts.
- Integrate mine risk education into school curricula to educate children about the dangers and precautionary measures associated with explosive remnants.
- Provide immediate medical care, rehabilitation services, and long-term support for individuals affected by landmine injuries, including prosthetics, physical therapy, and mental health services.
- Strengthen healthcare infrastructure in affected areas to ensure access to timely and quality medical services for victims.
- Conduct surveys and mapping of areas suspected to be contaminated with explosive remnants to guide clearance efforts and prioritize high-risk zones.
- Facilitate the sharing of information and data on contaminated areas among governments, international organizations, and demining agencies for coordinated efforts.
- Provide financial support and incentives for individuals and communities to start small businesses, fostering economic resilience.

Implementing these policy-level mitigations requires coordinated efforts at the national and international levels, involving governments, environmental organizations, disarmament agencies, and affected communities. The goal is to eliminate the threat of pollution, protect ecosystems, and safeguard human health in areas affected by landmines and related weaponry.

4.3.2 Land Degradation and Desertification (Impacts on Agriculture and Food Security)

Desertification, according to the United Nations Convention to Combat Desertification (UNCCD), is defined as 'land degradation in arid, semi-arid, and dry sub-humid areas, resulting from various factors, including climate variations and human activity'. Therefore, desertification is a natural phenomenon exacerbated by human activities. Approximately 40 % of the world's land surface is covered by drylands (i.e. arid, semi-arid and dry sub-humid lands), which are home to approximately two thousand million people. Unfortunately, a large part of these lands

is degraded, meaning that they are gradually losing their ecosystem functioning and productivity. This can eventually lead to desertification, which is the most severe form of land degradation. With increasing pressure on the landscape due to a growing population and economic development, this can have devastating impacts on rural livelihoods. Target 15.3 of the Sustainable Development Goals (SDGs) sets a global ambition for



a land degradation-neutral world by 2030 (UNCCD, 2018) of the Sustainable Development Goals (SDGs) sets a global ambition for a land degradation-neutral world by 2030 (UNCCD, 2018).

Somalia, as east African country that covers an area of about 637,657 Km2, selfdestruction through civil wars, has also allowed its environment to degrade to a level that cannot be described in words. Between 2000 and 2015, the total degraded land was 147704 km², representing 26.7% of the total land area of Somalia. Desertification, along with climate change and the loss of biodiversity were identified as the greatest challenges to sustainable development during the 1992 Rio Earth Summit. Rising temperatures, variation in rainfall patterns, and frequent extreme weather events associated with climate change have adversely affected agriculture and food security in these areas.

Mataban District is a region where desertification poses a significant challenge to agricultural livelihoods. Recurrent droughts coupled with wind erosion have led to reduced wheat yields in arid, semiarid, and dry sub-humid zones. Agricultural production in the drylands is experiencing irreversible impacts as the grain formation phase has accelerated with a warmer climate, leading to improper growth and reduced yields.

The livestock sector across global drylands observed impacts including reduction of plant cover in rangelands, reduced livestock and crop yields, loss of biodiversity and increased land degradation and soil nutrient loss as well as injury and livestock death due to SDS.

Woody plant encroachment and greening may be masking underlying land degradation processes and losses of ecosystem services, livelihood, and adaptation options in pastoral systems. Woody encroachment alters ecosystem services, particularly in rangelands, resulting in reduced grass cover, hindering livestock production, and reducing water availability.

Impacts on Soil Quality (Soil Erosion)

- Rainwater harvesting and soil conservation, grass reseeding, agroforestry
- Use of different breeds of grazing animals, altered livestock rotation systems, use of new crop varieties, development of management strategies that reduce the risk of wildfire

Impacts on Livelihood (Overgrazing)

- Modification of production and management systems that involve diversification of livestock animals and crops, integration of livestock systems with forestry and crop production, and changing the timing and locations of farm operations
- Improved breeds and feeding strategies and adoption of improved breeds for households without cows (both economic and environmental gain)

impacts on Natural Vegetation

- Carbon sequestration through decreasing vegetation clearing rates, reversal through revegetation, targeting for higher-yielding crops with better climate change adapted varieties, and improvement of land and water management
- Agroforestry role in addressing various on-farm adaptation needs besides fulfilling many roles in agriculture, forestry and other land use-related mitigation pathways (assets and income from carbon, wood energy, improved soil fertility and enhancement of local climate conditions; provides ecosystem services and reduces human impacts on natural forests) Implementation of co-benefits

strategies including provision of incentives across multiple scales and time frames, fostering multidimensional communication networks and promoting long-term integrated impact assessment Achievement of triple-wins in sub-Saharan Africa through provision of development benefits by making payments for forest services to smallholder farmers, mitigation benefits by increasing carbon storage, and adaptation benefits by creating opportunities for livelihood diversification

Invasive species and woody encroachment

- Climate change is projected to facilitate the spread of invasive species that can have profound impacts on dryland ecosystem functioning leading to the loss of biodiversity
- Biomass harvesting and selective clearing; utilising intense fires to manage encroachment, combined browsing and fire management
- Rewilding in open ecosystems and reintroduction of mega-herbivores (e.g., in parts of Africa) to counter negative impact of woody encroachment; chemical removal of undesirable encroached woody species

Droughts Conditions

- Proactive drought risk mitigation compared with reactive crisis management approaches
- Promoting collective action in livestock management, optimising livestock policies and feed subsidies, interventions in livestock markets during drought onset
- Expanding sustainable irrigation and shifting to drought-resistant crops and crop varieties Environmentally sustainable seawater desalination
- Promoting behavioural changes for more efficient residential water use; moving away from water-intensive agricultural practices in arid areas; harvesting rainwater by local communities; empowering women and engagement in local climate adaptation planning, community-based early warning systems, Integrated Water Resources Management, water
- governance benchmarking, and exploration of palaeo channels as freshwater sources using remote sensing

Grassland and savanna degradation

• Prescribed fire and tree cutting, invasive plant removal, grazing management, reintroduction of grasses and forbs, restoration of soil disturbance

Rangeland degradation (decreasing fodder quality or yield, invasion by fodder poor value species/refusals)

- Promote local and regional herd mobility during the growing season to avoid intense grazing pressure on growing annual herbaceous vegetation of rangelands near settlements, water points, markets
- Moderate grazing facilitates grass tillering and herbaceous flora diversity
- Ecological restoration of grazing ecosystems by sowing a mixture of zonetypical dominant species and life forms of plants on severely degraded land; clearance of invasives
- Ecological restoration of arid ecosystems by sowing a mixture of zone-typical dominant species and life forms of fodder plants with partial (ribbon) treatment of pasture lands
- Ecological restoration of secondary salted irrigated soils using halophytes

Poor livestock productivity (reproduction)

 Promote seasonal-regional herd mobility to optimise the use of complementary fodder resources (rangelands, browses, crop residues); implies institutionalised communal access, community agreements and infrastructures (water points, livestock path, grazing reserves, access to education, health care, markets for transhumant population); cross state boundary mobility implies international agreements such as promoted by N'djamena meeting (Declaration 2013)

Dairy/meat) in relation with poor seasonal nutrition

 Promote strategic supplementation of reproductive and young animals by the end of dry and early wet season Secondary effect on excretion quantity/ quality to manure croplands

Decrease trend in cropland soil fertility

 Rotational corralling of livestock in field during the dry season (and on cleared fallow the following year in the wet season) to ensure maximum retrieval of organic matter and nutrients from faeces and urine deposited

- Application of mineral N and P fertilizers as placed (per pocket) microdoses (50– 80 kg/ha) to intensify staple crop production
- Impact on soil fertility, rain use efficiency, vegetation cover, organic matter production and recycling Legume association with cereals (millet-cowpea; sorghum-groundnut)
- Adapting cultivars and cropping techniques (calendar, fertilization)

Salinisation and groundwater depletion

- Indigenous and scientific adaptive practices to cope with salinity
- Farmers in waterlogged saline areas harness subsurface drainage, salt tolerant crop varieties, land-shaping techniques and agroforestry to adapt to salinity and waterlogging risks
- Locally adapted crops and landraces and the traditional tree- and animal-based means to sustain livelihoods in face of salinisation

Sand and dust storms

- Use of live windbreaks or shelterbelts, protection of the loose soil particles through the use of crop residues or plastic sheets or chemical adhesives, increasing the cohesion of soil particles by mechanical tillage operations or soil mulching Use of perennial plant species that can trap sediments (sand and fallen dust) and form sandy mounds, such as Haloxylon salicornicum, Cyperus conglomerates, Lycium shawii and Nitraria retusa
- In the Sahel, promote herbaceous (not woody plants) to trap sand: annuals such as Colocynthis vulgaris, Chrozophora senegalensis, Farsetia ramosissima; perennials such as Cyperus conglomeratus, Leptadenia hastate
- In the Sahel, leaving at least part of the crop residues (stalks) on the soil during the dry season (100 kg dry matter per hectare has already had significant effect on wind erosion, many trials on millet in Niger); trampling by grazing livestock improves the partial burying of the residues
- Improve monitoring, prediction and early warning to mobilise emergency responses for human systems and prioritise long-term sustainable land management measures; establish a Global Dust-Health Early Warning System (building on the Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) initiative); multi-sectoral preparedness and response including public

health, hospital services, air and ground transportation and communication services

Mitigation Measures

Desertification, Climate Change, and Loss of Biodiversity:

- Implement and strengthen sustainable land management policies and practices.
- Enforce regulations against illegal logging, land clearance, and unsustainable resource extraction.
- Integrate climate change adaptation and mitigation strategies into national development plans.
- Establish protected areas to conserve biodiversity and ecosystem services.
- Develop and implement afforestation and reforestation programs.

Agricultural Impacts in Mataban District:

- Promote sustainable agricultural practices through subsidies and extension services.
- Invest in research and development for climate-resilient crop varieties.
- Implement water conservation and rainwater harvesting initiatives.
- Integrate agroforestry into land-use planning to enhance soil fertility.
- Establish early warning systems for drought and provide timely support to affected communities.

Livestock Sector Impacts:

- Develop and enforce sustainable grazing management policies
- Implement programs to improve livestock breeds and health
- Provide incentives for sustainable land use practices in pastoral systems
- Strengthen veterinary services to prevent and control diseases
- Support community-based initiatives for sustainable livestock management

Soil Quality (Soil Erosion):

- Enforce regulations against overgrazing and deforestation
- Promote sustainable land management practices through education and outreach
- Incentivize the use of erosion control measures, such as terracing and cover cropping
- Implement land tenure and land use planning reforms

Invasive Species and Woody Encroachment:

- Develop and implement invasive species management plans
- Support community-led efforts for biomass harvesting and selective clearing
- Invest in rewilding initiatives in open ecosystems

• Implement regulations on chemical removal of undesirable encroached woody species

Droughts:

- Develop and implement proactive drought risk mitigation strategies
- Establish community-based early warning systems
- Invest in sustainable irrigation infrastructure
- Promote drought-resistant crop varieties
- Support policies that enhance water use efficiency in agriculture and residential areas

Grassland and Savanna Degradation, Rangeland Degradation:

- Implement prescribed fire and tree cutting programs
- Support grassland restoration initiatives
- Encourage sustainable grazing practices through policy and education
- Develop and implement programs for ecological restoration of degraded lands

Decrease in Cropland Soil Fertility, Salinisation, and Groundwater Depletion:

- Promote sustainable agricultural practices to enhance soil fertility
- Implement rotational corralling of livestock to maximize nutrient retrieval
- Invest in research for drought-resistant and salt-tolerant crop varieties
- Enforce regulations on groundwater use to prevent depletion
- Support farmers in adopting adaptive practices for coping with salinity

Sand and Dust Storms:

- Implement land-use planning regulations to prevent soil degradation
- Promote the use of windbreaks and cover crops to reduce wind erosion
- Establish monitoring and early warning systems for sand and dust storms
- Support international initiatives for cross-border cooperation in dust and sandstorm management

Poor Livestock Productivity and Dairy/Meat Quality:

- Support seasonal-regional herd mobility programs
- Establish infrastructure for communal access, water points, and grazing reserves
- Promote sustainable livestock policies and feed subsidies
- Invest in education and health services for pastoral communities

4.3.3 Climate change impacts on newly liberated areas and future projection

Climate change can have significant and wide-ranging impacts on newly liberated areas, affecting both the environment and the socio-economic conditions of these

regions. The potential impacts can vary depending on the specific geographical location, but some general trends and consequences may include:

- Increase in Temperature: Climate change is expected to lead to a rise in global temperatures. Newly liberated areas may experience more extreme heat events, impacting agriculture, water resources, and public health.
- Water Resources: Climate change can alter precipitation patterns, leading to droughts or increased rainfall in certain areas. This can affect water availability, impacting agriculture, ecosystems, and local communities.
- Agriculture and Food Security: Changes in temperature and precipitation patterns can affect crop yields, potentially reducing agricultural productivity and threatening food security in newly liberated areas.
- Shifts in Growing Seasons: Climate change may lead to shifts in growing seasons, impacting the suitability of certain crops and requiring adjustments in agricultural practices.
- Sea Level Rise: If the newly liberated areas are coastal, they may be vulnerable to sea level rise. This can result in the loss of land, increased flooding, and damage to infrastructure.
- Extreme Weather Events: Climate change is associated with an increase in the frequency and intensity of extreme weather events such as hurricanes, floods, and wildfires. These events can lead to significant economic and social disruptions.
- Health Risks: Changes in temperature and precipitation can influence the spread of vector-borne diseases. Additionally, extreme heat events can pose health risks, especially in areas without adequate infrastructure or healthcare facilities.
- **Ecosystem Changes:** Climate change can disrupt ecosystems, leading to the loss of biodiversity and affecting the availability of resources for local communities.
- **Migration and Displacement:** Climate change impacts may contribute to increased migration and displacement of people from affected areas, potentially leading to social and political challenges.
- Infrastructure Vulnerability: Extreme weather events and sea level rise can damage infrastructure, including roads, buildings, and utilities, posing challenges for reconstruction efforts in newly liberated areas.
- **Conflict and Security Risks:** Changes in water and food availability, combined with other environmental stresses, can contribute to resource scarcity and potentially exacerbate existing tensions or create new conflicts.

Mitigation Measures

Climate Change Mitigation and Adaptation Strategy:

- Develop and implement a comprehensive climate change mitigation and adaptation strategy tailored to the specific challenges of newly liberated areas
- Establish a dedicated government agency or task force responsible for coordinating climate action and integrating it into all relevant sectors

Water Resources Management:

- Implement sustainable water management practices to ensure efficient use and conservation of water resources
- Invest in water infrastructure development, such as dams, reservoirs, and irrigation systems, to mitigate the impacts of changing precipitation patterns

Agricultural Resilience:

- Promote climate-smart agricultural practices, including the use of droughtresistant crops and sustainable farming techniques
- Provide farmers with training, resources, and financial incentives to adapt to changing growing conditions

Early Warning Systems:

- Develop and strengthen early warning systems for extreme weather events, including hurricanes, floods, and heatwaves
- Implement community-based early warning systems to ensure timely evacuation and preparedness

Infrastructure Planning and Resilience:

- Integrate climate resilience considerations into infrastructure planning and development
- Upgrade and reinforce critical infrastructure, such as roads, bridges, and utilities, to withstand extreme weather events and sea level rise

Ecosystem Protection and Restoration:

 Implement policies to protect and restore ecosystems, including afforestation and reforestation programs

⁴ Strategic Environmental Issues and Proposed Risk Mitigation Strategies

• Establish and enforce regulations to prevent habitat destruction and promote biodiversity conservation

Public Health Interventions:

- Develop and implement public health strategies to address the changing patterns of vector-borne diseases
- Enhance healthcare infrastructure and services, particularly in vulnerable and newly liberated areas

Community Engagement and Education:

- Conduct awareness campaigns to educate communities about climate change impacts and adaptation strategies
- Encourage community participation in decision-making processes related to climate resilience and disaster risk reduction

Migration and Displacement Planning:

- Develop policies to manage and support populations vulnerable to climateinduced migration and displacement
- Establish mechanisms for planned and organized relocation when necessary, considering social, economic, and cultural aspects

Conflict Prevention and Resolution:

- Address potential conflicts arising from resource scarcity by promoting equitable access to water, land, and food resources
- Support community-based conflict resolution mechanisms and promote dialogue among stakeholders

International Collaboration:

- Engage in regional and international collaborations to share knowledge, resources, and best practices for climate change adaptation
- Advocate for global efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change

Future Projections

1. Projected Changes and Risks in Natural Systems

<u>Temperature</u>

⁴ Strategic Environmental Issues and Proposed Risk Mitigation Strategies

Globally, warming rates have been twice as high in drylands as in humid lands, because the sparse vegetation cover and lower soil moisture of dryland ecosystems amplify temperature and aridity increases. This enhanced warming is expected to continue in the future.

<u>Rainfall</u>

Drylands are highly sensitive to changes in precipitation and evapotranspiration. Potential evapotranspiration (PET) is projected to increase in Mataban District. Globally, soil moisture declined over the 20th century (Gu et al., 2019), a trend that is projected to continue under all emissions scenarios (WGI). Projected drier soils can further amplify aridity through feedbacks with land surface temperature, relative humidity and precipitation. Drought conditions (frequency, severity and duration) are expected to substantially worsen in dryland of Mataban District, driven by a higher saturation threshold and more intense and frequent dry spells under rising temperatures.

<u>Sea level rise</u>

The modest sea level rise projected over the course of the rest of the century will not place a significantly larger land area at risk. However, demographic growth will mean that a significantly larger population is exposed in future.

Extreme weather events

Projected increases in temperature, an increase in the frequency of extreme weather events, and warming sea temperatures are likely to combine to shift weather patterns in ways that provide suitable environments for an increasing incidence of crop pests and disease. This will affect agricultural livelihoods and food availability across the region. There may be a reduction in the prevalence of some vectors if climatic conditions become too warm or humid for them to thrive. At present, however, making robust predictions of likely pest and disease impacts is not possible, as there is inadequate understanding of the specific relationships between weather events, including seasonal patterns, and the severity of impact of individual pests and disease. The below mentioned figure is just showing an example of how conflict has contributed to extreme weather events in Somalia.



Figure 4-1: Timeline of conflict and extreme weather events in Somalia

Source: Conflict data (red boxes): ACLED database; disaster data (i.e., extreme weather events) (green boxes): EM-DAT, the International Disaster Database.

4.3.4 Infrastructure impact on newly built or rehabilitated areas

Infrastructure plays a critical role in the development and sustainability of newly built or rehabilitated areas. However, it can also have various impacts. Many difficulties are faced by infrastructure providers in post-conflict situations. Some of these difficulties can be easily identified and mitigated by providers. However, other issues do not become apparent until later stages of development. As the ongoing environmental assessment operates at the policy level, it is pertinent to outline the key challenges influencing the provision of infrastructure.

Immediate issues

- Lack of security provision
- Hazards such as land-mines and diseases
- Funding

Underlying problems

- Identification of the causes of conflict
- Lack of institutional capacity
- Corruption
- Lack of political will
- Governance

Problems of response

- Strategy/sector prioritization
- Types of key stakeholders
- Access to populations
- Existing infrastructure

⁴ Strategic Environmental Issues and Proposed Risk Mitigation Strategies

- Involvement of civil society and NGOs
- Participatory methodologies
- Long and short-term solutions needed how to meet immediate needs but achieve long-term sustainability
- Lack of local qualified technical staff
- Procurement activities, particularly those requested by donors

Mitigation Measures

Conflict triggers are often related to power and access to resources. During the reconstruction phase, efforts to mitigate underlying tensions can unintentionally make them worse. The restoration of physical infrastructure is crucial for showing a reduction in tensions. However, if control over a key service remains with one faction, tensions may persist. On the other hand, involving all parties in the reconstruction process could foster goodwill. Infrastructure reconstruction work is at risk from poor security and renewed conflict due to its need for specialized materials and predictable locations, making it important to monitor community tensions carefully.

Key stakeholders

Various actors will influence the successful reconstruction program and the assessment process needs to identify the diverse stakeholders relating to the particular context. These may include:

Category	Stakeholder	General problems	Infrastructure problems	Alternative roles
Institutional	National Government	-May have been involved in conflict -May discriminate against opponents, reward loyalty -Viewed with suspicion by local population -Corruption	-National policies and strategies are priority in infrastructure development -Opponents of government may target infrastructure -Issues surrounding infrastructure are political - decisions based on broad sense of security, economic and social agendas	-Facilitate greater integration of disenfranchised groups, and access to remote regions -Seek legitimacy
	Local Government, including municipal authorities	-Lack of funding or support from central government -Too autonomous after conflict –	-Projects may be too focused on local interest -Lack of wider participation	-Closer relationship with local people (more accountable) -Provide additional support and legitimacy to projects

4 Strategic Environmental Issues and Proposed Risk Mitigation Strategies

		little interest in development -Corruption		
				Active partner in reconstruction
	International Non- Governmental Organisations (INGOs)	-Uneven regional and project coverage -Patchy development -No regard to national plans or divisions/ inequalities that led to conflict	-Mostly humanitarian aid -Not many long-term solutions	-Long-term sustainable support needed for infrastructure projects -Partnerships with private companies -Pooled resources/ cost sharing
				-Provide advice on conflict to infrastructure providers
				-Clear exit strategies
rmental and civil society	Local NGOs	-Lack neutrality and impartiality -Lack of independent evaluation and accountability	-Projects may be too issue specific -Lack of coordination with national objectives	-Bridge between local population, INGOs and infrastructure providers -Help user groups/ consultation groups
Non-gove	Civil Society Organisations, including user groups	-Focused on local issues -Not impartial	-Projects may become hijacked by their involvement	-Can aid in dispute resolution -Aid in raising local support for project
				-Increase long- term sustainability
	International Organisations e.g. UN	-Competitive rather than collaborative responses between bodies. E.g. such as between UN aid agencies competing for funds and awareness of their individual issues	-Biased for own projects/expertis e areas -Lack of unified approach between and within international organisation	-Office for Coordination of Humanitarian Action (OCHA) established to improve coordination -Can aid with country and conflict experience

	International Committee of the Red Cross (ICRC)	-Neutrality may be seen as a sanction for conflict	-Short-term maintenance of infrastructure	-Neutral monitors -Help in planning for conflict mitigation/ resolution
Funding Agencies	Donor Organisations	 Political pressure at home may influence funding regions/ programme Funding is not sustainable with few funds targeted for crucial few years after a conflict 	-Type of funds provided for infrastructure may be influenced by political strategies rather than needs -Reliance of home- state manufactured output	-Work with INGOs and national governments to boost legitimacy and capacity beyond initial efforts for more sustainable solutions -Sensitivity of response needed to reduce partisan perceptions
	Multilateral donors and International Funding Institutions e.g. World Bank	-Terms for provision of funds and loans may be too rigid and bureaucratic	-Provision of non- specialised procurement staff can delay projects -Procurement requirements can be too rigid and do not take into account timelines and immediate needs	-Funding beyond immediate post- conflict period can increase sustainability of infrastructure development and aid in peace. -Can provide aid and guarantees for private companies -Increase state capacity and legitimacy through funding
Security Forces	Military Units, including former rebel forces	-Mistrust by communities by -Security issues may be caused by military to justify presence -Involvement in conflict	-May requisition use of infrastructure types according to own needs -Assistance with rehabilitation may be linked to political and national objectives	-Aid in providing security for infrastructure -Can assist with rehabilitation work particularly in insecure environments
	International Military Resources	-Political aims of home nation -Do not include civil society in decisions	- Development/prot ection provided to infrastructure may rely on political motivations of home nation	-Can assist with rehabilitation work particularly in insecure environments

d Stakeholders	Private Companies e.g. Multinational organisations and local contractors	-No experi ence of conflic t/regio n for Multina tionals -Contractors may have close political links -Procurement difficulties	-Attempt to influence decision makers -Contractors who have survived through the conflict may have developed close political links	-Links and support with NGOs can aid better understanding, and better targeting of projects -Provide labour- based infrastructure development – employment for locals
Providers (-Tendering processes may be distorted through contracts awarded for political support	-Work with donors to provide longer term solutions
	Local Populations	- Long-term causes of conflict not ended by peace agreements	-Lack of support for development projects lower sustainability or uptake of projects	-Creative use of civil society and user groups can increase sustainability
				-Their involvement can lessen hostilities/ causes for conflict

This policy-level environmental assessment aims to guide infrastructure provision by addressing these key issues, promoting sustainable and resilient development that aligns with broader environmental, social, and economic objectives.

4.3.5 Socioeconomic and Livelihood Impacts

Livelihoods are the means by which households obtain and maintain access to the resources necessary to ensure their immediate and long-term survival. These essential resources can be categorized into six categories: physical, natural, human, financial, social, and political. Households use these assets to increase their ability to withstand shocks and to manage risks that threaten their well-being.

Links Between Livelihoods and Conflict

Conflict can result from a wide range of factors, including competition for scarce resources, ethnic or religious tensions, competition over political power, dissatisfaction or desperation on the part of marginalized groups, or deliberate attempts by the state

to subjugate particular groups or extract resources from areas where there are competing claims.

Livelihood Assets and Conflict Shocks			
	Livelihood assets	Conflict shocks	
Physical assets	Farm equipment, seeds, tools, sewing machines, vehicles, livestock, houses	Looting or destruction	
Natural assets	Agricultural and grazing land, water resources, food, timber, fish	Burning, displacement, loss of access to grazing land	
Human assets	Labor power within a household, education, skills, vocational training	Death, loss of productivity, disability; school & workplace closures	
Financial assets Wages, access to credit, savings		Collapse of banking system, displacement causing unemployment	
Social assetsKinship structures, religious groups, neighbourhoods		Displacement, fighting between groups	
Political assets	Citizenship, access to political leaders, recourse to a functioning legal system	Deterioration of state, loss of legal system	

Mitigation Measures

The following mitigatory measures have been implemented in conflict situations to protect or enhance household assets:

- Utilizing local resilience-based strategies
- Promoting peace building and reconciliation
- Counteracting state weakness through livelihoods support
- Working with legitimate local actors
- Building economic and market linkages
- Addressing shifts in gender roles & relations
- Providing livelihood support to displace population
- Creating flexibility in planning and budgeting

5 ENVIRONMENTAL MANAGEMENT PLAN

5.1 GENERAL

This Chapter provides an overall approach for managing and monitoring the environmental issues and describes the institutional framework and reporting mechanism to implement the Environmental Management Plan (EMP) for sustainable development of the newly liberated study area. The EMP has been prepared with the following objectives:

- Provide the details of the Environmental Risk Mitigation Strategies along with the proposed mitigation measures, and corresponding action.
- Define the roles and responsibilities of the implementing bodies in order to effectively implementation of action plan.
- Frame a monitoring mechanism for developers to ensure that EMP has been effectively implemented.
- Define the requirements necessary for documenting compliance with EMP and communicating it to all the concerned regulatory agencies.

5.2 STRUCTURE OF EMP

The EMP has been divided into the following sections:

- Review of regulatory requirements and applicable standards
- Mitigation Management Matrix (MMM)
- Institutional Arrangements for Implementing the EMP
- Roles and Responsibilities of the different agencies.

5.3 MITIGATION MANAGEMENT MATRIX (MMM)

This matrix identifies the environmental issues in newly liberated area. The action required for the mitigation with the responsible organization and government bodies. The MMM presented in **Table 5-1** identifies the following:

- The strategic issues and action required for possible mitigation measures for development plan.
- The person/organization directly responsible for adhering to or executing the required actions.
- The person/organization responsible for ensuring and monitoring adherence to the actions.

Table 5-1:Mitigation Management Matrix for Strategic Development Plan for MatabanDistrict

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department	
		International Treaties and Agreements:		
		• Countries should ratify and adhere to international agreements that address the issue of landmines and UXO. The Ottawa Convention (Mine Ban Treaty) and the Convention on Cluster Munitions are two crucial treaties that focus on prohibiting the use, production, and stockpiling of these weapons.		
		National Legislation:		
	Unexploded ordnance and landmines	linevoloded ordnance and landmines	 Establish and enforce national laws and regulations to control the production, use, and trade of landmines and UXO. Develop comprehensive legislation to address victim assistance, demining activities, and the clearance of affected areas. 	
1.		Mine Action Programs:	Hirshabelle-Ministry of Environment	
	 Implement comprehensive mine action programs that include clearance, risk education, and victim assistance. Allocate sufficient resources and funding to support mine action initiatives. 			
		Risk Education and Awareness:		
		 Implement educational programs to raise awareness about the dangers of landmines and UXO among local communities. Promote safe behaviors and inform people about the risks associated with these explosive remnants. 		
		Land Use Planning:		
		• Integrate mine action considerations into national and local land use planning to ensure that development		

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		activities do not inadvertently increase the risk of encountering explosive remnants.	
		Technology and Innovation:	
		 Invest in research and development of technologies for more efficient and safer demining operations. Support the development of mine-detection technologies and methodologies to enhance the speed and accuracy of clearance efforts. 	
		Coordination and Cooperation:	
		 Encourage international cooperation and coordination on mine action efforts. Collaborate with neighboring countries, international organizations, and non-governmental organizations to share resources, expertise, and information. 	
		Victim Assistance Programs:	
		 Develop and implement programs to assist victims of landmines and UXO, including medical care, rehabilitation, and socio-economic support. Ensure that victim assistance is integrated into broader healthcare and social services. 	
		Reporting and Data Collection:	
		 Establish systems for reporting and documenting incidents involving landmines and UXO. Maintain accurate and up-to-date databases to track affected areas and prioritize clearance efforts. 	
		Sustainable Development:	

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		• Integrate mine action into broader sustainable development strategies to address the socio-economic impact of landmines and UXO on affected communities.	
		Capacity Building:	
		 Build national capacity for mine action through training programs, technology transfer, and the development 	
		Desertification, Climate Change, and Loss of Biodiversity:	
2	Land Degradation and Desertification	 Implement and strengthen sustainable land management policies and practices. Enforce regulations against illegal logging, land 	Hirchabelle Ministry of Environment
2	(impacts on Agriconore and rood seconly)	clearance, and unsustainable resource extraction.	
		strategies into national development plans.	
		• Establish protected areas to conserve biodiversity and	
		ecosystem services.	

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		Develop and implement afforestation and reforestation	
		programs.	
		Agricultural Impacts in Mataban District:	
		Promote sustainable agricultural practices through	
		subsidies and extension services.	
		• Invest in research and development for climate-resilient	
		crop varieties.	
		Implement water conservation and rainwater harvesting	
		initiatives.	
		Integrate agroforestry into land-use planning to enhance	
		soil fertility.	
		• Establish early warning systems for drought and provide	
		timely support to affected communities.	
		Livestock Sector Impacts:	
		Develop and enforce sustainable grazing management	
		policies	
		• Implement programs to improve livestock breeds and	
		health	
		• Provide incentives for sustainable land use practices in	
		pastoral systems	
		• Strengthen veterinary services to prevent and control	
		diseases	

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		Support community-based initiatives for sustainable	
		livestock management	
		Soil Quality (Soil Erosion):	
		• Enforce regulations against overgrazing and	
		deforestation	
		Promote sustainable land management practices	
		through education and outreach	
		Incentivize the use of erosion control measures, such as	
		terracing and cover cropping	
		Implement land tenure and land use planning reforms	
		Invasive Species and Woody Encroachment:	
		Develop and implement invasive species management	
		plans	
		 Support community-led efforts for biomass harvesting and selective clearing 	
		Invest in rewilding initiatives in open ecosystems	
		• Implement regulations on chemical removal of	
		undesirable encroached woody species	
		Droughts:	
		• Develop and implement proactive drought risk	
		mitigation strategies	
		Establish community-based early warning systems	

Impact	Action required to mitigation	Responsible Agency or Department
	Invest in sustainable irrigation infrastructure	
	Promote drought-resistant crop varieties	
	• Support policies that enhance water use efficiency in	
	agriculture and residential areas	
	Grassland and Savanna Degradation, Rangeland	
	Degradation:	
	Implement prescribed fire and tree cutting programs	
	Support grassland restoration initiatives	
	Encourage sustainable grazing practices through policy	
	and education	
	Develop and implement programs for ecological	
	restoration of degraded lands	
	Decrease in Grand Sail Fastility Saliniastion and	
	Groundwater Depletion:	
	Promote sustainable agricultural practices to enhance	
	soil fertility	
	• Implement rotational corralling of livestock to maximize	
	nutrient retrieval	
	Invest in research for drought-resistant and salt-tolerant	
	crop varieties	
	• Enforce regulations on groundwater use to prevent	
	depletion	
	Impact	Impact Action required to mitigation Invest in sustainable irrigation infrastructure Promote drought-resistant crop varieties Support policies that enhance water use efficiency in agriculture and residential areas Grassland and Savanna Degradation, Rangeland Degradation: Implement prescribed fire and tree cutting programs Support grassland restoration initiatives Encourage sustainable grazing practices through policy and education Develop and implement programs for ecological restoration of degraded lands Decrease in Cropland Soil Fertility, Salinisation, and Groundwater Depletion: Promote sustainable agricultural practices to enhance soil fertility Implement retrieval Implement rotational corraling of livestock to maximize nutrient retrieval Encourage regulations on groundwater use to prevent depletion Enforce regulations on groundwater use to prevent depletion

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		• Support farmers in adopting adaptive practices for coping with salinity	
		Sand and Dust Storms:	
		 Implement land-use planning regulations to prevent soil degradation Promote the use of windbreaks and cover crops to reduce wind erosion Establish monitoring and early warning systems for sand and dust storms Support international initiatives for cross-border 	
		cooperation in dust and sandstorm management	
		Poor Livestock Productivity and Dairy/Meat Quality:	
		 Support seasonal-regional herd mobility programs Establish infrastructure for communal access, water points, and grazing reserves Promote sustainable livestock policies and feed subsidies Invest in education and health services for pastoral communities 	
3	Climate change impacts on newly liberated areas	Climate Change Mitigation and Adaptation Strategy:	Hirshabelle-Ministry of Environment

5 Environmental Management Plan

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		 Develop and implement a comprehensive climate change mitigation and adaptation strategy tailored to the specific challenges of newly liberated areas Establish a dedicated government agency or task force responsible for coordinating climate action and integrating it into all relevant sectors 	
		Water Resources Management:	
		 Implement sustainable water management practices to ensure efficient use and conservation of water resources Invest in water infrastructure development, such as dams, reservoirs, and irrigation systems, to mitigate the impacts of changing precipitation patterns Agricultural Resilience: 	
		 Promote climate-smart agricultural practices, including the use of drought-resistant crops and sustainable farming techniques Provide farmers with training, resources, and financial incentives to adapt to changing growing conditions Early Warning Systems: 	

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		 Develop and strengthen early warning systems for extreme weather events, including hurricanes, floods, and heatwaves Implement community-based early warning systems to ensure timely evacuation and preparedness 	
		Infrastructure Planning and Resilience:	
		 Integrate climate resilience considerations into infrastructure planning and development Upgrade and reinforce critical infrastructure, such as roads, bridges, and utilities, to withstand extreme weather events and sea level rise 	
		Ecosystem Protection and Restoration:	
		 Implement policies to protect and restore ecosystems, including afforestation and reforestation programs Establish and enforce regulations to prevent habitat destruction and promote biodiversity conservation 	
		Public Health Interventions:	
		 Develop and implement public health strategies to address the changing patterns of vector-borne diseases Enhance healthcare infrastructure and services, particularly in vulnerable and newly liberated areas 	

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		Community Engagement and Education:	
		 Conduct awareness campaigns to educate communities about climate change impacts and adaptation strategies Encourage community participation in decision-making processes related to climate resilience and disaster risk reduction 	
		Migration and Displacement Planning:	
		 Develop policies to manage and support populations vulnerable to climate-induced migration and displacement Establish mechanisms for planned and organized relocation when necessary, considering social, economic, and cultural aspects 	
		 Address potential conflicts arising from resource scarcity by promoting equitable access to water, land, and food resources Support community-based conflict resolution mechanisms and promote dialogue among stakeholders 	

Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
		 International Collaboration: Engage in regional and international collaborations to share knowledge, resources, and best practices for climate change adaptation Advocate for global efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change 	
4	Infrastructure impact on newly built or rehabilitated areas	 Conflict triggers are often related to power and access to resources. During the reconstruction phase, efforts to mitigate underlying tensions can unintentionally make them worse. The restoration of physical infrastructure is crucial for showing a reduction in tensions. However, if control over a key service remains with one faction, tensions may persist. On the other hand, involving all parties in the reconstruction process could foster goodwill. Infrastructure reconstruction work is at risk from poor security and renewed conflict due to its need for specialized materials and predictable locations, making it important to monitor community tensions carefully. 	Hirshabelle-Ministry of Environment
Sr. No.	Impact	Action required to mitigation	Responsible Agency or Department
---------	--------------------------------------	---	-------------------------------------
5	Socioeconomic and Livelihood Impacts	 Utilizing local resilience-based strategies Promoting peace building and reconciliation Counteracting state weakness through livelihoods support Working with legitimate local actors Building economic and market linkages Addressing shifts in gender roles & relations Providing livelihood support to displace population Creating flexibility in planning and budgeting 	Hirshabelle-Ministry of Environment

5.4 INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTATION OF EMP

The successful implementation of the EMP as a guide in the preparation of appropriate management plan depends on the commitment of the concerned institutions in carrying out their respective roles, as well as the capacity of these units to do the job effectively. An institutional arrangement had been proposed that clearly states the roles of these stakeholders though out the Project cycle. Also, the capacity building activities have been devised to ensure that the units/ organization assigned to perform the relevant tasks are capable of doing so.

Institutional Arrangements

One of the tasks prescribed in the EMP is to identify the appropriate individuals/entities to be involved in the development activities, and define their respective roles and responsibility.

5.5 POLICY RECOMMENDATIONS

The policy recommendations aim to create a holistic and sustainable framework for addressing environmental concerns specially drought and promoting sustainable development in Mataban District. Implementation should involve collaboration between government agencies, local communities, non-governmental organizations, and international partners. Regular monitoring and adaptation of strategies based on changing conditions are essential for long-term success.

5.6 CAPACITY BUILDING

In order to achieve the goal of the EMP, there is a need for capacity building and strengthening of relevant competencies on environmental and social management at both regional and States levels. It involves organizational development, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and other concerned sectors (public, private and community). The environmental and social management requirements and provisions outlined in this EMP, competencies and capacity building will be required. While the training needs of the Regional local government and its instrumentalities are important, however, the it can only cover the capacity-building programs for those concerned government

institutions that have direct participation in its activities as defined in the Institutional Arrangements.

5.7 INTEGRATION WITH DEVELOPMENT PLANS

Integration with existing development plans is crucial for the success and sustainability of policies aimed at addressing drought and promoting development in Mataban District. The key considerations for integrating these recommendations with broader development plans:

Alignment with Local Development Goals: Ensure that the proposed policies align with the specific development goals outlined in Mataban District's local development plans.

Incorporation into Sectoral Plans: Integrate drought mitigation and development initiatives into relevant sectoral plans, including water resource management, agriculture, infrastructure, health, and education. This ensures a coordinated and cross-cutting approach to address various aspects of community development.

Stakeholder Engagement and Consultation: Conduct consultations with local communities, government agencies, NGOs, and other stakeholders during the development and review of plans. This ensures that the proposed policies reflect the needs and priorities of the local population.

Budgetary Allocation: Allocate sufficient budgetary resources for the implementation of mitigation and development projects within the broader financial framework of the district's development plans. This includes funding for infrastructure, capacity building, and community-based initiatives.

Monitoring and Evaluation Mechanisms:

Integrate robust monitoring and evaluation mechanisms into the existing development plans to track the progress of drought mitigation and development initiatives. Regular assessments help identify successes, challenges, and areas that require adjustment.

Policy Coherence:

Ensure coherence with existing national and regional policies related to water resource management, climate resilience, and sustainable development. This

coherence facilitates a more comprehensive and interconnected approach to addressing development challenges.

Mainstreaming Climate Change Adaptation:

Integrate climate change adaptation strategies into development plans, considering the increasing vulnerability of regions like Mataban District to climatic uncertainties. This includes building resilient infrastructure and promoting sustainable practices.

Capacity Building for Local Authorities:

Strengthen the capacity of local authorities to effectively integrate and implement drought mitigation and development policies within their administrative structures. This includes training on planning, implementation, and monitoring.

Flexible Planning for Adaptability:

Recognize the dynamic nature of drought and climate conditions. Build flexibility into the development plans to allow for adaptive management, enabling adjustments based on changing circumstances and emerging challenges.

Documentation and Reporting:

Document the integration process, including policy changes, community engagements, and project outcomes. Regularly report progress to stakeholders, fostering transparency and accountability in the implementation of development plans.

6 COMMUNITY ENGAGEMENT AND CONSULTATION

6.1 GENERAL

Public consultation is a systematic process, which provides an opportunity for planners, citizens, managers and selected representatives to share their experience, knowledge and concerns and perceptions about any proposed development. The objectives of the public consultation for the proposed Project are to:

Share information with the stakeholders and their expected impact on the socio-economic environment of the Study Area.

Understand the stakeholder's concerns regarding the various aspects of the Project, including the existing condition of the Study Area, upgrade requirements, and the likely impacts of the construction related activities and operation of the Project.

6.2 IDENTIFICATION OF STAKEHOLDERS

First setup for the stakeholder consultation is the identification of stakeholders. United Nations Environment Programme (UNEP) is the Project Proponent. The project has both primary as well as secondary stakeholders. As per definition, stakeholder is an entity which is concerned with the proposed project in any way. Direct stakeholders are those entities which are directly concerned with the project.

The primary stakeholders include in the project are the affected persons according to the conditions, Environmental Protection Authority and District level concerned departments whereas the secondary stakeholders include the public and private agencies involved in the implementation of the project.

Comprehensive consultations focus group discussions were held. In addition, a few consultations were also held in the form of detailed interviews of individuals including men and women of the study area. The different stakeholders which are identified for the project includes Governmet Representatives, Landowners, Local Users of Natural Resources Chief of Police (COP), Chairman of Local Bodies, Chairman of Youth, Chairman of Women Organization, Herdsman, Farmers,

Animals Husbandry Department Representative and Chief of High Court (the response are shown in annexure-03).

6.3 CONSULTATION WITH THE AFFECTED AND WIDER COMMUNITY

The involvement of local communities in the assessment process ensures a more holistic, culturally sensitive, and sustainable approach to environmental management. It fosters collaboration, empowers communities, and helps create solutions that are both effective and socially accepted. Findings of the consultations with affected & wider community are summarized in Error! R eference source not found..

Table 6-1, Views & Concerns of the Affected & Wider Community

Sr. No.	Date	Location	Summary/ Key Issues	Pictorial Evidences
1.	13/12/23	Takaraale	Dispute between two clans	
2.	13/12/23	Takaraale	People do not have basic needs like water	
3.	13/12/23	Takaraale	• There is a limited supply of potable water, and the taste is sour.	
4.	13/12/23	Takaraale	• There is a lack of water, and the conflict between the two clancreates insecurity in our region.	
5.	13/12/23	Takaraale	No water wells, less drinking water supplyVery few educational facilities	
6.	14/12/23	Harqabobe	People fight to attain water.	
7.	14/12/23	Harqabobe	• Requirement of additional resources to meet the needs of the expanding populace.	
8.	14/12/23	Harqabobe	 Lack of security Lack of schools and health facilities 	

9.	14/12/23	Harqabobe	• The government, private sector, and international community need to pay attention to our welfare.	
10.	. 14/12/23	Harqabobe	• Desire Peace and conflict between two clans to end soon.	
11.	14/12/23	Harqabobe	Living below the poverty line	
12.	. 14/12/23	Harqabobe	 Lack of water resources The conflict needs to be resolved soon as it is causing violence in the region 	
13.	. 14/12/23	Harqabobe	 Lack of security in residential areas poses a significant concern for homeowners Lack of better educational facilities 	
14.	. 14/12/23	Harqabobe	 There is a lack of water, education, and health facilities The region lacks peace due to conflict 	
15.	. 14/12/23	Harqabobe	• More than 20 years of conflict has destroyed peace in the region	

AN POINT

16.	14/12/23	Harqabobe	• Government and private funding are vital for improving living standards	
17.	16/12/23	Bergadiid	 Lack of basic needs of life, such as water wells and roads, in our village which is a foremost demand and also a fundamental right 	<image/>

ANNEXURES

Baseline Environment Questionnaire

BASELINES CONDITIONS AND IMPACTS

1. TYPE OF AREA

- Arid
- Semi-arid
- Populated
- Densely populated
- Any other ______specify)

2. PHYSICAL ENVIRONMENT

a. geological conditions

- Is the origin of rocks a) Sedimentary b) Igneous c) Metamorphic
- Any other ______ (specify)

b. seismology

•	Is there any record of earthqua	Yes	No		
•	Presence of faults/fractures	Yes	No		

- Any other details ______ (specify)
- c. topography & soils
 - Are the soils mixtures of sand /silt/clay/gravel/clayey silt______
 - Any other ______ (specify)

d. Climate

Temperature (°C) (Min - Max)		Winds	Relative Winds humidity	Precipitation	Wind speed
Summer	Winter				-

Does the project area has any previous records of flooding?

e. Surface and Ground water	Yes	No
	Yes	No

Г

Page 1 of 4

- Is groundwater potable
- If surface water available, what is its quality? _______

f.Air Quality

- Is the area visually pollution free Yes No
- Is the source of pollution traffic (cars, trucks, etc.) Or any other
 (specify)

Yes

Yes

Yes

No

No

No

• Is the project area is highly; a) populated b) commercial

g.Liquid effluents

- Are there any liquid effluents due to industries/household
 - If any other reason _____(specify)
 - Is there exists proper drainage system?
- Is there any effluent treatment system exists?
- · How much quantity of wastewater generated per day

h. Solid Waste

- Is solid waste management of the area poor/nominal/good_
- What type of solid waste management system exists?
- What is approximate quantity of solid waste generated from the project area/study area per day?
- What type of solid waste generated from the project area?
- Is there any hospital waste generated in the project/study area

Yes Page 2 of 4 No

• If yes, what are the management/disposal system

i. Noise

- Any sources of noise like traffic/industry/commercial activities or other
 (specify)
- Was any instrumental monitoring carried out to observe the noise levels?
- If yes, provide details

j. Buffer Zone

• Are there any protected areas/park in close vicinity of the project area/study area ______

i). ECOLOGICAL ENVIRONMENT

a. Flora & Fauna

- Aquatic ecosystems (if exists)
- Prevailing non fruit trees
- Prevailing fruit trees_____
- Is there presence of any endangered or rare species of plants
- Is there presence of any endangered or rare species of animals
- Is there any removal of trees involved
- Is the project area falls under route of migratory birds?

No

Yes

• Common wild animals in study/project area

Page 3 of 4

• Is there any threaten national park, reserved forest or wildlife sanctuary in

close vicinity of the project route.

Yes

- Common birds species in study/project area
- Anything special

Page 4 of 4

Baseline Socio-Economic Questionnaire

SOCIO-ECONOMIC ENVIRONMENT

i). Human & Economic Development

a. Industries

- Does the project area has any industries big / small ______
- Are there some home industries in the area

b. Infrastructure facilities

Infrastructure facilities available to the people:

Facility	Yes	No
Roads		
Sanitation		
Water Supply		
Heath facilities		
Educational facilities		
If any other (Specify)		

c. Mode of Transportation

• Do the people of the area use conservative/modern modes of transportation:

 0		•	0 3
5	nec	11	V)
 -	pee		Ly /

• Is there any special trade of transportation in project area, etc.

e. Power Sources & Transmission

Yes	No	
		-

- Is there any grid station/ sub-station present in the project area?
- Is electric supply available to every commercial/

Yes	?	No	
Yes		No	

Do people use other sources of power like generators?

Yes	No

- ii). Quality of Life Values/Socioeconomic Values
- a. Income

Page 1 of 5

• Are most of people living below/above pov	erty line?
• Does the population comprises of cemented	houses /slums ?
• Do people have basic needs of life in their l	nouses?
Do people are well off	· · · · · · · · · · · · · · · · · · ·
b. Employment and Occupation	
• What are major sources of employment	
c. Education	
• Is literacy level of the area low/medium/hig	gh
d. Religion	
• Is the religion of majority population Islam	
Any other	(Specify)
e. Gender Ratio	
Is population of women more than men	
Is population of men more than women	
• Ratio of population of men to population of	f women in the area (%)
1. Men2. Women	
• Population density of the area is low/mediu	m/high

f. Role of Women

• Either women of the area involve in

Activity	Yes	No
Household activities		
Business Activities		
Private/Government service		

Page 2 of 5

Electoral activities	
Any other (specify)	

g. Public Health

- Are sanitation, water supply facilities available ______
- Any hospitals, dispensaries available in the area ______
- Any social health workers available _____
- Any particular diseases reported in the area______

h. Recreational Resources & Development

- Parks/Swings get together areas / festivals arrangements ______
- If any other ______(Specify)

i. Aesthetic Values

•

- Any sources of visual pollution _
- Sources which add to the visual beauty ______
 - If any other _____

i. Archeological or Historical Treasures

• Does the area any archeological or historical monuments

		Yes	No
•	If yes,		(Specify)

j. Cultural Values

- Is the culture of area modernized/conservative or a blend of both
- Is the community agree to absorb outsider visitors

Yes No

(Specify)

Page 3 of 5

0 Annexures

k. Indigenous People

- Is there any group of indigenous people in project area?
- Is there relocation of such a group is involved.
- Anything special

4. STATUS OF LAND

- Does the area fall under government proprietorship
- Is it a private land
- The extent of land which is to be acquired (if any)

	2
Yes	No
Yes	No

No

No

Yes

Yes

5. EXISTING STRUCTURES

Sr.No	Category	Nos.
1	Residences	
2	Commercial	
3	Communal property	
4	Religious building	
5	Any other	

6. Respondent's Views about Project

- **6.1** In your opinion, how will you be affected by construction/operation of this project?
- 6.2 Is this project beneficial for the community?



6.3 Will you feel any disturbance from noise generated by the operation of ropeway system?





6.4 Do you think it will disturb your privacy?

Yes	No
-----	----

6.5 Would you like to be associated with the project as a worker?

Yes	No
-----	----

7. General Observations of Interviewer

Name & Signature of Interviewer: _____ Date: _____

Page 5 of 5