



ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

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Project/Programme Category: Regular Project

Title of Project/Programme: **Restoration of Lake Babati for Enhanced Climate Change Adaptation in Babati District**

Type of Implementing Entity: National Implementing Entity (NIE)

Implementing Entity: **National Environment Management Council (NEMC)**

Executing Entity/ies: **Climate Action Network Tanzania (CAN Tanzania)/Babati Town Council**

Amount of Financing Requested: **US\$ 4,000,0864,000,200**

1.0 Project Background and Context

The Babati District (BD) is one of 5 districts of Manyara region which is located in northern Tanzania, East Africa. The district comprises of a district council and a town council namely Babati District Council (BDC) and Babati Town Council (BTC) respectively. The BTC serves the urban segment of the district while the BDC serves the rural segment which is the largest. These two administrative authorities are key for development endeavors of the district with a population 116,458 in BTC and 390,737¹ in BDC.

The district land surface has a number of undulating hills and mountains as part of the East African Rift Valley Highlands. The large part of the Babati district is in a semi-arid region that receives an average rainfall between 450mm (in lowlands) and 1,200mm (in highlands) per year, with two rainy seasons. The short rain season is increasingly becoming unreliable and begins in the third to fourth week of October and ends in December while the long rainy season starts sometimes in March or April with increasing dry spell incidences and ends in May. The soils are of volcanic origin and range from sand loam to clay alluvial soils.

Available scientific literature predicts average increase in temperature associated with prolonged droughts and unpredictable rainfalls that affect the district and community livelihood activities. While rainfall predictions have remained less certain and the distributions is very much uneven, low capacity of the communities to adapt to the impacts especially prolonged droughts have increased levels of poverty and vulnerabilities.

Some interventions to address the climate-induced challenges (such as crop failure, resource conflicts, encroachments, water scarcity, food insecurity and economic shocks) facing the communities and their livelihood activities in BD are of paramount importance for enhancing climate resilience. In particular, the semi-arid characteristic of the district coupled with prolonged dry spells and erratic rainfall pattern exacerbate the vulnerability of community livelihoods to climate risks. Lake Babati including its shoreline appears to support various livelihood activities during dry spells but now its capacity to do so is increasingly becoming low due to intensive and prolonged

¹ National Bureau of Statistics 2018

dry spells associated with high level of human demands leading to its degradation. Therefore, to enhance climate change adaptation of communities and their associated livelihoods the lake has to be sustainably managed.

1.1 Socio-economic context

The main livelihood activities of BD are agriculture, livestock keeping and fisheries. However, these livelihoods are impacted by climate variability and ecosystem degradation. Rainfed agriculture which is mainly practiced upland but experiencing a low yield due to prolonged dry spells and rainfall variability while soil is becoming unproductive due to high level of erosion. In most cases soil nutrients are washed away to the lowlands. This situation has compelled people to move in the lowlands along the shore of Lake Babati and engage in alternative livelihoods after the failure of rainfed agriculture uplands. Such alternative livelihood activities solely depend on the already drought affected lake needed to support irrigation agriculture, fishing and brick making. While irrigation agriculture ensures food availability throughout the year, it is conducted not only at the lakeshore but also is unsustainably done thus contributing to encroachments and siltation of the lake. The prolonged dry spells have had impact on availability of pasture and water for livestock thus forcing the pastoralists to flock to the Lake for grazing and watering their cattle. Brick making which employs a significant number of men and youth is also an alternative to failed agriculture uplands, whereby the sites nearby the lake are used. In particular, the brick makers excavate along the lake buffer area to obtain the clay soil for making bricks.

It should be always remembered that, lake Babati is the main source of water for dry season agriculture whereby farms are irrigated using the water from the lake. This enables the households to have a continued supply of food and income from sales of crop harvests. Still, the prolonged dry spells have had impact on availability of farming land, pasture and water for livestock thus forcing the pastoralists to flock to LB for grazing and watering their cattle. Important also to note that, in some parts of the lake, farmers are using diesel generators to pump water and hence polluting both the environment and water itself. This situation has increased resource degradation and related conflicts. With the increased unpredictability of rainfall due to climatic variation and the increased degradation of the lake, the vulnerability of the communities in both BTC and BDC is likely to worsen thus threatening their well-being.

Moreover, the fact that most of the farming activities are already frustrated by climate variabilities and hence conducted in close vicinity of the lake, poses a big risk in case of flood events and resource management. While the agricultural activities along the shore of the lake are conducted at the detriment of the lake ecosystem, they are also a source of resource-human conflicts. The hippos which inhabit the lake are active at night, thus as they graze they find their way to the farmlands located in vicinity of the lake hence destroying crops. This is attributed to the fact that the lake buffer area has been significantly encroached making it difficult for hippos to find pastures. The available pastures are also grazed by the livestock from the periphery of Babati Town Council and rural areas of Babati District Council. The pastoralists flock to the lake for grazing and watering their cattle especially during the dry season when pastures become scarce elsewhere. Illegal fishing which is largely practiced at night is another source of hippo-human conflicts. Male hippos attack fishermen when they encounter them at night. The male hippos are very aggressive due to their territorial behavior whereby they tend to defend their territory in vicinity to water. There have been a number of reported cases on fishermen killings caused by hippos at night. If we are to build a sustainable ecosystem and community, lake restoration and building a climate resilient society is urgent and paramount.



Figure 1: Farmlands in vicinity of the lake shore



Figure 2: Cattle grazing and watering in the lake



Figure 3: Destructive brick making in the lake buffer zone

1.2 Development context

The Babati district considers Lake Babati and its neighborhoods as one of tourist attractions and opportunity for supporting adaptation options. In particular, canoeing and site viewing are the potential tourist activities.

According to Manyara region investment guide of 2018, lake Babati is highlighted as one of key investment areas particularly in the tourism industry. While the lake shore is potentially good for construction of tourist hotels, it is important that the existing policy and legal frameworks are observed. The lake also can support livelihood diversifications options through supporting sustainable fishing and farming.

If successfully restored and well managed, lake Babati can potentially contribute to the revenues of BTC through various sources. Fisheries can be the largest income earner of the town council if well regulated. Besides artisanal finishing done by local communities, there are many commercial fishers from other parts of Tanzania who seek fishing licenses for undertaking fishing activities in lake Babati. Currently, owing to high population of water weeds; waterways are blocked. Therefore, tourist activities inside the lake and other activities that would earn revenues for the BTC cannot be conducted. Therefore, the removal of water weeds will not only contribute to ecosystem restoration efforts, but also facilitate waterborne economic activities such as canoeing and other water sports.

Owing to its relative favourable agricultural conditions, the Lake Babati basin attracts diverse groups of people from various parts of Tanzania who come and settle in this area. For example, it had 132,000 residents by the year 2016, with 40% of them in the economically active age group of between 15 and 44 years, and an average household size of 5.27². The Water supply system does not adequately meet the water requirements of each water user leading to competition for water between sectors such as agriculture and domestic use. This is further exacerbated by decrease

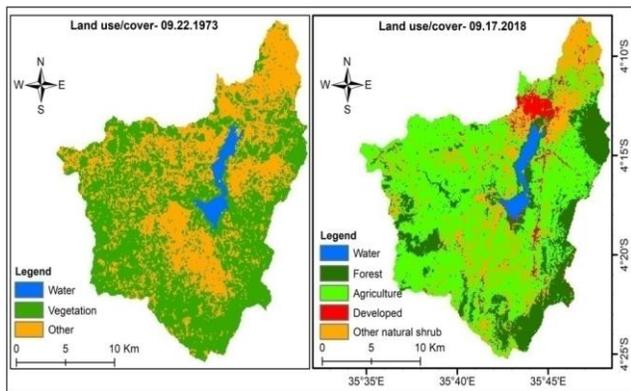
²Esri Living Atlas 2016.

of water in the lake leading to high cost of water from BAWASA. As a result the majority of residents in BTC fetch water directly from lake Babati.

1.3 Environmental context

Babati district which covers 12 km² is endowed with various natural resources including Lake Babati which is within the East African Rift valley in Manyara region. However, these resources are facing climate change and degradation challenges. Lake Babati fresh water is located in semi-arid environment with relatively shallow but highly fluctuating water levels. The lake is very crucial for the livelihoods of adjacent communities employing about 1000 artisanal fishers³. Furthermore, a large proportion of women and girls are engaged in selling of fried fish from the lake. Besides fishing, some men and youth are involved in brick making business whereby the sites nearby the lake are used. In particular, the brick makers excavate along the lake buffer area to obtain the clay soil for making bricks. Generally, the lake is main source of water for irrigation farming, bricks making, livestock and many more.

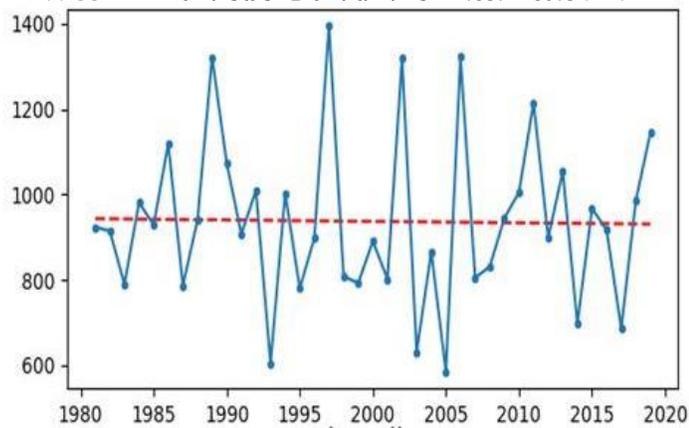
The lake has since 1964 experienced environmental stresses which emanate mainly from climate and land use change. Several studies on flooding and drying of the lake has attributed the two events to climate change events and changes in land cover. For example a study in 1995 concluded that “an analysis of rainfall trends in the region, a water-balance model simulating lake levels under both forested and deforested-degraded catchment conditions, and a series of interviews with senior citizens, all indicate that changes in climate and the landscape, induced both floods and droughts. The lake has limited specific in-depth investigations and studies on how climate change has influenced recent flood and water scarcity events^{3,4}. A recent study on land use/land cover and climate change in 2020 revealed substantial urban development as the town of Babati expanded, and also showed the intensification of crop cultivation throughout Lake Babati Basin during the period between 1973 and 2018 (Figure 3). A disproportionally large area of land which was covered by forests in 1973 has been converted into farmlands and urban development activities as of 2018. Furthermore, owing to siltation and drought the lake depth has reduced from 8m to 4m between 2000 and 2018⁵.



³ Interview with Member of Parliament for Babati Urban Constituency, July 2021

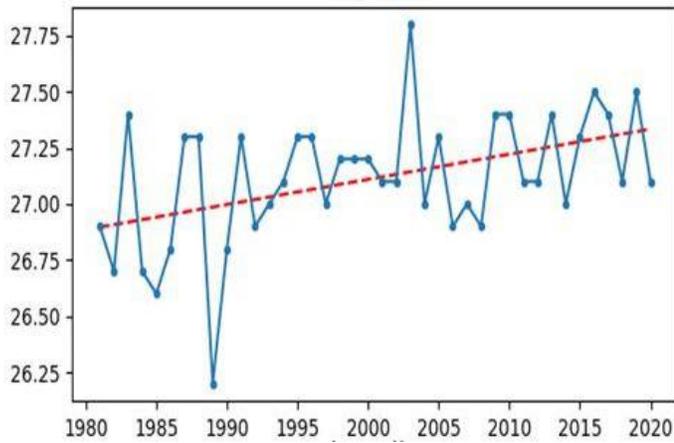
Figure 4: Land use /land cover change in Lake Babati Catchment between 1973 and 2018 ⁶

Like many other parts in Tanzania, Babati district has been experiencing increasing frequency and severity of extreme climate events including droughts, strong winds and higher temperature⁷⁸. The detailed analysis and description of rainfall and temperature trends is presented in Figure 43. As shown, the variability of rainfall is strong, and under enhanced global warming, the observed variability is projected to increase. Figure 45(a) depicts a slight decreasing trend in mean annual rainfall, while figures 5(b) and 5(c) depicts trend in maximum and minimum temperature respectively. In general trend in both maximum and minimum temperature is statistically significant, with minimum temperature increasing much faster than maximum temperature. This suggests that given prevailing environmentally degradation of Lake Babati and the increasing trend of climate variability, the people of Babati are already experiencing climate related challenges and are posed to experience adverse climate impacts in the near future. The erratic nature of the rainfall pattern makes it impossible for farmers to plan for their agricultural produce hence remaining with an option of irrigation farming along the Lake shore and fishing. Yet the Lake is under threat of disappearance owing to destructive activities and climate change. Thus, the combined effects of climate variability and land degradation reduce the resilience of communities thus making them impoverished. On the other hand, in-depth discussions with both key informants and groups have indicated that, the use of climate information and related services is still insignificant limiting options to undertake informed livelihood operations

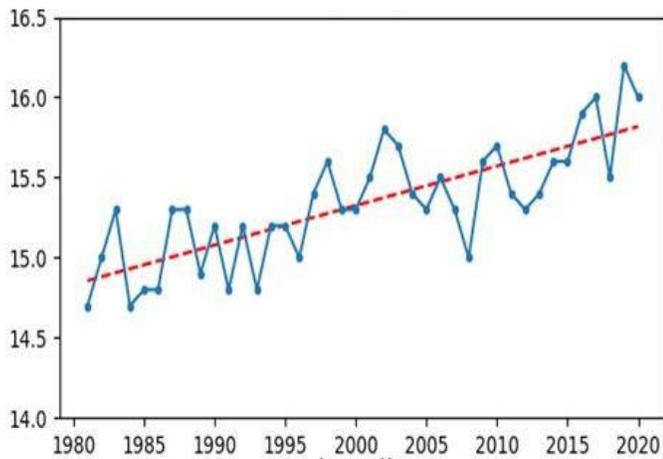


⁷ Chang'a, Ladislaus Benedict, Japheth, L. P., Kijazi, A. L., Zobanya, E. H., Muhoma, L. F., Mliwa, M. A., & Chobo, J. S. (2021). Trends of Temperature Extreme Indices over Arusha and Kilimanjaro Regions in Tanzania. *Atmospheric and Climate Sciences*, 11(03). <https://doi.org/10.4236/acs.2021.113031>

⁸ Chang'a, Ladislaus B., Kijazi, A. L., Luhunga, P. M., Ng'ongolo, H. K., & Mtongor, H. I. (2017). Spatial and Temporal Analysis of Rainfall and Temperature Extreme Indices in Tanzania. *Atmospheric and Climate Sciences*, 07(04), 525–539. <https://doi.org/10.4236/acs.2017.74038>



(b) Mean annual maximum temperature for Babati district from 1981 to 2018 (°C)



(c) Mean annual minimum temperature for Babati district from 1981 to 2018 (°C)

Figure 5: Climate trend in Babati district from 1981 to 2018⁹

⁹ Tanzania Meteorological Authority, 2021

1.4 Gender context

The available information in Babati district shows that women are more vulnerable to the effects of climate change than men in most villages. Although they constitute a large proportion of population in the district, women are still marginalized. Norms and traditional systems in the communities, expose women to struggle mostly with domestic issues and to keep domestic matters of families going. Also, they are more dependent for their livelihood on sectors sensitive to climate shocks. Above all they face social, economic and political barriers that limit their coping capacity. It has been observed that these roles such as to be charged with the responsibility to secure water, food and fuel for cooking and heating make them to suffer the most whenever climate calamities happen. Ideally, available information on gender-based violence in the district is linked to climate change issues such as water scarcity and food shortage. Water scarcity and continued food crisis in villages of the targeted project sites have also instigated conflict within households, including incidents of abandonment or separation of couples. The proposed project will integrate gender roles and special needs of marginalized groups in various activities/interventions.

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1.5.4 Scope of the project and location of project areas

The project will be implemented in Babati District, particularly in the catchment and neighborhood areas of Lake Babati which spans across both the BTC and BDC. The lake faces on-site and off-site threats which ought to be addressed to foster restoration efforts and build climate change resilience of not only lake adjacent communities but also the economy of Babati district, Manyara region and the country at large. On-site threats include increasing weather events (especially prolonged droughts and floods) unsustainable fishing practices in the lake, agricultural activities, livestock grazing, deforestation and destructive brick making along the lake shore. Such activities are typical in BTC which increases pressures to the lake from its urbanization undertakings. While the town council promotes investment projects with a view of generating revenues, it is imperative that such investments pose no harm to the lake, its entire ecosystem and the livelihoods of lake dependent communities and instead, should strengthen communities and local institutions to address climate change impacts.

Interventions in BTC will involve 4 wards namely **Nangara, Bonga, Singe and Bagara (Figure 7)**. Such wards were selected due to their proximity to the lake, poverty and their climate change related events. Moreover, most of the activities which adversely impact the lake are found in those wards. On the other hand, off-site threats are those emanating from deforestation and unsustainable farming practices upstream leading to soil erosion which contributes to siltation and eutrophication. This results into an outgrowth of water hyacinth, water sedges and other water weeds which block the underwater life and waterways. In particular, the water sedges have engulfed a significant proportion of the lake making movement in the lake by boat impossible (Figure 6). The off-site activities occur partly in some hamlets of Babati town council and a large proportion of rural areas of Babati district council which are upstream of the lake. Interventions in BDC will involved 2 wards namely **Ayasanda and Riroba (Figure 7)** whose communities practice unsustainable agricultural practices leading to soil erosion and low crop yield.



Figure 6: Water hyacinth and water sedges in the lake

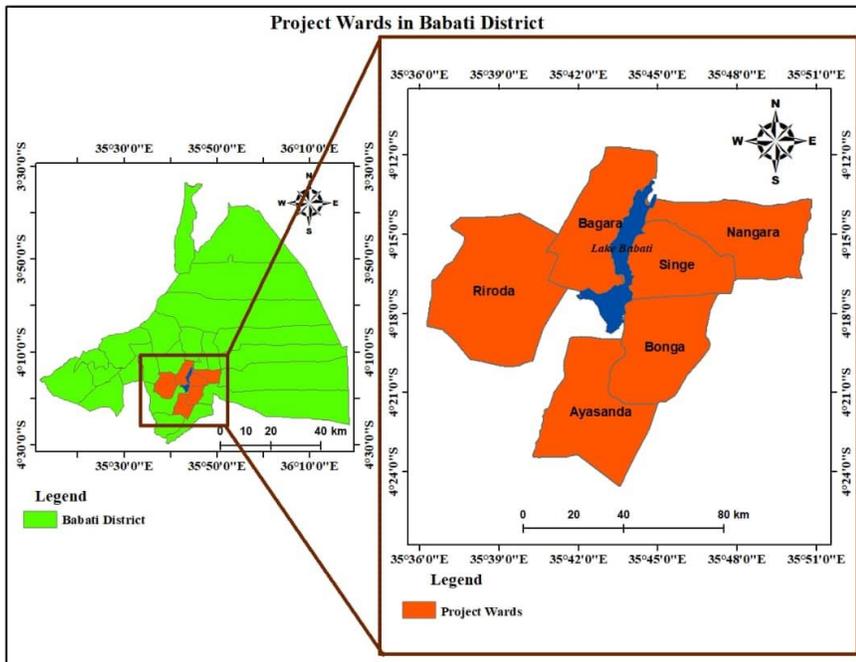


Figure 7: Project Wards in Babati District

1.4 Project objectives

The project will progress activities geared towards restoration of Lake Babati and enabling climate resilient livelihoods in climate impacted and degraded areas of Babati District. Therefore, the project’s main objective is to restore the severely degraded ecosystem of Lake Babati while building the capacity of adjacent communities and institutions in tackling climate change impacts through practical solutions; that have concrete and tangible outputs. Specifically, the project envisages achieving the following:

- (i) Promoting soil erosion control measures upstream of the lake catchment
- (ii) Mechanical control of aquatic weeds in the lake
- (iii) Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts
- (iv) Supporting climate resilient and environment friendly livelihood activities
- (v) Institutional capacity building of BTC, BDC and lake adjacent communities in planning , implementation of lake Babati restoration measures, climate change adaption actions and dissemination of project results and lessons learnt.

1.5 Project Components and Financing:

Table 1: Project components

Project Components	Expected Concrete Outputs	Indicative activities	Expected Outcomes	Amount (US\$)
1.Promoting soil erosion and sediment control measures	1.1 Improved land management with reduced erosion and improved crop yield	1.1.1Undertake a baseline study to establish soil erosion benchmark 1.1.2Train & support lake adjacent communities to implement soil and water conservation techniques 1.1.3 Establishment of demo farms (farmer field schools) 1.1.4 Tree nursery establishment 1.1.5 Supply of seedlings for tree planting for restoration of degraded sites upstream	Improved management of Lake Babati Catchment	957,000

	1.2 Improved water resources management	1.2.1 Earthen dike construction 1.2.2 Construction of charcoal dams 1.2.3 Community awareness raising on integrated water resources management 1.2.4 Establishment of Water Users Association (WUA) for lake Babati 1.2.5 Training of WUA leaders on good governance, financial management, water use conflict management and water resources management		
2. Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages	2.1 Improved water transport and other lake based activities	2.1.1 Removal of the aquatic weeds using harvester machine and other specialized equipment 2.1.2 Collection and sorting of the harvested water weeds	Improved water quality and lake visibility	380,000
	2.2: Improved crop yield and livestock production	2.2.1 Using the harvested weeds to feed livestock 2.2.2 Production of compost manure from weed residues 2.2.3 Training of farmers on compost manure production	Improved food security	
3. Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts	3.1 The population of hippos in the lake kept at acceptable ecological limits	3.1.1 Baseline assessment to estimate the hippo population 3.1.2 Gathering information on the required legal procedures for cropping of hippos 3.1.2 Cropping the recommended number of hippos	Increased crop yield, reduced hippo-human conflicts and improved resilience to climate change impacts	590,000
	3.2 Barbed wire fence constructed in selected areas along the lake buffer zone	3.2.1 Technical design 3.2.2 Procurement of equipment Construction of the fence 3.2.3 Tree planting along the wire fence		
4. Supporting climate resilient and environment friendly livelihood activities	4.1 Drip irrigation systems for horticulture production supported	4.1.1 Site selection and community mobilization to agree on the selected site for the irrigation schemes 4.1.2 Installation of drip irrigation system 4.1.3 Training on horticulture production for selected crops	Increased income, food security and resilience to climate	1,000,000

		<p>4.1.4 Procurement and installment of greenhouses in selected sites</p> <p>4.1.4 Provision of start up capital to farmers groups and support extension services</p> <p>4.1.5 Support business development activities and enabling farmers to access local and international markets</p> <p>4.1.6. Establishment and building capacity of horticulture producers cooperative</p>	change impacts	
	4.2 Water troughs for livestock constructed	<p>4.2.1 Establishment of water supply system from the lake to support watering of livestock</p> <p>4.2.1 Material mobilization</p> <p>4.2.3 Cattle water trough construction</p>		
	4.3 Fish ponds for improved aquaculture constructed	<p>4.3.1 Training on basic aquaculture principles</p> <p>4.3.2 Site selection</p> <p>4.3.3 Fish ponds construction</p> <p>4.3.4 Supply of fingerlings</p> <p>4.3.5 Supply of fish feeds and training on fish feed management</p>		
	4.4 Environment friendly brick making technology supported	<p>4.4.1 Training</p> <p>4.4.2 Site selection</p> <p>4.4.3 Purchase of machines(hydraform machines)</p>		
	4.5 Beekeeping enterprises supported	<p>4.5.1 Training on apiary management</p> <p>4.5.2 Training on honey processing /value addition</p> <p>4.5.3 Support in beehives production</p> <p>4.5.4 Provision of protective gears</p>		
5. Institutional capacity building of Babati Town Council , Babati District Council and lake adjacent communities in planning ,	5. 1 The capacity of Babati Town Council and Babati District Council in facilitating the adoption of climate resilient and environmental friendly	<p>5.1.1 Training Needs Assessment</p> <p>5.1.2 Training of Babati Town Council and Babati District Council officials on climate smart agriculture including mainstreaming of climate change into development plans and budgeting process.</p>	Improved capacity of Babati Town Council, Babati	463,000

implementation of lake Babati restoration measures, climate change adaption actions and dissemination of project results and lessons learnt.	interventions improved	5.1.3 Facilitating district officers to provide technical assistance to farmers on climate smart technologies and practices 5.1.4 Disseminating project results and share lessons learnt through various communication methods and channels including monthly reflection meetings	District Council and communities in planning and implementing adaption actions	
	5.2 Capacity of the community based groups/organization in managing climate resilient and environmental friendly interventions improved	5.2.1 Build capacity of farmers associations on planning for climate related action 5.2.2 Train farmers associations on climate smart agriculture and sustainable and integrated water management practices 5.2.3 Supporting Community Based Trainers (CBT) in training peer farmers 5.2.4 Facilitate farmers exchange visits/study tours		
	5.3 The capacity of Babati Town Council and Babati District Council in law enforcement related to restoration and protection of lake Babati improved	5.3.1 Training on law enforcement 5.3.2 Provision of equipment to support patrols to combat illegal fishing in lake Babati 5.3.3 Purchase 2 field vehicles to facilitate lake catchment protection activities		
	5.4 Knowledge management enhanced	5.4.1 Support research activities 5.4.2 Documentation of project results		
1. Project execution cost				<u>316,383,322,050</u>
2. Total Project cost				<u>3,703,7833,390,00</u> 0
3. Project cycle Management Fee charged by the Implementing Entity				<u>296,303,288,150</u>
4. Amount of financing requested				<u>4,000,0864,000,20</u> 0

Projected Calendar

Milestones	Expected Dates
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Start of Project Implementation	August-October 2022
Mid-term Review	October August 2024
Project Closing	October August 2026
Terminal Evaluation	April February 2027

PART II: PROJECT JUSTIFICATION

PARTII A: Describe the project components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience.

The project is conceptualized and designed in such a manner that it comprises of concrete activities which contributes to lake ecosystem restoration and thus enhancing the climate resilience of communities who solely depend on the lake and nature as an adaptive measure for a climate affected rainfed agriculture. Erratic rainfall pattern and prolonged dry spells limit agricultural and livestock productions upstream of the lake, hence compelling the agro-pastoral communities to shift to the lowlands along the lake shoreline to access water and pastures. While Lake Babati enables the communities to adapt to rainfall shortage condition through irrigation farming, fishing and brick making, such activities are not sustainably done leading to lake ecosystem degradation. Therefore, the proposed project is designed using ecosystem based adaptation concept whereby it is envisaged that the proposed interventions for lake restoration will enhance the capacity of the lake to support sustainable and climate smart livelihood activities hence contributing to climate resilience of the communities. The project will include five (5) components, the details of which are provided below.

Component 1: Promoting Soil erosion and sediment control measures

This component aims at restoration of the degraded LB ecosystem. A significant portion of the lake catchment area is severely affected by prolonged droughts and hence easily degraded. Today many farmers in hilly slopes experience low crop yield due to droughts and soil erosion. These are resulted from deforestation activities and failure to implement soil and water measures in their farmlands. The productive capacity of land has declined due to poor farming practices which affect the soil health and cause unnecessary water loss. Besides poor farming practices which causes soil erosion resulting from reduced water infiltration and increased runoff, the low crop yield is further exacerbated by rainfall shortage. In semi-arid condition of Babati district, it is critical to have interventions that enables the farmers to maximize crop yield from the little rainfall received.

Output 1.1 Improved land management with reduced erosion and improved crop yield

Soil and Water Conservation (SWC) techniques are among the smart agriculture technologies and practices. They enable capturing and water/moisture retention in the soil, reduce evaporation losses and retain nutrients hence supporting plant growth even in drought conditions. For hilly sites of Babati, technologies such as contour farming and terraces will be supported. This will go hand in hand with environmental friendly tree planting in severely deforested sites. The project aims at restoring at least 100 ha of vegetation (30 ha in BTC and 70 ha in BDC). At least 500 farm households will be trained on soil and water conservation methods in BD. The training will be conducted in two phases whereby the first phase will involve training of Community Based Trainers (CBT) who will then train their peers in the second phase. 100 CBTs will be trained whereby 50 will be women and 50 will be men.

The project will also promote the establishment of tree nurseries with a view of not only restoring the degraded forests in the lake catchment area, but also generating income from the sale of seedlings. Seedlings of appropriate tree

species will be supplied. Native tree species will be promoted so as to restore the natural vegetation. While the communities in BD have the right to use natural resources including the lake and forest resources, the government has crafted some laws and regulations that govern resource use. However, due to weak enforcement, destructive use of resources is on the rise. Therefore, this project will build the capacity of local institutions to supervise lake catchment restoration activities and enforce resource use laws and regulations. The project will support 12 tree nursery groups in BTC and 8 groups in BDC. Each group will have at least 20 members consisting of men, women and youth. Furthermore, each group will have a target of producing and supplying at 10,000 seedlings.

The indicative activities to be implemented under this output include the following:

Activities

- Undertaking a baseline study to establish benchmark of degraded land
- Training on soil and water conservation techniques
- Establishment of demo farms
- Training on tree nursery establishment
- Support tree nurseries and supply of seedlings

Output 1.2: Improved water resources management

The project will also foster lake protection efforts downstream with a view of controlling sediment inputs to the lake. To this end, measures such as an earthen dike construction along at least 30m buffer of the lake will be supported. Furthermore, a total of 8 charcoal dams will be constructed in the lowlands of the lake catchment with a view of trapping sediments. Furthermore, the lake outlets will be rehabilitated with concrete walls¹⁰. Both BTC, BDC, communities and other water stakeholders will be involved in catchment conservation activities. The project will employ a water stewardship approach (WSA) whereby a forum for water stakeholders will be established for fostering participatory water resources management. In particular, community engagement in water resources management is one of the principles of integrated water resources management (IWRM) and water resilience approach. Thus the project will support the formation of Water Users Associations (WUAs) with a view of protecting water resources and addressing water use conflicts among various water users. This will ensure equitable water allocation and access to water for all. The WSA will go beyond the traditional WUAs established in Tanzania whereby most of the WUA members are riparian communities mostly smallholder farmers. As the lake falls under the Internal Drainage Basin (IDB) Water Board, the project will work closely with the Basin Water Board staff with a view of addressing the water resource management challenges. The IDB is one of 9 river basins of Tanzania supported under the Water Sector Development programme (2006- 2025). Therefore, the proposed interventions are envisaged to contribute to water sector development programme (WSDP). While WSDP has several interventions in the IDB, presently there are no specific interventions focusing on Lake Babati

The indicative activities to be implemented under this output include the following:

Activities

- Earthen dike construction
- Construction of charcoal dams
- Improvement of the lake outlets
- Community awareness raising on integrated water resources management

¹⁰ The part of the budget allocated for construction of charcoal dams will be used to rehabilitate the lake outlets

- Situational analysis of water resources in the project sites
- Establishment of WUAs
- Facilitating water stakeholders forum for Lake Babati
- Development of Catchment Protection Plan
- Training of WUA leaders on good governance, financial management, water use conflict management and water resources management

Component 2: Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages

Aquatic weeds are those unabated plants which grow and complete their life cycle in water and cause harm to aquatic environment directly and to related eco-environment relatively¹¹. While the aquatic weeds may be useful when their populations are within the acceptable limit, they are harmful for the fish and fisheries when population goes beyond the limit hence requiring necessary interventions. They compete with fish for water, nutrients, light, niche and oxygen and thus reduce the yields. Aquatic weeds pose a big threat to the lake Babati hence affecting the lake biodiversity and economic activities which depend on the lake such as tourism, fishing and patrol operations. The most dominant weeds in the lake are the water sedges which have grown up to the height of 2 m or more.

Output 2.1 Improved water transport and other lake based activities

The project will progress interventions towards removal of aquatic weeds in the lake notably the water sedges. This is envisaged to improve the economic activities in the lake such as fishing and water transport. Furthermore, with the improvement of water transport in the lake, the BTC will be well positioned to successfully enforce the fisheries regulations. The project will support the following activities:

- Hiring of harvester /dredging equipment for removal of the weed
- Harvesting of the weeds
- Collection and sorting of the harvested weeds
- Processing of the weeds into other useful forms

Output 2.2 Improved crop yield and livestock production

Based on the activities in output 2.1, the harvested weeds will be processed to make compost manure which can be used in farmlands and fish ponds. In particular, the interventions on horticulture in component 4 will make use of such manure. The project will also facilitate sorting of water sedges so as to obtain the good quality material that may be used to feed animals. This will be great help to pastoralists who face grazing challenges during the dry period. The following are indicative activities:

- Collection of the harvested material
- Sorting of the harvested materials
- Training of farmers on compost manure making
- Compost manure making
- Supply of the harvested weeds to pastoralists

Component 3: Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts

¹¹ Lancar, L. and Krake, K. (2002). Aquatic Weeds & their Management. International Commission on irrigation and Drainage. p.1- 65

Like other water bodies, Lake Babati's buffer zone ought to be protected as per Tanzanian Environmental Management Act, 2004 which prohibits activities within a 60 m buffer of a water body. However, due to weak enforcement of this law, the buffer area of the lake comprises of various activities which threaten its sustainability. This component will progress interventions towards securing the buffer area with a view of restoring the degraded land and vegetation in the buffer zone. Therefore, a barbed wire fence will be constructed in selected areas along the lake. This is envisaged to improve the buffer area of the lake and thus contributing to its protection, The fence once built will also reduce hippo human conflicts as the hippos will remain inside the fence. Furthermore, the fence will control entry of livestock in the lake.

Output 3.1 The population of hippos in the lake kept at acceptable ecological limits

During field visits to lake adjacent communities, it was frequently reported that hippos in the lake have become a nuisance to the community. This is due to several reported cases of crop destruction and human killings. While the community has a right to complain about hippos, it is important to recognize that hippos need to live their ecologically framed life whereby the need to get out the lake and graze at night. If the lake buffer zone was not disturbed by agricultural fields, hippos wouldn't have destroyed the crops. To address, the project will among others reduce the number of hippos in the lake if need be. The following activities will be implemented:

- Baseline survey to estimate the hippo population
- Liaising with relevant government authorities on procedures for cropping hippos
- If found feasible, cropping of hippos will be done

Output 3.2 Barbed wire fence constructed along the lake buffer zone

Besides controlling the number of hippos as mentioned in 3.1 and controlling the sediment inflow to the lake as stated in component 1, the project will support the construction of a barbed wire fence of about 4 km (circumference) along the lake buffer area. This is ensure that hippos do not cross the fence and no entry to the lake buffer zone by livestock and other activities. There will be special entry gates for only authorized individuals and activities. This will not only contribute to lake protection, but also enable the BTC to control illegal fishing practices and hence increase their revenues from fisheries. The fence will be constructed along the earthen dike to be constructed in component 1. Both the wire fence and earthen dike will be reinforced by trees to be planted. The following activities will be implemented:

- Purchase of materials
- Construction of a barbed wire fence
- Tree planting along the constructed fence

Component 4: Supporting climate resilient and environment friendly livelihood activities

Like other districts of Tanzania, the livelihoods of communities in Babati district depend on climate sensitive resources. Thus it is important that adaptation strategies that target climate resilient livelihoods are promoted. Livelihood integration and diversification is recommended so as to maximize the resilience. This is because reliance on only one means of livelihood may risk increased climate vulnerability if that particular livelihood activity fails. Integration of livelihoods increases cost effectiveness as may generate some co-benefits and synergies. For example, the integration of tree planning, aquaculture and beekeeping on the same farm creates synergies. Environmentally friendly trees protect soils and enhance water infiltration in the soil, poultry farms supplies manure to the fish ponds. The nutrient-rich water from the fish ponds are then used to irrigate horticultural crops adjacent to the fish ponds. Thus this kind of integration enhances productivity while ensuring cost effectiveness. Furthermore, beekeeping may be integrated in the same farm for enhanced pollination and increased income accruing from sale of honey. About 1000 farm households are expected to benefit from the livelihood intervention in both BTC and BDC directly; and 20,000 farm households will benefit indirectly. The adoption of integrated climate

resilient and environment friendly livelihoods is envisaged to improve the household income by at least 20 % by the end of the project. This will eventually contribute to climate resilience of local communities in Babati district.

Output 4.1 Drip irrigation systems for horticulture production supported

Horticulture farming involves growing fruits and vegetables, products highly needed in daily meals. Important to note in agriculture is that farmers normally diversify livelihoods through cultivation of variety of crops such as maize, beans, sunflower, cowpeas, Irish potatoes, onions and carrots. Farmers in Babati district can potentially receive income from the sale of Irish potatoes, onions and carrots. These are the main horticultural crops common across all the in Babati district . Horticulture crops production normally generates higher earnings per unit area and is often an alternative to farmers with small acreage to get adequate income. Horticulture is a fast growing non-traditional crops sub-sector in Tanzania, producing different varieties of fruits, vegetables, flowers and other ornamental plants, spices and herbs crops for domestic and export market. The potential to increase income lies in the fact that horticultural production shifts resources from low value crops to high value ones, and hence increases the returns that small-scale farmers get. Research findings have shown that small-scale farmers who produce fruits and vegetables earn more than those who produce cereals. Sales from other crops are not promising and are sometimes unreliable due to fluctuations in production due to changing rainfall patterns and lack of fertilizers to replenish soil fertility. Many households complained about poor production of non-horticultural crops due to limited land , unreliable rainfall and loss of fertility in their farms. The advantage of horticultural crops is that they are all weather crops though cultivated in wetlands where there is adequate availability of water. Furthermore, they can be produce on small area size provide high returns. Moreover, there is a reliable market. The demand for Irish potatoes, onions and carrots is always high in most urban centres such as Babati, Arusha and Dar es Salaam.

Activities

- Training on horticulture production for selected crops
- Installation of drip irrigation system
- Construction of greenhouses
- Supporting the provision of extension services to farmers
- Support business development activities and enabling farmers to access local markets including tourism market

Output 4.2 Water troughs for livestock constructed

As stated in the previously sections, pastoralists graze their cattle in the buffer zone of the lake and such cattle obtain water directly from the lake. This is not a recommended practice as it has adverse impacts to the lake. Interview with one of pastoralists who bring cattle to the lake indicated that most of pastoralists cannot afford the metered water from BAWASA ,hence their only option is to send their cattle to the lake. Therefore, the project will support the construction of water troughs for easy access of water by livestock. The water will be sourced from the lake through a controlled water supply system. The following activities will be implemented:

- Establishment of water supply system from the lake to support watering of livestock
- Material mobilization
- Cattle water trough construction

Output 4.3 Fish ponds for improved aquaculture constructed

Under the prevailing conditions of overfishing in lake Babati, aquaculture has a huge potential for reducing fishing pressure and contribute to community livelihoods. In the integrated farming settings, freshwater fish production is recommended as the farm will have other activities requiring freshwater. Fishponds will provide nutrients through the nutrient-rich water to be used for cultivation of horticultural crops in the other side of the farm. Moreover, the fishponds will provide source of water for the bees. The project intends to support at least 50 ponds with a view of reducing fishing pressure on Lake Babati. Such fish farmers will be in groups and shall include men, women and youth. The project will support 1,000 direct beneficiaries (fishers-at least 40% women) in groups of 20 involving both BTC and BDC.

The following activities will be conducted

- Training of farmers on production of various aquaculture products
- Designing and construction of fish ponds/floating fish cages for aquaculture production
- Purchase and distribution of fingerlings to farmers
- Supporting the fish farmers with a starting capital for purchasing feeds

Output 4.4 Environment friendly brick making technology supported

The conventional brick making practice involves burning of bricks which makes use of trees as source of energy. Due to high demand of bricks in Babati town, many trees have been cut for burning bricks. Although in some parts of Tanzania, burning of bricks is done using saw dust and rice husks, in Babati town fuelwood is predominantly used. Unlike the conventional system, the hydraform brick making technology is environment friendly. Because the stabilized soil bricks are cured in the sun, the need for fuelwood is eliminated thus protecting forests. The project will support a total of 20 brick making groups (12 in BTC and 8 in BDC) whereby each group will be given a hydraform brick making machine. Therefore, project will progress the following activities:

- Site selection
- Procurement of hydraform machines
- Training of brick making groups

Output 4.5 Beekeeping enterprises supported

Honey production is another livelihood activity with a potential to increase resilience to climate change impacts. Beekeeping is a practical tool for raising the awareness of communities on the importance of forest management and conservation¹². Compared with cultivated crops, beekeeping is not very much affected by climate variations and can provide a more predictable source of income. Besides, the pollination contributes to crop yields. The climate resilience of the beekeeping enterprise lies in the fact that the honey bees can tolerate high temperatures to some extent. The integration of beekeeping in a farm will facilitate crop yield through pollination. The direct beneficiaries will include 10 beekeeping groups in BTC and 20 beekeeping groups in BDC whereby each group will have 20 members including men, women and youth.

Activities

- Training on sustainable beekeeping practices
- Provision of modern beehives and other related items
- Training on honey processing and packaging
- Provision of honey processing equipment such as honey centrifuge machine and many more

¹²Geburu, Y.G., Gebre, A.E and Beyene G. (2016). Review on the role of honey bee in climate change mitigation and poverty alleviation. *Livestock Research for Rural Development* 28 (3)

Component 5: Institutional capacity building of Babati Town Council , Babati District Council and lake adjacent communities in planning , implementation of lake Babati restoration measures, climate change adaption actions and dissemination of project results and lessons learnt.

Institutional capacity building for planning and management of adaptation actions is key for successful interventions. The project will work in an integrated manner on strengthening the capacity of local government authorities , farmers associations and communities regarding promoting the adoption of climate smart agriculture /soil and water conservation practices. Furthermore, the communities will be capacitated to practice climate smart agriculture in their farming activities. The project will also promote learning and knowledge management so that the key messages from the project reach as many people as possible. This will be done by facilitating the district councils and local communities to share and communicate the project results and lesson learnt. Thus, the project will craft mechanisms by which the project results and lessons will be disseminated to the wider community of Babati district, Manyara region and the entire country at large.

Output 5.1 The capacity of Babati Town Council and Babati District Council in facilitating the adoption of climate resilient and environmental friendly interventions improved

The local institutions operating within project areas have a potential to influence transformation of agricultural practices from destructive to conservation practices . This is because of their direct interaction with farmers as well as their planning and decision-making roles in formulating agricultural related policy and legislations. The farmers in the project areas depend solely on rain fed agriculture. Rain fed field crops are amongst the most vulnerable crops to climate change. Several technologies are harnessed to risk coping, including the introduction of adapted selected varieties, supplementary irrigation and irrigation management, integrated pest management, no-till and crop rotation practices and so forth. Thus, it is important to build capacity of the local institutions in promoting the adoption of climate smart agriculture and practices that combat soil erosion. This will result in among others increasing farmers' capacity on how to practice operate under climate uncertainty. This will assist the implementation of climate resilient interventions and practices by farmers and thus amplifying the adaptation mechanism as well as increase farmers' resilience.

At present, both BTC and BDC are not well capacitated to integrate climate change adaption activities in their development plans. Through training and financial support to be provided by this project, the district officers will be capable of planning and implementing adaptation activities. This is envisaged to ensure project sustainability as the districts will be able to implement some of the activities even after project termination. The capacity building activities will involve 5 officers from the region, 5 officers BTC and 5 officers from BDC and 60 leaders from the project hamlets/villages.

Proposed activities:

- Training needs assessment
- Development of training modules
- Training of local government officials in BTC and BDC on climate change, including mainstreaming of climate change into development plans and budgeting process.
- Facilitating district officers to provide technical assistance to farmers on climate smart technologies and practices
- Disseminate project results and share lessons learnt through various communication methods and channels

Output 5.2 Capacity of the community based groups/organization in managing climate resilient and environmental friendly interventions improved

Building capacity of the farmers associations/cooperatives and communities in promoting the adoption of climate resilient practices is very important. Farmers association in project areas are mainly composed of farmers and led by farmers themselves who for a large extent live within the respective project areas. Adoption of soil and water conservation practices largely based upon farmer to- farmer transfers of information, knowledge, experience and resources. Lead farmers who are locally influential farmers within farmers associations are vital to this process. The proposed project will train and capacitate farmers associations and communities at large in promoting the adoption of soil and water conservation practices. The training will be provided to 500 selected members of farmers cooperatives in BTC and 150 selected members in BDC. The trained farmers will be expected to transfer the acquired knowledge to their peers.

Activities:

- Build capacity of farmers associations on planning for climate related action
- Train farmers associations on soil and water conservation management practices
- Supporting Community Based Trainers (CBT) in training peer farmers
- Facilitate farmers exchange visits/study tours

5.3 The capacity of Babati Town Council and Babati District Council in law enforcement related to restoration and protection of Lake Babati improved

Given the prevailing condition of mismanagement of natural resources including illegal fishing and deforestation, in Babati district, particularly in the catchment of lake Babati; it is important that some immediate interventions be effected. Due to blocked waterways owing to aquatic weeds and inadequate human and financial resources, patrol operations to combat illegal fishing in the lake are not conducted. Generally, there is no concrete plan and interventions to enforce environmental protection laws and regulations in BTC. Therefore, the project will progress interventions which will be geared towards supporting the law enforcement with a view of protecting the environmental resources on which the livelihoods of the people depend. Activities to be implemented will include the following:

- Training on enforcement of natural resource-based laws
- Provision of equipment to support patrols to combat illegal fishing in the lake
- Purchase 2 field vehicles to facilitate lake catchment protection activities

5.4 Knowledge management enhanced

The project will promote knowledge management with a view of documenting and dissemination of project results and lesson learnt. Monitoring ~~of the~~ ~~of the~~ impact of project interventions on erosion control, sediment yield, removal of water weeds, lake hydrology and land cover change will be done in collaboration with research and academic institutions with technical capacity to handle data on various aspects of the Lake catchment/ecosystem. In particular, the project will work closely with Sokoine University of Agriculture (SUA) and [Nelson Mandela Institute of Science and Technology \(NEMAIST\)](#) ~~University of Dar es Salaam~~ in monitoring key parameters. The data to be collected will be analysed and published in various professional and academic platforms. Linked to that, projects impacts shall be shared at UNFCCC Conference of Parties (COP) side events.

Activities to be implemented will include the following:

- Support research activities
- Documentation of project results
- Disseminate findings

PATR IIB. Describe how the project provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund. (

All five components of this project are designed to contribute to the environmental, economic, and social benefits especially at the community level whereby local farmers and marginalized groups (incl. women, youth and people with disabilities) will directly benefit through the improved capacity to adapt to the impacts of climate change. This project also complies to the Environmental and Social Policy of the Adaptation Fund whereby relevant risks are clearly identified, and mitigation measures are proposed.

Environmental benefits

The proposed project is expected to have multiple environmental benefits. The adoption of soil and water conservation techniques (which are also climate smart) and other best environmental conservation practices such as tree plantation will improve the natural vegetation cover thereby contributing to proper management of soil and water resources thus reducing siltation of lake Babati. In particular, tree planting will significantly contribute to the restoration of forests which were previously cleared for various reasons. Restoration of lake Babati along its shorelines will reduce sediment inflow to the lake. Furthermore, the construction an earthen dike and barbed wire fence will secure the lake buffer area from invasion by farmers and pastoralists. Removal of aquatic weeds will save lives of many fish which are currently overstressed by the presence of water hyacinth and water sedges hence contributing to their ecological integrity. Furthermore through the support to be provided under institutional capacity building, the lake ecosystem will be closely monitored ensuring that destructive and illegal activities stop. This is envisaged safeguard the environment of the lake and its surroundings thus ensuring environmental sustainability. The project will also contribute to environmental protection through the introduction of environment friendly brick making technology which eliminates use of fuelwood for burning bricks. Furthermore, the water stewardship approach to be employed by the project is envisaged to improve lake governance.

Economic benefits

This project has significant economic contribution to the economy of Babati district and country at large. The project will combat crop damages done by hippos through fencing the lake thus enabling farmers to harvest their crops and earn some income. With the drip irrigation system in place and greenhouse units over 1000 farm households are envisaged to produce more crops which will not only increase household food security but also income. The income of beneficiary households is expected to increase by at least 20% through implementing climate resilient and environment friendly livelihood strategies as explained in component 4 of the project. The construction of charcoal dams will reduce siltation of the lake hence enabling lake based economic activities to continue smoothly. The mechanical control of aquatic weeds will increase the fish population thus improving the fisheries sector which employs many lake adjacent communities.

The activities to be implemented under components 1 – 4 will transform the economic status of vulnerable communities ~~_(especially women)~~ from resource-poor and vulnerable to resource-rich and resilient to climate shocks. In particular, the project will empower the economic status of vulnerable men, women, youth, people with disabilities and the elderly. Component 1 contributes to reduction of lake siltation and increase of forest cover thus improving water quality and quantity in the lake. This is envisaged to benefit all gender groups through availability of water and fish. Increased availability of fish will enable more women to engage in the fish value chain and thus building their resilience to climate shocks. Component 3 reduces hippo-human conflicts by construction of wire fence which

will be integrated with trees. This will reduce crop damages thus improving the crop yield and income from sale of surplus crops thus benefitting households. Component 4 comprises of 4 livelihood activities which are envisaged to transform the lives of men, women, youth, people with disabilities and the elderly. In particular, the implementation of livelihood based enterprises such as aquaculture, cultivation of high value horticultural crops and beekeeping offers many economic benefits.

Table 2: Projected annual average income from proposed livelihood activities (US \$)

Livelihood activities	Project Component	Project time frame				
		Baseline	2022/2023	2023/2024	2024/2025	2025/2026
Environment friendly brick making	4	0	4000	8000	10,000	12,000
Horticulture		2500	6000	10,000	12,500	15,000
Aquaculture/fisheries		3000	5600	7000	9500	11,500
Beekeeping		1200	6,000	7,200	9,600	10,500

Social benefits

The project offers many social benefits which can be realized through the proposed interventions aiming at building the resilience of vulnerable communities to climate impacts. The unpredictability of rainfall in Babati district affects the livelihoods and social life of the people. The construction of barbed wire fence along the lake will alleviate hippo-human conflicts which have had negative impacts to the community especially crop damage and killings of people, notably fishermen. Furthermore, project interventions related to construction of charcoal dams and mechanical removal of aquatic weeds are envisaged to contribute to protection of the lake. This will enable sustainable supply of ecosystem services from the lake including recreation and cultural values. This enhances the adaptive capacity of the communities and especially women. The livelihood activities to be supported by the project will have a multiplier effect whereby the benefits will trickle down to more vulnerable and marginalized groups in the community notably women, youth, people with disabilities and the elderly. At least 1000 farm households will benefit from the project interventions. Women economic empowerment through livelihood activities to be conducted by women groups will empower women to participate in socio-economic development endeavors. Furthermore, a sizeable number of youth will benefit from the livelihood activities. By empowering the youth economically, the project will make them stay in their local communities and contribute to community development instead of migrating to urban areas in search of employment. This will also improve the gender relations by increasing the number of women and youth in decision making processes at various levels.

PART IIC. Describe or provide an analysis of the cost-effectiveness of the proposed project

The cost-effectiveness of the project's adaptation interventions will be greatly enhanced by the executing entity. Considering the costs and benefits of implementing this project, it is worth noting that the implementation of this project will lead to more resources being saved and more livelihoods being improved. Failure to implement the project will lead to reduced wellbeing of people of Babati and reduced food security (crop damage by hippos and low fish catch from the lake due to aquatic weeds). The resources to be committed in this project will result into long term and sustainable impacts to lake Babati and adjacent communities.

All the construction activities will use a force account approach with a view of minimizing the costs. Therefore, no contractor will be involved unless the work cannot be done by the government officers. For example, construction of an earthen dike, charcoal dams, water troughs and barbed wire fence will be done by relevant government engineers who will be paid allowances for their time spent in the project. Furthermore, the project will involve the communities who will volunteer to provide labor. Where necessary some will be paid a modest allowance for their participation especially for activities requiring some technical knowledge.

Cost effectiveness is also demonstrated in component 4 whereby the livelihood activities to be supported by the project were carefully selected after consultative meetings with the beneficiaries and economic feasibility analysis. Although the communities have some other livelihood activities such as small businesses and cultivation of staple food crops, their average income/day is below the poverty line. By supporting activities such as beekeeping, aquaculture and horticulture farming the project will be investing the AF resources in livelihoods with high economic returns thus enhancing not only the livelihoods and wellbeing of the people of Babati but also their resilience to climate change impacts. Table 3 provides more analysis of cost effectiveness.

Table 3: Project costs and benefits

Project Component	Project Cost (USD)	Concrete adaption benefits	Avoided losses	Trade-offs
1 Promoting soil erosion and sediment control measures	957,000	<ul style="list-style-type: none"> • Increased agricultural productivity • Increased food security food • Increased household income • Increased knowledge on water resources management • Reduced sediment inflow to the lake • Increased availability of fish in the lake due to reduced siltation and water weeds • Increased resilience to climate change Impacts 	<ul style="list-style-type: none"> • Reduced lake depth due to siltation • Loss of fish due to increased water weeds • Food insecurity • Malnutrition 	<ul style="list-style-type: none"> • Siltation of may lead to the disappearance of the lake • Construction of terraces and ridges in farmlands upstream alone may not be effective in controlling sediment inflow in the lake.
2.Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages	380,000	<ul style="list-style-type: none"> • Increased visibility of the lake • Boat transport will be possible 	<ul style="list-style-type: none"> • Increased blockage of the lake • Fish life saved 	<ul style="list-style-type: none"> • Loss of revenues from lake based economic activities • Loss of fish • Loss of biodiversity

		<ul style="list-style-type: none"> • The fish population will increase as a result of removal of water weeds • Increased crop and livestock productivity from the harvested water weeds 		
3. Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts	590,000	<ul style="list-style-type: none"> • Increased conservation of hippos • Restoration of the lake buffer vegetation • Reduced crop damage by hippos • Reduced killings of people by hippos 	<ul style="list-style-type: none"> • Crops damage • Human killings • Invasion of the lake buffer area 	<ul style="list-style-type: none"> • Government to spend more money compensating families whose loved ones are killed by hippos • Increased crop damage by hippos • Increased vulnerability to climate change impacts
4. Supporting climate resilient and environment friendly livelihood activities	1,000,000	<ul style="list-style-type: none"> • Enhanced resilience to climate change impacts • Increased household income • Reduced income poverty • Improved management of marine ecosystems 	<ul style="list-style-type: none"> • Abject poverty • Degradation of lake catchment • Food insecurity • Malnutrition • Health problems 	<ul style="list-style-type: none"> • Increased degradation of lake Babati catchment • Loss of biodiversity • Increased vulnerability to climate change impacts • High adaption cost – especially when the rainfed agriculture fails and communities have no alternative livelihoods

<p>5. Institutional capacity building of Babati Town Council , Babati District Council and lake adjacent communities in planning, implementation of lake Babati restoration measures, climate change adaption actions and dissemination of project results and lessons learnt.</p>	<p>463,000</p>	<ul style="list-style-type: none"> • Increased capacity of local government authorities and communities to plan and implement climate change adaption interventions • Increased coordination of climate actions at local level • Increased resilience to climate change impacts • Increased capacity to communicate project outcomes and key lessons learnt 	<ul style="list-style-type: none"> • Inability to foresee climate impacts • Increased vulnerability to climate change impacts • Loss of livelihoods • Food insecurity • Abject poverty 	<ul style="list-style-type: none"> • Increased victims of climate impact impacts due to poor planning and unpreparedness of local government authorities • Increased adaption cost • Failure of climate change adaption interventions (any intervention should include a component for building the capacity of local institutions to coordinate and plan for climate actions otherwise such an intervention may fail)
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PART11 D: Describe how the project is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

This project is designed to maintain consistency with national and sub national policies, sustainable development strategies and plans on climate change as well as cross-sectoral policies such as those on forestry, agriculture, livestock, fisheries, water and environment. The United Republic of Tanzania has signed and ratified several multilateral agreements including those under United Nations such as the UNFCCC, UNCCD and the CBD. All national level policy and legislation take into account these agreements.

This project aims to tackle climate change related challenges facing communities around Lake Babati by building their adaptive capacity as well as resilience against the adverse effects brought by climate change. Important policies, strategies and plans, which the project conforms with are summarized in the following paragraphs:

National Water Policy 2002

The proposed project is consistent with Tanzanian National Water Policy 2002 which among other underscore the importance of integrated water resources management including the establishment of water users associations. The proposed water stewardship approach in addressing the lake governance issues is well aligned with the Water Policy.

Water Resources Management Act 2009

The proposed project will progress the establishment of Water Users Associations (WUAs) for Lake Babati. This is consistent with Water Resources Act 2009 which provides a definition of WUA and its functions. The Act also stresses on the need to for integrated water resources management which is at the centre of the project interventions.

Water Sector Development Programme 2006 -2025

The proposed project is also in line with Water Sector Development Programme (WSDP) 2006 -2025 which has been running in cycles of 5 years. One of the objectives the programme is to improve the water resources management in water basins which are currently 9 in Tanzania. Administratively and hydrologically, Lake Babati falls under the Internal Drainage Basin. Thus the project interventions to improve the governance of lake Babati is consistent with WSDP.

The National Climate change Response Strategy (2021)

Water is conceived being among the main source of livelihoods, harnessed for domestic, agriculture, industrial use. Climate change is negatively impacting water sources, therefore addressing these climate change induced impacts will allow continuous availability for these elements which are important for sustaining livelihoods, economic growth and social development. In response, as due to the growing concerns over negative climate changes and climate variability, Tanzania like many other countries has vested into several initiatives to curb the situation include developing the National Climate Change Strategy. National Climate Change Strategy was devised seeking for enhancing the technical, institutional and individual capacity of the country to address the impacts of climate change. In order to achieve this aim, the National Climate Change Strategy has identified several strategic interventions (SI), among which are proposed by this project, such as interventions to control soil erosion which leads to siltation of water bodies such as ponds and lakes hence affecting water quality and quantity.

Forest Policy (1998)

Climate change is reported to have affected the forestry sub-sector by dwindling forest ecosystems. The National Forest Policy of 1998 and subsequent Acts programs and plans have the overall goal of enhancing the contribution of forests to sustainable development and conservation of biodiversity for the benefit of current and future generations. In Tanzania, forests play a major role in building adaptive capacities and resilience of poor and marginalized vulnerable communities. Protecting and conserving biodiversity through application of best practices in soil and water conservation; expanding forest cover and use of adaptive species as well as linking conservation areas is pivotal in adapting to climate change and ensuring continuity in the availability of ecosystem goods and services hence improving the livelihoods of Tanzanians. The proposed project will strengthen efforts invested by the Government Forestry Sector particularly to (a) Enhance conservation of forests biodiversity and control of invasive species; (b) Supporting alternative livelihood initiatives for forest dependent communities; and (c) Strengthening and up scaling of community based forest management best practices.

Agriculture Policy:

In Tanzania, the agricultural sector is figured as the back bone of the national economy, employing more than 80% of the country population of about 60 million people. Agricultural sector in the country unfortunately suffers from dependency on climate sensitive rain-fed agriculture. Adverse effects of climate change have been recorded within different government reports as cited from World Bank. The dependence of agriculture on rainfall increases risks of droughts and floods. Therefore, reducing vulnerability of the sector to climate change will significantly contribute to socio-economic development and ensure food security.

The Agriculture policy and plans have set and implemented several priorities, which the project will also contribute to so as to enhance resilience of the more vulnerable farming communities to climate-induced impacts. These include installation of water efficient irrigation schemes; Promoting early maturing and drought tolerant crops; Addressing soil and land degradation by promoting improved soil and land management practices/techniques; Strengthen early warning systems at District level.

Fisheries:

As far as fisheries sector is concerned, the goal of Tanzanian Government is to have fisheries resource able to resist and/or adapt to climate change risks and continue supporting community livelihoods, productivity and diversity of the aquatic ecosystems and fisheries sector in general. The proposed interventions are also within the Government frameworks and most particularly on: Promoting aquaculture, Enhancing protection and conservation of aquatic ecosystems productivity, and diversity.

National Adaptation Programme of Action (NAPA):

The Government of The United Republic of Tanzania recognizes that the extreme vulnerability of communities and the surrounding natural systems to the effects of climate change escalates poverty and slows down achievement of Millennium Development Goals (MDGs) and several other National Development Strategies such as National Strategy for Growth and Poverty Reduction (NSGPR/MKUKUTA) and Vision 2015. The National Adaptation Programme of Action (NAPA) of 2007 was developed to respond to these challenges particularly to identify and prioritize activities that addresses adaptation to climate change so as to avoid the risks of increased vulnerability and costs, which come along with effects of climate change. NAPA underscores that Agriculture, Water and Forestry are high priority sectors that requires interventions for adaptation to climate change. The project conforms with NAPA activities described in each sector, which aims to enhance the resilience to the vulnerable communities of Babaito the impacts of climate change.

Tanzania Nationally Determined Contribution (NDCS)

Tanzania revised Nationally Determined Contributions (NDC-2021) has put much emphases to reducing vulnerabilities and increasing resiliencies to Agriculture, livestock, forest, energy, Coastal, Marine Environment and Fisheries, water resource, tourism, human settlement and health

National Environmental Action Plan (NEAP)

NEAP developed to support the country towards meeting key international environmental obligations, which include conventions related to Biodiversity and Forests, Climate Change, Sustainable Land Management; Environmental Pollution, Hazardous Waste and Chemicals Management; Sustainable Oceans, Coastal Zones, and protection of Coral Reefs.

National Biodiversity Strategy and Action Plan (NABSAP) 2015-2020

As per requirements of Article 6 of the CBD, Tanzania formulated her 2nd National Biodiversity Strategy and Action Plan (NBSAP) 2015-2020 to address national biodiversity targets based on the national priorities that contribute to the global targets popularly known as the Aichi targets. This plan addresses among other things, a number of emerging issues such as climate change and variability, invasive species, GMOs, biofuel development, mining, oil and gas exploration and the continuous anthropogenic impacts that were not sufficiently addressed in the first NBSAP 2001.

PART III. Describe how the project meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund

The proposed project is fully aligned and compliant with all key national, regional and international technical standards and good practices. In particular, the project complies with strategic Environmental Assessments (SEA) [guidelines](#) 2017 and Environmental Impact Assessment and Audit (EIA/EA) requirements stipulated by Environmental Management Act (Cap.191 of 2004) and Environmental Impact Assessment (EIA) and Environmental Audit (EA) Regulations (G.N. No. 349 of 2005). SEA guidelines intend to assist government authorities, SEA practitioners and other stakeholders to design, conduct and implement SEA on policies, bills, regulations, strategies, plans, and programmes that are likely to have effects on the management, conservation and enhancement of the environment, or sustainable management of natural resources. They give direction on how SEA practice in Tanzania should be conducted following internationally accepted principles and good practice. See <https://www.vpo.go.tz/uploads/publications/en-1592644741-NATIONAL-GUIDELINES-FOR-STRATEGIC-ENVIRONMENTAL-ASSESSMENT.pdf>

On the other hand, EIA/EA regulations provide rules relative to the procedures for and carrying out of environmental impact studies and environmental audits as provided for under the Environmental Management Act. They prohibit carrying out of projects without an environmental impact assessment required under the Environmental Management Act and define the contents and form of an environmental impact assessment and the basic principles of an environmental audit. For instance, they prohibits activities within 60 m from a water body and calls for promotion of ecosystem preservation, Environmental Monitoring, Waste management, Coastal zone management, Precautionary principle, conservation of freshwater/wetlands and pollution control and operationalization of the Precautionary principle where necessary.

The design of this project has taken into account all the above requirements. Based on these provisions, all key activities with potential environmental risks such as small scale construction works proposed under components 1, 3 and 4 have been subjected to EIA [regulations](#), [though no mandatory EIA is required for this kind of project](#) –[An environmental screening for each activity under components 1, 3 and 4 preliminary environmental for each activity has been](#) [conducted whereby an and corresponding environmental and social management plan \(ESMP\) and an environmental and social monitoring plan were](#) s-prepared as presented in table 10. It should however be noted that some of the proposed interventions

will contribute directly to environmental conservation and enhancement of ecosystem health which is critical for addressing climate change by strengthening ecological resilience and adaptive capacities of communities in project area. These interventions include tree planting, weed control, promotion of organic manure (compositing) and beekeeping as well as capacity building measures proposed under component 5 which will strengthen the institutional capacity of Babati Town Council, Babati District Council and lake adjacent communities in planning and implementation of climate Smart and restoration measures.

With regard to the Adaptation Fund AF categorization, the project can be categorized as Category B, meaning that it has potential adverse impacts, but in small number and scale, not widespread and easily mitigated through respective ESMP developed for this project.

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

The proposed project and its interventions will avoid any duplication of actions and funding sources. During conceptualization and designing of this project, consultations were made with officers from both BTC and BDC whereby it was clear that no similar interventions exist in the selected wards. Furthermore, during the development of the project proposal, a number of stakeholders including NIE were involved. This ensured that no duplication of project or funding sources is done. However, there are some projects in other wards of BTC and BDC which were proposed or implemented or are implementing some of the aspects of the project. In particular, the THRIVE project implemented by World Vision which comes to an end this year may provide some lessons to the proposed project especially on tree planting and community engagement in project interventions. Table 4 below shows some of related projects for climate change adaptation conducted in Babati. More projects are found in appendix 4.

Table 4: Climate change related projects/programs in Babati district

Project/Program	Objectives	Synergy with the proposed project
Transforming Household Resilience in Vulnerable Environment (THRIVE) implemented by World Vision Tanzania for the period October 2017 – October 2021	Overarching project goal is to ensure Improved and Resilient Livelihoods (incomes and assets) of smallholder farmers and agro-pastoralists within Babati and nearby districts.	No duplication. The proposed project complements the interventions done by World Vision Tanzania (WVT) in Babati district which will end in October 2021. Moreover, the interventions by WVT were conducted in different wards which are not targeted by the proposed project. Furthermore, the project by WVT had no interventions directly related to lake Babati
Smallholders' Utilisation of Smart Technologies in Agricultural Industries and natural resources management (Funded by Norwegian Government) and implemented by the Ministry of Agriculture for the period 2017 -2021	Up scaling agriculture sectors for smallholder farmers	No duplication. The project largely focused on development of agricultural value chains. It had no component for restoration of Lake Babati
Sustainable Nou Forest Ecosystem Management Project funded by EU and implemented by Farm Africa for the period 2013-2016	To alleviate poverty of forest-dependent communities in Babati and Mbulu districts, Manyara region	No duplication. With exception of beekeeping, the proposed livelihood interventions are different from those supported by this EU funded project by Farm Africa. Furthermore, the project had no interventions for restoration of

		lake Babati. Moreover, the proposed wards focuses on wards which were not covered by Farm Africa
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PART IIG. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

The project’s learning and knowledge management component is captured under component 5. It will entail dissemination positive project results and lesson learned. The project will organize and conduct study visits within the project sites to help farmers learn and sharing experience. Study visits to areas with similar project will also be organized to enhance better learning. Communities will actively participate in project activities by learning and practicing climate change adaption technologies and practices. The lessons learnt by few community members are envisaged to diffuse to the wide community through peer training and hence impacting many community members in Babati district . At local level, the project will produce and distribute leaflets and brochures highlights key project achievements and lessons learnt.

Project results and lessons learnt will further be disseminated at national and international levels through conferences, symposia , meetings, workshops, various publications in peer reviewed journals. In particular, Sokoine University of Agriculture and Nelson Mandela Institute of Science and Technology (NEMAIST shall support in monitoring of key parameters related to Lake . Furthermore, other means such as radio , TV, newspapers, YouTube, Facebook and video documentaries will be used as well to share and communicate project results, outcomes and lessons leant. Furthermore, learning and knowledge management will be an integral part of the M& E framework.

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

The formulation of this project followed a participatory and iterative process whereby all key project stakeholders were involved from the community level to the highest level of government. A total of 72 people from various backgrounds and institutions participated in stakeholders consultation process. Among the 72 participants 31 (43%) were women and 41 (57%) were men. The project idea was conceptualized during a meeting held in June 2021 which was organized by the NIE. This led to the formation of project design team which among others identified and visited communities adjacent to lake Babati. While in Babati the project design team visited some of the degradation hotspot areas including the farmlands.

Before visiting the sites, the team held meetings with local government officers and leaders who provided their concerns and insights to the project design process. In particular, officers from Babati town council including the Executive Director and Member of Parliament for Babati Urban Constituency were very instrumental in providing information related to threats for lake Babati. The project design team visited 4 wards adjacent to the lake in Babati town council which included Nangara, Bonga, Singe and Bagara.

The stakeholders consultation was done to ensure that the full project proposal is developed while ensuring that the issues to be addressed by the project reflect the needs of the target communities and fits in the broader context of socio economic development of Babati district . During field visits in communities, a participatory rural appraisal (PRA)

technique of Focus Group Discussion (FGD) was used with an objective of understanding the community concerns and priorities.

~~The stakeholder's consultation employed two main methods namely focus group discussions (FGDs) and key informant's interview (KII).~~ FGDs involved men and women from the communities adjacent to the lake. During the discussions the facilitator had a checklist of questions which guided the discussions with a view of capturing the community perception regarding climate risks, importance of lake Babati, threats to the lake and interventions for lake restoration and enhancing climate resilience. From the discussions, a number of recommended interventions were obtained thus shaping the design of project components, outputs and activities. For example, interventions such as soil erosion control measures and fencing of the lake to avoid hippo-human conflicts were proposed by the communities from Bagara and Singe wards which are in close proximity to the lake.

The information collected through FGDs were supplemented/validated by information collected through Key informant Interview KII. This involved senior government leaders and officers in Bababti District. KII was also conducted to officers ~~from NGOs~~ found in Babati Town Council (World Vision Tanzania and COSITA).

The analysis of the collected information in terms of climate risks, community livelihoods, threats to the lake and recommended interventions shaped the project design.



Figure 8: Stakeholders consultations

Besides understanding the stakeholders' views on the project, the consultations also aimed at conducting Environmental and Social Impact Assessment of the proposed interventions in line with the requirements of the Environmental Management Act ,2004 and AF's Environmental and Social Policy.

Findings of Stakeholders consultations

Key issues raised

- The project should focus removal of aquatic weeds and hippo-human conflicts
- Deforestation is the underlying factor for siltation of lake Babati
- The project should support farmers to implement soil erosion control measures upstream with a view of reducing siltation of the lake
- Support to establish fish ponds will reduce fishing pressure in the lake
- Finding alternative sites and technology for brick making
- Women are more vulnerable to climate change impacts than men as they have the primary responsibility of ensuring availability of water and food in the household
- Gender must be mainstreamed in project activities so that all groups in the community benefit from the project. In particular, special attention should be placed to the most vulnerable groups such as widows, people with disability, orphans and the elderly group. The project interventions in components 1 - 4 should specifically demonstrate how men, women, youth, people with disability (PWD) and the elderly will tangibly benefit from the project. This will among others include, the involvement of all gender groups in project activities.
- Management of the lake must be improved. It has become an open access resource
- Small scale fishers must be considered in the project

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Key issues raised on Environmental and Social Impact Assessment

- The Environmental and Social Management Plan to be developed by the project should be implemented accordingly.
- The earthen dikes to be constructed should be properly designed to avoid disasters
- The construction earthen dike entails excavating and removing the soil. Proper mitigation measures should be put in place
- Horticulture production involves use of pesticides, proper mitigation measures should be crafted
- Construction of charcoal dams requires land clearing and involves heavy equipment especially during excavation, thus care must be taken not to disturb the unintended vegetation
- Traditional honey harvesting methods should be banned as they pose wildfire risks as they involving setting fire to scare bees.

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Recommendations /Way Forward

- Fencing of the lake to control hippos and entry of cattle
- Construction of water troughs for livestock
- Establishment of solar-powered irrigation system for enhanced crop production
- Supporting the youth with brick making machines
- Construction of earthen dike and dike and charcoal dams to trap sediments

- The most vulnerable groups notably widows, orphans, people with disabilities and the elderly group should be given first priority during implementation of livelihood activities

Categories of Stakeholders consulted

a) Sectoral level Stakeholders (MDAs):

- National Environmental Management Council (NEMC)
- Vice President’s Office -Division of Environment
- President’s Office Regional Administration and Local Governments
- Ministry of Water
- Tanzania Meteorological Authority
- Sokoine University of Agriculture

b) LGAs Level Stakeholders:

- Babati Town Council
- Babati District Council
- Ward offices of Nangara, Bonga, Singe and Bagara

c) NGOs

- Word Vision Tanzania
- Community Support Initiatives Tanzania (COSITA)

Table 6: Stakeholders Analysis

Potential Stakeholders	Description of the Roles
Local government authorities (BTC and BDC)	The authorities have a role to mobilize community to participate in the project activities, monitor project progress, support community natural resources management program including approval of bylaws for safeguarding water resources.
Farmer groups/cooperatives	These are stakeholders that are part of the farmers but established to oversee and advocates farmer’s rights in agriculture sector including managing rice fields, water utilization and follow up of access to farming inputs. In this project they will be used to mobilize farmers to actively engage in project activities. They will also receive training on how best to manage community groups, manage irrigation structures and enforcing the bylaws to realize positive projects outputs and outcomes. Members of the famer’s associations are democratically elected, and they are about twenty with leadership structure.
Non-government organizations	These are specialized group of stakeholders that will be engaged by the project to raise community awareness on climate change issues, climate smart agriculture and water resource management. They will work under the guidance of project team and district authority and in close consultation with farmers associations. COSITA and many others found in Babati district. World Vision Tanzania (WVT) is an international NGO which was incorporated in Tanzania and has implemented enormous number of projects in Tanzania some of which are related to climate change.

Farmers	These are grass root project beneficiaries that will be mobilized through their local institutions to participate in project implementation including climate smart agriculture practices, trainings and awareness raising sessions, water sources protection and community meetings. Farmers are key stakeholders that will be used to provide feedback and lesson learned from project activities as they will practice the interventions on the ground.
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PART III I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Funds requested from the Adaptation Fund will be used to support building the capacity of Babati town council and District council and their communities to adapt to the impact of climate change through implementation of practical interventions to produce tangible and sustainable impacts. Without funds from the Adaptation Fund, the communities in will continue to be negatively affected from the impacts and fail to meet the livelihood needs. A more justification for funding can be evaluated by analyzing the project and without project scenarios as described below:

Component 1: Promoting soil erosion and sediment control measures (US \$ 957,000)

Without funds from the Adaptation Fund (AF), no activity will be implemented to address the challenge of siltation of lake Babati. This means eutrophication of the lake will continue until the entire lake is occupied by aquatic weeds. This will lead to disappearance of fish in the lake and consequently the livelihoods of over 5000 young men and women will be in jeopardy. Given the climate risks in Babati districts which are projected to worsen in future, in the absence of AF funding to support ecosystem restoration, the communities are posed to be more vulnerable to both climate and non-climate risks

AF funding to support implementation of soil and water conservation measures upstream, construction of earthen dike and charcoal dams will reduce a significant amount of sediments from entering the lake hence contributing to its sustainability. This kind of investment is not possible under current government financing framework which is very limited to provision of key social services such as health care and schools. Therefore, AF funding is crucial for successful restoration of lake Babati. Tree planting will contribute to the restoration of forest cover which is critical for soil erosion control.

Considering the scale of land degradation problem in the catchment of Lake Babati coupled with climate variability, the investment in interventions that build the adaptive capacity of vulnerable communities through control of soil erosion and protection of water resources is worthwhile.

Component 2: Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages (US \$ 380,000)

As stated above, without AF funding it is unlikely that the Babati Town Council and the Tanzanian government at large will be able to address the aquatic weeds problem in lake Babati. Without AF funding there will be an increased proliferation of the aquatic weeds which will eventually cover the entire lake causing the lake adjacent communities to fail in applying the ecosystem based adaptation approach to climate change impacts. This is because fisheries which may appear to an adaptive measure for climate induced crop failures will be constrained.

Without AF the water hyacinth and water sedge will continue to deteriorate the ecological integrity of the lake.

The mechanical removal of such weeds is the best option of dealing with this problem. The removal of the weeds will facilitate economic activities inside the lake and fish life will improve. With the removal of the weeds and combined efforts to control soil erosion upstream and sediment inflow to lake, the condition of the lake will improve thus supporting the livelihoods of adjacent communities who are already vulnerable to climate change impacts. Furthermore, the aquatic weeds to be harvested from the lake will be used as forage in livestock production and manure in farmlands. Thus, the investment in component 2 does not only contribute to ecosystem restoration but also generate more benefits to both pastoralist and farmers .

Component 3: Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts (US \$ 590,000)

Without AF funding to construct a barbed wire fence along the buffer area of the lake, land degradation resulting from cattle grazing will continue . Furthermore, the hippo-human conflict may escalate causing unrest in the communities. This will not only affect the social life of the people but also their farm-based livelihood activities. With funding from AF, the buffer area of the lake will be well protected thus contributing to its restoration and hence enabling the lake to support the communities whose livelihoods are climate sensitive. In particular, the investment towards fencing of the lake buffer area offers a longer-term contribution to lake restoration endeavors . Once fenced , there will be no grazing problem in the buffer area, even fishing will be easy to monitor. Furthermore, fencing will protect farmlands from hippos.

Component 4 : Supporting climate resilient and environment friendly livelihood activities (\$ 1,000,000)

Given the current situation in Babati district whereby the livelihoods of poor communities are vulnerable to climate change impacts, more people are posed to experience shortages of water and food. The current farming practices are not climate resilient causing farmers to experience very low yield. Therefore without AF funding, the communities are more likely to continue suffering from climate change impacts owing to inability to implement climate resilient livelihood activities. Currently , most of the communities are engaged into exploitative farm –based livelihoods which offer low yield due to much dependence on rainfall and poor and inefficient irrigation structures along the shores of the lake. Hence without AF support, the current livelihood strategies are not adequate to enable communities to adapt to climate risks.

With AF funding it is envisaged that the livelihoods of communities at grassroots will be improved making them vibrant and resilient to climate change shocks.. Activities such as horticulture, environment friendly brick making, beekeeping and aquaculture among others have economic potentials which if well supported can build the capacity of communities to adapt to climatic shocks. This will eventually contribute to the economic development of the country. Thus the investment of US 1,000,000 for this component is envisaged to produce concrete socio-economic benefits at both household and community levels. The livelihood activities to be supported were strategically selected by the beneficiaries aiming at changing their lives from climate vulnerable to climate resilient.

Thus the project will contribute to poverty reduction, economic growth and national climate adaptation efforts.

Component 5: Institutional capacity building of Babati Town Council , Babati District Council and lake adjacent communities in planning, implementation of lake Babati restoration measures, climate change adaptation actions and dissemination of project results and lessons learnt (\$ 463,000)

At present BTC and BDC s do not have adequate capacity to effectively facilitate implementations of climate change adaptation interventions. Without the AF funding, it is likely that the pace to incorporate climate adaptation related issues into district development plans and implementing adaptation actions will be slow and may in some instances be impossible. Without AF resources climate change vulnerable communities in Babati are more likely to continue suffering. With AF funding the district will be able to facilitate the implementation of adaptation actions with a

possibility to scale up the interventions in other sites found in the district. Furthermore, the district will be able to integrate adaptation costs in district planning a, development and financing mechanisms

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

Sustainability aspect was taken into consideration during project design. This is demonstrated by involvement of communities to identify issues and propose solutions the project should implement. The involvement of BTC and BDC which have legal mandate to oversee development activities in the project sites also provide rooms for sustainability as staff will be part of the project implementing team and the impacts shall be incorporated into institution plans. The infrastructures to be developed in the project sites will remain under overall supervision of the BTC and BDC after project termination. Moreover, the project will build the capacity of ward level institutions in managing the infrastructures to be developed. Furthermore, the farmers and livestock keepers will be trained on how to implement various climate smart technologies which can be sustained beyond the project period. The infrastructures such as the irrigation and water supply systems will be solar powered to ensure the communities will still be able to use them even after project termination. To meet the upkeep costs of the irrigation and water supply systems, the project will establish the management structures for community based water supply organizations and irrigators association. Such community groups will be responsible for managing water resources and associated infrastructures. Furthermore, they will be collecting water use tariffs. The revenues to be collected from water use will be used to meet the maintenance costs for the established infrastructures.

Furthermore, as part of the M & E framework, the project will craft a sustainability/exit plan that will ensure that investments made by the project are sustained beyond the project period. For livelihood activities, the project will build the capacity of the beneficiaries in farm, business and financial management so as to make sure that the chosen livelihood activities have economic and financial sustainability. This will also include establishment of credit and savings associations for sustainability of capital source.

For restoration activities, the project will build the capacity of the project team to mobilize more resources to finance catchment wide restoration activities on a long term particularly planting of native trees. Management of aquatic weeds will be sustained through building the business model for the supply of pasture and manures from the weeds. Babati district is bordered by pastoral communities with high number of cattle who face pasture shortage especially in dry season. Thus, the project will promote the continued mechanical removal of the weeds while converting them into pasture and manure in commercial settings.

Sustainability aspects have been embedded into the project results framework to make it easier for the project during execution of the exit plan after project termination. In terms of political and policy sustainability of the project, there is a very good political will from local and national political leaders such as District Commissioner, Regional Commissioner and Member of Parliament. Thus, the project has full support from at all levels. Therefore, the district officers will still provide technical assistance to the communities even after project termination. Besides, following project termination, some of project activities will be incorporated in the district's and town council's Medium Term Expenditure Framework. This will be particularly possible because the district and town council officers will have gained sufficient capacity building sessions under component 5 by the end of the project.

Sustainability aspect was taken into consideration during project design. This is demonstrated by involvement of communities to identify issues and propose solutions the project should implement. The involvement of BTC and BDC which have legal mandate to oversee development activities in the project sites also provide rooms for sustainability and staff will be part of the project implementing team and the impacts shall be incorporated into institution plans. There was also strong involvement of relevant national and local stakeholders including ministries, civil society, Local Government Authorities, academia, etc.) at all stages of project design. All these actors have special chance to contribute to a participatory management and implementation.

The sustainability of beneficiaries' climate smart and resilience building activities are engrained in the core benefits that they will accrue from promoting soil erosion, climate smart and resilient and environmental friendly livelihood activities that shall provide alternative food and income.

The project will support smallholder beneficiaries from shifting and encroachment type of cultivation done both upland and on Lake Babati that have led to erosion, siltation, degradation associated with low yield each year to climate smart and environmental friendly upland and lowland to increase yield and build a climate resilient society.

In collaboration with research and high learning institutions, this project will promote the learning and knowledge hub (real world laboratory) in collaboration with local actors and beneficiaries to be adopted in the local government climate change adaptation action plans. Thereafter, local government authorities shall be able to integrate them in the internal budgetary financing mechanisms beyond project lifespan.

At community level knowledge and skills acquired especially on climate smart and climate resilient building methods is something that shall exist for level and component 5 of the project provides room to document and disseminate it beyond project boundaries for replications. Linked to that, a number of benefits stakeholders shall get from applying climate smart skill and knowledge is considered to be motivating factor for sustaining resilience building among communities.

The infrastructures to be developed in the project sites will be developed in a participatory manner to ensure ownership and shall remain under overall supervision of water users associations, the BTC and BDC after project termination. Moreover, the project will build the capacity of ward level institutions in managing the infrastructures to be developed. Furthermore, the farmers and livestock keepers will be trained on how to implement various climate smart technologies which can be sustained beyond the project period. The infrastructures such as the irrigation and water supply systems will be solar powered with a lifespan of 25-30 years to ensure the communities will still be able to use them even after project termination. To meet the upkeep costs of the irrigation and water supply systems, the project will train local technicians (especially women and youth) to conduct simple maintenance procedures such as cleaning, replacing batteries, also the project will establish the management structures for community-based water supply organizations and irrigators association. Such community groups will be responsible for managing water resources and associated infrastructures. The project will undertake capacity needs assessment and conduct training sessions in infrastructure management and maintenance for user associations. A group of trained personnel proposed by members of the water user association shall select five people to form operation and maintenance committee responsible for and infrastructure. The duties of the operation and maintenance committee shall include evacuation of silt from developed infrastructure, checking solar quality, glass fibre boat, and ensure quarterly reporting to the association on the state of the infrastructure and boat. Furthermore, the community groups will be collecting a reasonable water use tariffs, the revenues to be collected from water use will be used to meet the maintenance costs for the established infrastructures under the management of BTC and BDC.

Furthermore, as part of the M & E framework, the project will craft a sustainability/exit plan that will ensure that investments made by the project are sustained beyond the project period. For livelihood activities, the project will build the capacity of the beneficiaries in farm, business, infrastructure and financial management to make sure that the chosen livelihood activities have economic and financial sustainability. This will also include establishment and promotion of existing credit and savings associations for sustainability of capital source.

For restoration activities, the project will build the capacity of the project team to mobilize more resources through Village Community Bank which is a tailored micro-finance program designed to provide credit to low-income people who need capital to start their own businesses. The project shall bring together groups of 25 to 50 people, mostly women, and allows them to combine their savings to create a community-based bank. The gained benefits shall finance

catchment wide restoration activities on a long term particularly planting and nurturing of native trees. Management of aquatic weeds will be sustained through building the value chain business model for the supply of pasture and manures from the weeds. Babati district is bordered by pastoral communities with high number of cattle who face pasture shortage especially in dry season and lake invasion. Thus, the project will promote the continued mechanical removal of the weeds while converting them into pasture and manure in commercial settings.

The engagement of research and high learning institutions such as Sokoine University of Agriculture and Nelson Mandela Institute of Science and Technology which will be responsible for providing backstopping, conducting research and knowledge generation in collaboration with local communities and beneficiaries creates another room for sustainability. SUA has been always looking for community which act as real world laboratory for both training, learning and support in the fields of soil, crops, water and vegetation sciences. Also Nelson Mandela Institute of Science and Technology being located nearby the project area has agreed to provide support issues related to engineering and solar maintenance technology beyond project lifespan.

Sustainability aspects have been embedded into the project results framework to make it easier for the project during execution of the exit plan after project termination. In terms of political and policy sustainability of the project, there is a very good political will from local and national political leaders such as District Commissioner, Regional Commissioner and Member of Parliament. CANTZ has enough experiences and expertise needed for gaining political will and support for both policy change and implementation. Thus, the project has full support from at all levels. Therefore, the district officers will still provide technical assistance to the communities even after project termination. Besides, following project termination, some of project activities will be incorporated in the district's and town council's Medium Term Expenditure Framework. This will be particularly possible because the district and town council officers will have gained sufficient capacity building sessions under component 5 by the end of the project.

PARTII K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project.

Identification and analysis of potential risks that would emanate from the implementation of project activities have been done purposely to ensure that all negative impacts are mitigated. The impact identification and analysis was conducted according to ~~National~~ National Environmental Management Act (EMA) 2004.

Compliance with the Law

EMA 2004 explains all requirement to be done during implementation of development projects. This project ~~conducted was screened an~~ for Environmental and Social Impacts assessment (ESIA) ~~as~~ under the framework of Environmental and Social Impact Assessment which is guided by ~~per~~ EMA 2004. ESIA sets out environmental and social guideline to be followed ~~for mitigating~~ for mitigating the identified impacts for the project. ~~As the nature of project does not require a mandatory formal EIA, each project activity was screened for environmental and social impacts after which an ESMP was developed.~~

Access and Equity

The project is set for the requirement of individuals living in Babati district, their presence and their need is the key factor towards this project. Touching each person and making improvement of livelihood grantee success of this. Participatory method will be used and selection of members for management of project will be done by selecting members from each group/ethnic area.

Every person will be free to access the project following the set rules to ensure no conflict which arises.

Marginalized and Vulnerable Group

All development project are safeguarded with National and local set rules in which no vulnerable group which appears, resources are accessed following laws, human rights in Tanzania are well controlled by government from local government level to national level. Tanzania Development Vision, 2025 enhances opportunity for and protection of vulnerable and disadvantaged groups as orphans, the physical, mentally and psychological disabled, old people with no relatives or other means of support, it extends opportunity to vulnerable groups and disadvantaged groups, assisting individuals, or disabled groups to cope with disability, advocates participatory roles for private enterprises, people's organization and community in collaboration with the private sector, in skills development and promotion of quality of life of people with disabilities and other disadvantaged groups.

Gender Equity and Women's Empowerment

Tanzania Vision 2025 empowers people of both gender, all ages to full participate in development process, it removes gender bias in access to resource, participation in decision making and ownership of property, ensure equal access to education and employment at all level, improve the position of women in society and it reviews laws regulation to eliminate all forms of gender based discrimination and improves severe penalties for sexual and other offences against women, hence development of this project will ensure compliance with this vision.

Core Labor Rights

During implementation of this project, all workforce will be sourced from Tanzania ranging from specific village to national level, different risk may arise like accidents this will be controlled through implementation of safety culture at workplace by using of personal protective equipment's, inducting and training workforce on proper safe way of performing their work and comprehensive risk assessment at field level but also the company/individual who will be involved in implementation of project will have to be a member of Workers Compensation fund (WCF), Workers will join Trade Union to ensure they know their rights and it will serves as the watchdog for implementation of labor rights.

Indigenous Peoples

The population of project site includes people of the same tribe though there is less immigrant from different location seeking life opportunity but still they are living by respecting each other and follows legal requirement, for this there is no risk involved.

Table 7: Summary of identified environmental, social and safety issues

Checklist of Environmental and Social Principles	No further assessment required for compliance	Risk and potential impact	Detail of potential risks	Measures to address risk
Principle 1: Compliance with the Law	Yes. The project complies with domestic law and policies (see Annex 8)	Risk: Low Potential impact: Low.	According to the National Environmental Management Act (2004) and the Environmental Impact Assessment (EIA) and Environmental Audit (EA) Regulation (2005) and Sectorial Regulations and Guidelines of the United Republic of Tanzania, most of the components/activities of the proposed project do not fall within the First Category of projects that require full EIA. There is no activity under any component which require full EIA as their size are small and location of the intervention do not require further assessments. However, where some activities are not fully itemized there might be a risk that such activities will not comply with certain laws.	All relevant domestic laws as been assessed. The assessment results revealed that, the proposed project strongly comply with all relevant national laws including international standard). All proposed activities under the four components do not conflict with any domestic laws and policies, but they strongly support implementations of those laws and policies as indicated at Part II E above. In addition, all relevant authorities, district and national stakeholders have be consulted to ensure reflection of relevant legal requirements. However, the Environmental and Social Impacts and Risks management Plan has been prepared in Table 9.

<p>Principle 2: Access and Equity</p>	<p>Yes. This project promotes for fair and equitable access to benefits of the project</p>	<p>Risk: Low Potential impact: Low</p>	<p>The constitution of the United Republic of Tanzania specifies equitable distributions of benefits within communities, and prohibits any actions that promote economic imbalances among citizens and communities. However, some activities of the project, under component 4, for livelihood improvement are not intended to provide a benefit for all, but target those livelihoods in need as well as the livelihoods which are involved in restoration activities, transforming exploitive agriculture, livestock and beekeeping. Also given that the beneficiaries are rural people and marginalized poor families who are not often integrated in the villages politics and decision-making processes, there could be also a risk of insufficient access of the project resources by these people.</p>	<p>The project activities has fully designed to ensure that, implementation of activities will not reduce or prevent communities at the sites in all villages from accessing basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions and land right. Communities and beneficiaries will be highly sensitized to enhance priorities of the most vulnerable communities while ensuring benefits to reach further communities for scaling ups and replications. In addition, measures have been put in place to able this project to closely monitor all targeted beneficiaries to assure equal access of men, women, youth and the most vulnerable. Indicators in this regard will be included in the Monitoring and Evaluation Plan</p>
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<p>Principle 3: Marginalized and Vulnerable Groups</p>	<p>Yes. No initiatives are identified with execution that could generate a negative impact on marginalized and/or Vulnerable groups.</p>	<p>Risk: Moderate Potential impact: Moderate</p>	<p>In this project, there is no single activity or initiatives identified with execution that could generate a negative impact on marginalized and/or vulnerable groups. But without extensive consultation with marginalized/vulnerable groups at the project sites and in training exercises, it is probable that project activities will exclude these marginalized/vulnerable groups, thus preventing them from accessing benefits – both in terms of resources and training</p>	<p>Marginalized and poor vulnerable village groups especially women have been widely consulted and involved in the design of this project and will further be consulted and involved during the implementation of all on-the-ground activities. In addition, the project design has ensured that benefits accruing from the project interventions – including technology transfer and awareness-raising activities – reach marginalized and vulnerable groups in rural villages. This project ensures that all components enhance the adaptive capacity of marginalized and vulnerable groups including transforming their social life to better levels especially for women and girls.</p>
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Principle 4: Human Rights	Yes	Risk: Low Potential impact: Moderate/ High	None anticipated. No activities are identified whose execution is not in line with the relevant conventions on human rights, national and established international human rights. Project objectives promote basic human rights for equitable access to service and clean and safe drinking water, access to food, information, and quality and health environment.	The proposed project respect and adhere to all local laws in relation to human rights.
Principle 5: Gender Equity and Women's Empowerment	Yes, Gender analysis has been conducted	Risk: Moderate Low Potential impact: Moderate/ High	Without extensive, transparent and fair involvement of women and other gender sensitive groups, it is likely that women will be inadequately represented during implementation of this project. This inadequate inclusion of women would be compounded as the negative effects of climate shocks are recurrent and future climate change effects. All expected to be experienced disproportionately by women compared to men.	From the beginning the project has ensured inclusion of gender equality and women empowerment issues particularly equal rights, responsibilities, opportunities and access of women and youth to resources allocated to improve their resilience to the recurrent and future climate change effects. All consultative and participatory processes strived to include representation of women groups of the community and analyze relevant gender-disaggregated data. The ministry and department responsible for gender issues including gender experts and NGOs actively involved in gender issues in Tanzania were invited to participate in appraising the final document of this project.

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Principle 6: Core Labor Rights	Yes The project respects the labor standards as identified by ILO and the Employment and Labor Relation Act, 2004	Risk: Low Potential impact: Moderate/High	Activities under component 1,2, 3 and 4 will involve labor works for implementations of concrete adaptation actions through the popular implementation modality known as Force Account where community members and beneficiaries provide the labor force. However, in doing so local communities might be exposed to the risk of minor accidents while executing some constructions and tree planting and ecological restoration activities.	Core labor rights will be respected and considered in the project implementation. The employment and Labor Relation Act, 2004 prohibits employment of children less than 18 years of age, stipulated types of contracts that can be entered with employees. The Act makes provisions for core labor rights; establishes basic employment standards, provides a framework for collective bargaining; and provides for the prevention and settlement of disputes. In particular, national and regional stakeholders were involved in the design of project activities to ensure that labor legislations are adhered. All of the labor involved will be daily wages where the wages will be determined by the tasks and according to best common practices in the districts and villages
Principle 7: Indigenous Peoples	Yes, no further assessment is required.	Risk: Low Potential impact: Low	None anticipated	All project interventions ensure equitable access to project benefits and resources by local peoples and to most extent communities at grass-root and relevant marginalized community groups are included in community consultation and during participatory planning of activities.
Principle 8: Involuntary Resettlement	Yes	Risk: Low Potential impact: Low	None anticipated	The project design does not include voluntary or any involuntary resettlement.
Principle 9: Protection of Natural Habitats	Yes	Risk: Low Potential impact: Moderate	Interventions will include planting of tree species, bee-keeping, improved ecosystem and environmental quality and services and functions provide water access and improved food security through drip irrigation interventions. Despite this focus, there is a low risk that the interventions of concrete adaptation actions could result in destruction of small areas of natural habitat.	By implementing conservation measures linked to economic benefits to the people to tackle climate change in Babati district, the project will promote improved management of natural ecosystems, particularly in the context of future climate change. These activities will include enhanced ecosystem functioning in the projects and beyond.

<p>Principle 10: Conservation of Biological Diversity</p>	<p>Site specific baseline study will be undertaken during implementation to ensure that the project's activities do not result into significant loss of biological diversity or introduction of known invasive species.</p>	<p>Risk: Low Potential impact: High</p>	<p>The assessment study on environmental and social impacts and risks didn't identify significant impacts of biological diversity. However, without careful planning and mapping of project site, on-the-ground adaptation interventions might adversely impact on local biodiversity. For example, planting exotic, invasive species might outcompete indigenous species and impact negatively on both indigenous species richness and on the ecosystem services.</p>	<p>By implementing water conservation practices, smart water supply activities, climate sensitive agricultural techniques and best practices, and improved ecosystem services and functions this project promotes the improved management and conservation of biological diversity and local scale at village levels. It promotes establishment of village bylaws and regulations for protection of biological diversity and management of village environmental quality.</p> <p>Site specific baseline study will be undertaken during implementation to ensure that the project's activities do not result into significant loss of biological diversity or introduction of known invasive species.</p>
<p>Principle 11: Climate Change</p>	<p>Yes</p>	<p>Risk: Low</p>	<p>None anticipated. The project will contribute to climate change adaptation and mitigation, thus will complement the national and global efforts to combat detrimental effects of climate change.</p>	<p>Through the Five (5) components, this project is designed to improve climate resilience of communities in Babati District and facilitate transfer of climate adaptation technologies to local communities in rural villages, and promote innovations development for climate solutions in rural villages and communities. In this way, this project is design to enhance adaptive capacity of local communities and marginalized community groups. None of project activities will enhance emissions of greenhouse gases.</p>
<p>Principle 12: Pollution Prevention</p>	<p>Yes</p>	<p>Risk: Low Potential impact: High</p>	<p>None anticipated</p>	<p>The proposed project is visualized to cause no any harm or pollution.</p>

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Principle 13: Public Health	Yes	Risk: Low Potential impact: High	None anticipated	The proposed project enhances the quality of public health. Indeed, through component 1, contribution of this project to the general public health is clear. During the implementation of the project awareness raising activities will be undertaken on malnutrition related diseases, malaria and water related diseases including cholera and promote WASH issues through implementation of activities under Component 1
Principle 14: Physical and Cultural Heritage	Yes	Risk: Low Potential impact: Moderate	None anticipated	No physical and cultural heritage sites which exists in the project sites
Principle 15: Lands and Soil Conservation	Yes	Risk: Low Potential impact: Moderate	None anticipated.	This project is design to enhance and promote conservation of soil and land resources. The continued degradation of the land resources will be reversed through smart interventions for component 1. The proposed activities under those components will result into increased soil stability, rehabilitate the degraded contour bands/windrows and reduced runoff of nutrients from top soil, promote improved soil fertility and productivity, improve the hard pan soils and waste land to productive lands.

Mitigation measures for the environmental and social impacts and risks are further detailed in Section III C

PART III: IMPLEMENTATION ARRANGEMENTS

PARTIII A. Describe the arrangements for project implementation.

The Designated National Authority (DNA) for UNFCCC and all climate change projects in Tanzania is the Vice President Office. The DNA oversees all actions and interventions related to climate change and communicate to UNFCCC and its associated Boards or Committees. The project will be implemented by the AF accredited NIE (NEMC) and will be executed by in partnership with Babati Town Council (BTC).

A gender sensitive Project Management Unit (PMU) will be established to spearhead execution of this flagship project. With at least 35% of its members being a female, the PMU will be comprised of Project Coordinator, Water/Irrigation Engineer, Project Accountant, Community Development Officer, Agricultural officer, M&E officer and the driver, all to be attached to the project.

The project coordinator, community development officer and M & E officers will be employed by while other officers will be provided by BTC. Officers from BTC who will be seconded to the project and will receive a modest monthly allowance for their time spent in the project. Other officers from partner institutions and departments will receive some allowance when they get involved in field activities. The M & E officer, apart from monitoring the project progress he/she will also be responsible for coordinating ESMP activities. He/she will also be responsible for documenting and disseminating the project results and lessons learnt to fulfill the knowledge management aspect as stipulated in component 5.

The PMU will be supervised by an equally gender sensitive Project Steering Committee (PSC), which will be constituted by members from the relevant ministries and departments and agencies. The PSC shall have at least 35% female members based on skills, qualification and experience.

The National Implementing Entity (NIE): This project will be implemented by the National Environment Management Council (NEMC), which has required experience in implementing projects and programs of this nature in the United Republic of Tanzania. NEMC has dedicated staff in the areas of climate change adaptation and overall environmental management. To achieve project objectives the following implementation services will be provided by NEMC:

- i) Oversee the coordination and management of the project;
- ii) Coordinate and facilitate smooth communications and interactions with AF Secretariat and other likeminded stakeholders;
- iii) Oversight of project implementations and reporting on physical and budget performance;
- iv) Quality assurance and accountability for outputs and deliverables during project development, implementation and on completion phases;
- v) Receipt, management and disbursement of the AF's funds in accordance with the financial standards of the AF;
- vi) Oversight and quality assurance of evaluation processes for project performance and ensuring that lessons learned are incorporated to improve future projects in the Tanzania; and
- vii) General administration and support costs including legal services, procurement and supply management, IT and human resources management

The Lead Executing Entity for this project is Climate Action Network Tanzania (CANTZ) a think and do tank organization with ongoing projects in the country. Babati Town Council shall offer staff (woman) who will join CANTZ staff to ensure the project is implemented timely and with required standards and deliverables. CANTZ shall host the Project Management Unit chaired by Project Lead. PMU will remain responsible for implementing the

project and ensure the outcomes are achieved as planned in the project. PMU will be staffed with project lead who is also a director for CANTZ, assisted by three other new staff (full time) who will be either recruited or seconded by CANTZ, one being finance officer and two being project officers. The project lead shall oversee all project operations and implementations. While the finance officer shall be responsible for financial issues, the two other project officers shall be responsible for day-to-day operations of the project. In implementing project activities, PMU will receive technical supports from a group of relevant experts with different backgrounds and expertise including: Engineering, Ecology, Soil Sciences, Fisheries and Animal Sciences, Participatory Mapping Expert, Monitoring, Evaluation and Learning Specialist, and gender specialist. These will be outsourced based on needs. In this project the gender component and gender mainstreaming in the project shall be observed. This will go beyond to ensure project exit and sustainability. In the PMU gender issues shall be observed and given a required attention. Staff selection process, the program will include adequate gender understanding as criteria for selecting team members. Gender related competencies shall be assessed before setting up the team. Furthermore, workshops and training that intend to improve staff understanding of gender issues shall be conducted.

The Steering Committee (SC) will be set up to oversee the entire project implementation to ensure that the facilities and mechanisms are running timely and at needed qualities. The SC shall also make sure that the voices of stakeholders and vulnerable groups who have no opportunity to directly seat in the PMU are represented. The SC shall always provide technical guidance and advice to successful implementation of the project.

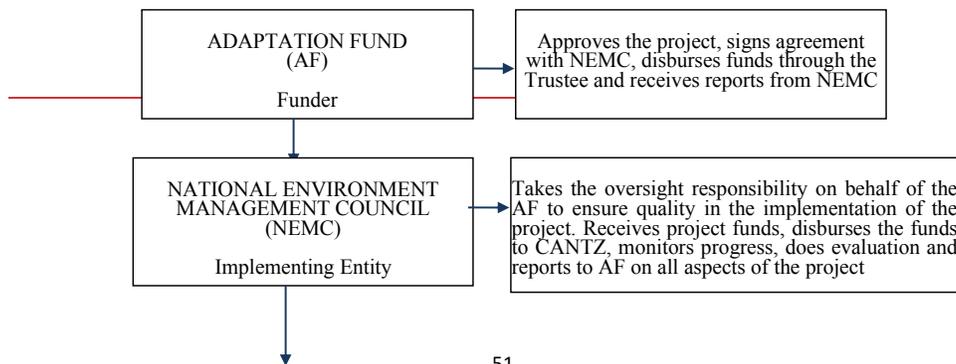
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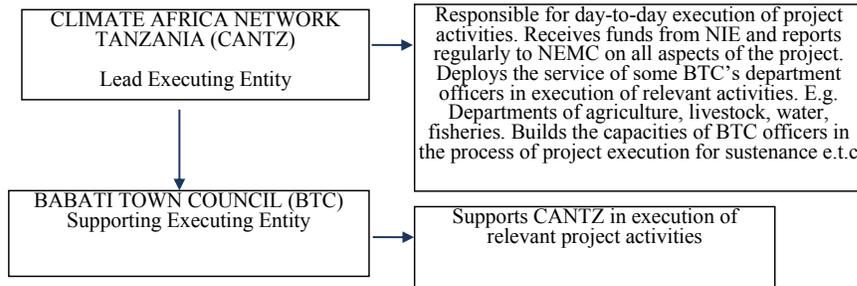
The key functions of the PMU include the following:

- Oversee and manage project implementation, monitor work progress, and ensure delivery of outputs and within the specified time and cost as outlined in the project document;
- Prepare reports for stakeholders and NIE;
- Develop and facilitate implementation of a comprehensive monitoring and reporting system;
- Ensure timely preparation of detailed annual work plans and budgets for approval by the PSC;
- Identification and select consultants and other experts as required;
- Supervise, coordinate and facilitate the work of project administrative/technical team;
- Control expenditures and assure adequate management of resources;
- Establish linkages and networks with on-going activities by other government and nongovernment agencies in the United Republic of Tanzania;
- Liaise and coordinate with NEMC on a regular basis;

The management arrangements for the project are summarized in the chart below.

SCHEMATIC DEPICTION OF THE IMPLEMENTATION ARRANGEMENTS





Research and high learning institutions such as Sokoine University of Agriculture (SUA), and Nelson Mandela Institute of Science and Technology (NEMAIST) shall be responsible on providing backstopping, conducting research and knowledge generation in collaboration with local communities and beneficiaries. SUA shall support issues related to soil, water, crops and vegetation sciences while NEMAIST shall support issues related to engineering and solar maintenance technology.

Grievance Management

The executing entity will work towards ensuring that the project direct and indirect beneficiaries are served to the required standards. The PMU will work to ensure that expectations of the communities are met. Therefore, any

grievance from the communities will be resolved using the existing governance structures. This project will adopt the Grievance Redress System used by the TASAF¹³ but with some modifications, whereby all attempts shall be made to settle grievances amicably. The grievance management mechanism is designed with the objective of solving disputes at the earliest possible time, which will be in the interest of all parties concerned and therefore, it implicitly discourages referring such matters to the national level government authorities or national level courts for resolution. The grievance management system will also address gender related grievances whereby a sub-committee on gender will be established.

Communicating the Grievance Management System

The Grievance Management system to be used will be communicated to the project stakeholders during project inception workshop. The stakeholders will have the opportunity to discuss it and proposed any necessary changes. Moreover, the project staff will regularly remind the project beneficiaries on the procedures for submitting their grievances

PARTIII B. Describe the measures for financial and project risk management

Table 8: Measures for risk management

Risk Type	Risks Category	Risk Level	Mitigation Measure
Financial risk	Late disbursement of funds	Low	Fund requests and project progress reports will be timely prepared, communicated and submitted to the Adaptation Fund and other relevant stakeholders to ensure adequate feedback is provided to speed up fund’s disbursement. The Project Team will follow required standards and templates as provided by the Adaptation Fund to ensure proper reporting and avoid unnecessary delays.
	Financial control risk	Low	Appropriate structures at the ministerial level and local government authorities exist for proper management and control of the public funds. This project will, therefore, follow these structures and international accounting standards (IAS) and to all Generally Acceptable Accounting Principles (GAAP) to meet all accounting requirements related to reporting, control and transparency and auditing.

¹³URT, (2016). TASAF III Vulnerable Groups Planning Framework

Project risk	Project performance	Low	Project Team will be carefully constituted based on skills and capacity to manage project on Climate change intervention as well good monitoring tools to facilitate implementation of this project. Detailed work plans will be developed and be approved by both the Project Steering Committee and NEMC.
Project delivery risks	COVID-19	Medium	The COVID-19 pandemic may affect project implementation. To mitigate its impact on the project, all preventive measures such as social distancing , wearing of face masks , use of sanitizers and vaccination will be applied.
	Unavailability of the required equipment	Low	The project will ensure that all the needed equipment are procured timely as per existing procedures
	Delays in implementation of work plans	Low	The project team will ensure regular communications to ensure that the project activities are implemented in the allocated timeframe

PARTIII C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

Pursuant to National Environmental Management Act, 2004 (Tanzania mainland) the project was ~~subjected to an~~ screened for any potential negative environmental impacts particularly components 1, 3 and 4 whose interventions may involve land clearing, environmental and social assessment, and an environmental and social management plan was developed.

While no mandatory formal EIA is required for this kind of project, an environmental and social management plan was prepared to guide the project (Table 9).

The construction of charcoal dams, earthen dike, fish pond and barbed wire fences is likely to cause some environmental impacts such as loss of biodiversity due to land clearing, oil spill from the equipment leading to the contamination of soil and dust pollution due to excavation. Moreover, dike construction may lead to soil erosion. The population and workers will be sensitized on health risks — and mainly HIV/AIDS-related risks.

Each project activity has been analyzed according to NEMC's and AF's Environmental and Social Policy requirements in order to identify potential risks and appropriate mitigation measures.

Environmental and Social Management Plan (ESMP) is based on those requirements, with the aim to:

- assessing possible measures to avoid, minimize and / or mitigate risks identified;
- develop a monitoring plan
- promote a policy for high quality of environmental and social practices.

All the costs related to mitigation measures and monitoring of environmental and social parameters are included in the project budget.

Table 9: Environmental and Social Monitoring-Management Plan for the Project

Component	Potential impacts	Mitigation Measures	Impact Likelihood & Significance	Monitoring parameters	Monitoring Frequency	Monitoring Area	Measurement Unit /Indicator	Target Level	Responsible	Costs (USD)
1. Promoting soil erosion and sediment control measures	Loss of biodiversity	Tree planting for restoration of biodiversity	Likely, insignificant	Microorganisms, reptiles and rodents loosed	Annually	Project site	Quantity of biodiversity lost	Minimal loss of biodiversity	PMU	1,500
	Dust emission and Air Pollution	Use of Personal Protection Equipment (PPE) to avoid dusts. Low carbon machines to be used	Likely, insignificant	NOx, CH4, SOx, particulate matter	Twice in a year	Project site and surrounding areas	ppm, mg/m3 µg/m3	Tanzania Standards	PMU	2,000
	Loss of vegetation	Tree planting	Likely, insignificant	Plants and vegetation loosed	Annually	Project site	Lost vegetation per m ²	Minimal loss of plants/vegetation	PMU	1,000
	Soil erosion	Construction of contour bunds and terraces in areas designated for construction of charcoal dams	Likely, significant	Soil washout	Quarterly	Project site and surrounding areas	Eroded area size (ha)	Minimal soil washout	PMU	1,500
	Potential for occurrence/outbreak of accidents	Use of PPE and implementation of HSE principles at the construction sites	Likely, insignificant	Number of PPE's available, Injuries and accidents occurring	Weekly	Project Site and supporting areas	Number of safety measures provided. Records, injuries and inspection	Zero or minimal Number of injuries and accidents	PMU	2,000
	Generation of wastes	Installation of waste bins	Likely, insignificant	Quantity of waste generated determined	Once in a month	Project site	Kgs for solid wastes Litters for liquid wastes	No waste is left unattended TBS (for oil content)	PMU	1,100

	Contamination of ground water	Proper handling of petrochemicals and other related chemicals	Unlikely, insignificant	Chemical, Biological & Physical	Quarterly and on discharge	Project site	Kgs, ppm	EMA, 2015 Standards Regulations	PMU	1,100	Formatted: Font: 9.5 pt
	Occurrence of HIV/AIDS	Sensitization on the use of condoms	Likely, significant	HIV /AIDS infection	Annually	Project site	Number of individuals infected	No HIV/AIDS infections	PMU	1,500	Formatted: Font: 9.5 pt
	Alteration of soil profile	Soil management by planting grasses and other trees along constructed charcoal dams	Unlikely, insignificant	Soil level	Quarterly	Project Site	m	Standards and Regulations	PMU	1,000	Formatted: Font: 9.5 pt
Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages	Soil and land pollution/degradation	Proper handling of petrochemicals and other related chemicals	Unlikely, insignificant	Contaminant level	Twice a year	Project Site	ppm, mg/m3	Standards and Regulations	PMU	2,000	Formatted: Font: 9.5 pt
	Soil compaction due to heavy machine erosion	Use of existing roads for accessing the lake during removal of the aquatic weeds	Likely and insignificant	Soil bulk density washout	Quarterly	Project site and surrounding areas	Eroded area size Soil bulk density	Minimal soil compaction washout	PMU	1,500	Formatted: Font: 9.5 pt
	Dust emission	Use of Personal Protection Equipment (PPE) to avoid dusts	Likely and insignificant	NOx, CH4, SOx, particulate matter	Twice in a year	Project site and surrounding areas	ppm, mg/m3 µg/m3	Tanzania Standards	PMU	2,000	Formatted: Font: 9.5 pt
Securing the Lake Buffer Zone for improved conservation and reduction	Soil and land pollution/degradation			Contaminant level	Twice a year	Project Site	ppm, mg/m3	Standards and Regulations	PMU	2,000	Formatted: Font: 9.5 pt
	Occurrence of HIV/AIDS Soil erosion	Sensitization on the use of condoms	Likely, significant	HIV /AIDS infection Soil washout	Annually Quarterly	Project site Project site and surrounding areas	Number of individuals infected Eroded area size	No HIV/AIDS infections Minimal soil washout	PMU PMU	1,500 1,500	Formatted: Font: 9.5 pt

of hippo-human conflicts	Dust emission	<u>Use of Personal Protection Equipment (PPE) to avoid dusts</u>	<u>Likely and insignificant</u>	NOx, CH4, SOx, particulate matter	Twice in a year	Project site and surrounding areas	ppm, mg/m3 µg/m3	Tanzania Standards	PMU	2,000
Supporting climate resilient and environment friendly livelihood activities	Dust emission during digging of fish ponds	<u>Use of Personal Protection Equipment (PPE) to avoid dusts</u>	<u>Likely and significant</u>	NOx, CH4, SOx, particulate matter	Twice in a year	Project site and surrounding areas	ppm, mg/m3 µg/m3	Tanzania Standards	PMU	2,000
	Water pollution due to agrochemicals from horticulture farming	<u>Sensitization of the farmers on the use of manures and organic pesticides.</u>	<u>Likely and significant</u>	Heavy metals, Ammonia, Nitrates	Quarterly	Project site and nearby river streams	mg/m ³	Tanzania Standards	PMU	1,000
	Occurrence of HIV/AIDS	<u>Sensitization on the use of condoms</u>	<u>Likely, significant</u>	HIV /AIDS infection	Annually	Project site	Number of individuals infected	No HIV/AIDS infections	PMU	0
		TOTAL COST								26,700

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PARTIII D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

The Project will comply with formal guidelines, protocols and toolkits for quality assurance issued by the AF and NEMC. NEMC will develop a Supervision Plan during the project's inception phase which will be distributed and presented to all stakeholders during the Inception Workshop. The emphasis of the Supervision Plan will be on outcome monitoring, learning and sustainability and financial management. Project risks and assumptions will be regularly monitored by NEMC. Risk assessment and rating will be an integral part of the Project Implementation Review (PIR). The quality of the project's M&E will also be reviewed and rated as part of the PIR. Appropriate financial parameters will be monitored semi-annually to ensure the cost-effective use of financial resources.

An independent Mid Term Evaluation will be conducted towards the end of second year of the project while Final Project Evaluation will be done three months prior to the Project's end date in accordance with the available guidance of NEMC as the NIE. The Final Evaluation will focus on the delivery of the project's results as initially planned – and as corrected after the Mid-Term Evaluation, if any such correction took place. The Final Evaluation will assess the impact and sustainability of results, including their contribution to capacity development and the achievement of adaptation benefits. Both expected and un-expected impacts will be investigated to evidence the situation before and after project implementation.

An Annual Project Progress Review (PPR will be undertaken and its results will be used for improving planned activities for the next financial year and phase. PPR will be prepared to monitor progress made since the project's start and in particular for the previous reporting period. The annual reviews will cover performance, output and outcome of the activities

Quantitative and qualitative approaches will be used for quantification and qualification of information gathered. A solid monitoring and evaluating system will be put in place and will base on the indicators and means of verification defined in the Results Framework. Monitoring and evaluation system will be linked to the results framework, annual work plans and budget. In addition, the project will commission an annual audit (to be conducted by a certified auditor) of project accounts to ensure compliance with the AF and Government rules and procedures. Table 11 summarizes the budget of the M&E plan.

Table 10: Monitoring and Evaluation Framework

Activity	Sex-disaggregated indicators	Responsibility	Budget in US \$	Timeframe
Inception and annual workshops	At least 50% of workshop participants are female, to maintain 50:50 gender ration	Project Manager M& E Officer /Project Management Unit(PMU)	10,000	Will be done soon after receiving the funds
Initial studies to document in-depth baseline, condition of the project sites and vulnerabilities	Procurement process of the consultant to consider gender at least 40% female available for evaluation process	National consultant, Project Manager and M&E Officer	10,000	Will be done at the begging of the project implementations
Monitoring Project implementation of activities and outputs under the Four Components	At least 50% of female benefits from the project in each village. The PMU to Consider 40% female	Project Manager and Monitoring and Evaluation Officer	18,000	Will be done quarterly and on need basis
Visits to field sites for joint review of status and project progress and reporting	At-least 50:50 male-female ration is maintained in execution of activities and benefits from each project activities under each component as per gender analysis study	Project team	20,000	Will be done on need basis
Independent Mid Term Evaluation	Mid Term Evaluation report to check if least 50% of project beneficiaries in village communities were female and girls	National Consultant	10,000	Will be done towards the end of Year 2
Independent Final Evaluation	Final evaluation report to check if least 50% of	National Consultant	15,000	Will be done at-least two months before

	project beneficiaries in village communities were female and girls			project closure
Monitoring of Environmental and Social Parameters	Monitoring Monitoring ensures that 50% of social parameters considers women and girls	Project team	48,900	Done periodically as environmental and social monitoring plan
Quality assurance and field-based field-based quality checks by the IE	IE to ensure at least maintain 50:50 gender ration by the executing agency as indicated in the Gender assessment report	IE quality assurance Team and the Task Manager	30,000	It is a continuous process in every quarter
Total M & E costs			161,900	

PARTIII E. Include a results framework for the project proposal, including milestones, targets and indicators.

Table 11: Project results framework

Expected Results	Indicators	Baseline	Targets	Means of Verification	Milestones
Project Goal: Restoration of Lake Babati ecosystem for enhanced climate change resilience for communities in Babati Town Council and Babati District Council					
Enhanced resilience to climate change impacts caused by drought and floods	The percentage of community members resilient to climate shocks	To be established during project Inception whereby a baseline study will be conducted	<p>At least 2000 female farmers and at least 1500 male farmers are practicing irrigation agriculture</p> <p>At least 40 % of male farmers and up to 60% female farmers have access to arable land following construction of dikes for preventing saltwater inundation</p> <p>Household income increased by at least 30% by the end of the project</p> <p>Income of women increased by at least 10% by the end of the project</p> <p>Crop yield increased atleast by 20%.</p>	<ul style="list-style-type: none"> • Project progress report • Midterm review report • End of project evaluation • Publication in journal articles 	By the end of the project and beyond
Component 1: Promoting Soil erosion and sediment control measures					
Reduced sediment input into the Lake	<ul style="list-style-type: none"> • Farmers practicing soil and water conservation measures • Number of charcoal dams constructed along the lake buffer • Length of 	To be established during the baseline survey	<p>At least 30% of farmers are practicing soil and water conservation measures</p> <p>10 charcoal dams constructed</p> <p>4 km length of earthen dike constructed along the lake buffer</p>	<ul style="list-style-type: none"> • Project progress reports • Midterm review report • End of project evaluation • Publication in journal articles 	By the end of Year 3

	earthen dike constructed along the lake buffer				
Component 2: Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages					
Improved fish, livestock and agriculture production	<ul style="list-style-type: none"> Area of lake with weeds cleared Number of pastoralists using the weeds as forage to feed animals Number of farmers using the compost manure made from water weeds 	To be established during the baseline survey	<p>Crop yield increase by at least 10% in farms using the compost manure from water weeds</p> <p>At least 200 pastoralists use the water weeds as pasture</p> <p>At least 300 farmers use compost manure made from water weeds</p>	<ul style="list-style-type: none"> Project progress reports Midterm review report End of project evaluation Publication in journal articles 	By first half of Year 3
Component 3 : Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts					
Improved protection of the lake and reduced hippo-human conflicts	<ul style="list-style-type: none"> Length of barbed wire fence constructed along the lake buffer Number of reported cases of crop damage by hippos Number of reported cases of human killing by hippo 	To be established during baseline survey	<p>Barbed wire fence with a circumference of 4km constructed along the lake buffer area</p> <p>Zero cases of crop damage</p> <p>Zero cases of human killings</p>	<ul style="list-style-type: none"> Project progress reports Midterm review report End of project evaluation Publication in journal articles 	By last half of Year 3
Component 4 : Supporting climate resilient and environment friendly livelihood activities					
Increased resilience to climate challenges through climate resilient and environment friendly livelihood activities	<ul style="list-style-type: none"> A gender-sensitive number of farmers doing aquaculture A gender-sensitive number of farmers 	To be established	<p><u>Environment friendly brick making</u> 50 women and 150 men will be supported on brick making</p> <p><u>Aquaculture</u></p>	<ul style="list-style-type: none"> Project progress reports Midterm review report End of project evaluation 	By end of Year 2

	<p>engaged horticulture farming</p> <ul style="list-style-type: none"> • A gender-sensitive number of youth doing environmental friendly brick making • A gender-sensitive number of farmers engaged in beekeeping 	during the baseline survey	<p>100 women and 80 men will be supported for their selected aquaculture livelihood activities</p> <p><u>Beekeeping</u> 88 women and 76 men will be supported</p> <p><u>Horticulture</u> 250 women, 200 men and 100 youth (55 girls and 45 boys) will be supported to progress horticulture farming</p>	<ul style="list-style-type: none"> • Publication in journal articles 	
<p>Component 5 : Institutional capacity building of Babati Town Council , Babati District Council and lake adjacent communities in planning, implementation of lake Babati restoration measures, climate change adaption actions and dissemination of project results and lessons learnt.</p>					
Improved capacity of local government authorities and communities in planning and implementing adaption actions	<ul style="list-style-type: none"> • A gender-sensitive number of district officers trained on climate change adaption issues • A gender-sensitive number of ward and village leaders trained • A gender-sensitive number of farmers from farmers cooperatives trained 	To be established during the baseline survey	<ul style="list-style-type: none"> • The capacity building activities of local government officers will include 10 district officers whereby at least 4 shall be women and 20 ward leaders among whom at least 8 shall be women • The capacity building of farmers will involves 200 farmers from various farmers cooperatives whereby 100 farmers will be women and 100 shall be male farmers. • At least 5 different project messages disseminated • At least 3 project documentaries created 	<ul style="list-style-type: none"> • Project progress reports • Midterm review report • End of project evaluation • Publication in journal articles 	By first half of Year 3

	<ul style="list-style-type: none"> • A gender-sensitive number of project messages disseminated • Number of project documentaries • Number of monthly reflection meetings 		<ul style="list-style-type: none"> • At least 6 news articles about the project appears in national newspapers 		
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F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Table 12: Aligning project components with the Results Framework of the AF

Project Objective(s)	Project Objective Indicator	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
1. Promoting Soil erosion and sediment control measures	Number of charcoal dams for trapping sediments constructed Length of earthen dike constructed along the lake buffer area Number of soil and water conservation techniques implemented	Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	957,000
2. Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages	Area of lake with aquatic weeds cleared	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	380,000
3. Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts	Length of barbed wire fence constructed Number of reported cases of crop damage by hippos	Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	590,000

4.Supporting climate resilient and environment friendly livelihood activities	<ul style="list-style-type: none"> • Number of farmers doing aquaculture • Number of farmers engaged horticulture farming • Number of farmers engaged in beekeeping • Number of youth engaged in hydraform bricks 	Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas.	6.2 Percentage of targeted population with sustained climate-resilient livelihoods	1,000,000
5.Institutional capacity building of Babati Town Council , Babati District Council and lake adjacent communities in planning, implementation of lake Babati restoration measures, climate change adaption actions and dissemination of project results and lessons learnt.	<ul style="list-style-type: none"> • Number of district officers trained on climate change adaption issues • Number of ward officers trained • Percentage of time and funds allocated for supporting climate change adaption interventions by district councils 	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	463,000
Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)

<p>1.Improved restoration of the lake and its ecosystem services</p>	<p>Number of charcoal dams for trapping sediments constructed</p> <p>Length of earthen dike constructed along the lake buffer area</p> <p>Number of soil and water conservation techniques implemented</p>	<p>Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities</p> <p>Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability</p> <p>Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability</p>	<p>4.1.1. No. and type of health or social infrastructure developed or modified to respond to new conditions resulting from climate variability and change (by type)</p> <p>4.1.2 Number of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)</p> <p>6.1.1.No. and type of adaptation assets (physical as well as knowledge) created in support of individual- or community- livelihood strategies</p> <p>6.1.2. Type of income sources for households generated under climate change scenario</p>	<p>957,000</p>
<p>2.Increased restoration of the lake from</p>	<p>Area of lake with aquatic weeds cleared .</p>			<p>380,000</p>

aquatic weeds invasion				
3. Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts	<p>Length of barbed wire fence constructed</p> <p>Number of reported cases of crop damage by hippos</p>	Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	.1.2 Number of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)	590,000
4. Increased income, food security and resilience to climate change impacts	<ul style="list-style-type: none"> • Number of youth engaged in hydraform brick making • Number of farmers doing aquaculture • Number of farmers engaged horticulture farming • Number of farmers engaged in beekeeping 	<p>Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities</p> <p>Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability</p> <p>Output 5: Vulnerable ecosystem services and</p>	<p>4.1.1. No. and type of health or social infrastructure developed or modified to respond to new conditions resulting from climate variability and change (by type)</p> <p>4.1.2 Number of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)</p> <p>5.1.1 Number of natural resources assets created ,maintained or improved to withstand</p>	1,000,000

		<p>natural resource assets strengthened in response to climate change impacts including variability</p> <p>Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability</p> <p>Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities</p> <p>Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts including variability</p>	<p>conditions resulting from climate variability and change (by type and scale)</p> <p>6.1.1. No. and type of adaptation assets (physical as well as knowledge) created in support of individual- or community- livelihood strategies</p> <p>6.1.2. Type of income sources for households generated under climate change scenario</p> <p>4.1.1. No. and type of health or social infrastructure developed or modified to respond to new conditions resulting from climate variability and change (by type)</p> <p>5.1.1 Number of natural resources assets created, maintained or improved to withstand</p>	
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		Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	<p>conditions resulting from climate variability and change (by type and scale)</p> <p>6.1.1. No. and type of adaptation assets (physical as well as knowledge) created in support of individual- or community- livelihood strategies</p> <p>6.1.2. Type of income sources for households generated under climate change scenario.</p>	
5. Institutional capacity building of Babati Town Council, Babati District Council and lake adjacent communities in planning, implementation of lake Babati restoration measures, climate change adaptation actions and dissemination of project results and lessons learnt.	<ul style="list-style-type: none"> • Number of district officers trained on climate change adaptation issues • Number of ward officers trained • Percentage of time and funds allocated for supporting climate change adaptation interventions by district councils 	<p>Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities</p> <p>Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability</p>	<p>2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events</p> <p>3.1.1 Number and type of risk reduction actions or strategies introduced at local level</p> <p>3.1.2 No. of news outlets in the local press and media that</p>	86,000

			have covered the topic	
			7.2. No. or targeted development strategies with incorporated climate change priorities enforced	

Targets for AF's Core indicators of the project

Table 13: Project indicators and Beneficiaries

Core indicators	Information on the core indicators
Number of Beneficiaries	<p>2500 direct beneficiaries and 500,000 indirect beneficiaries</p> <p><u>Detailed calculation of the direct beneficiaries</u></p> <ul style="list-style-type: none"> - 500 households (2500 persons) - Enhanced capacity of local institutions to mainstream climate change in community develop - Enhanced planning, sustainable natural resources management strategies and to record and communicate the lessons learned of 200 persons (100 by year 2 (half of them women and half of them men) - Informed of local climate change issues and adequate adaptation actions to be implemented for 600 persons (300 adult women, 250 adult men, 50 students (25 girls and 25 boys) <p><u>Detailed calculation of the indirect beneficiaries</u></p> <ul style="list-style-type: none"> - All project activities will have an impact on the entire population
Assets produced, developed, improved or strengthened” with the construction of barbed wire fence and earthen dike along the lake buffer area ,	<p>Assets improved or strengthened (in short-term)</p> <ul style="list-style-type: none"> - 4k m of dike - 4km barbed wire fence along the lake buffer area - 500 households - 10 charcoal dams water reservoirs - 4 greenhouses <p>Assets improved or strengthened(long-term)</p> <ul style="list-style-type: none"> - Wards of Nangara, Bonga, Singe and Bagara

<p>“Increased income, or avoided decrease in income”: aquaculture, beekeeping, horticulture, poultry and tree nurseries</p>	<ul style="list-style-type: none"> - The average annual income from horticulture is estimated at US \$ 15,00 from 4th year of the project - The average annual income from sale of honey is estimated at US \$ 10,000 by end of the project
<p>“Natural Assets Protected or Rehabilitated”: reduction of deforestation, improvement of biodiversity,</p>	<ul style="list-style-type: none"> - 50 ha of degraded land planted with trees

G. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

(a) Summary Budget

Table 14: Budget summary

	<u>Components</u>	<u>Output</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Total</u>
-	<u>Components 1: Promoting soil erosion control measures upstream of the lake catchment</u>	-	-	-	-	-	-
-	-	<u>1.1</u>	<u>15,000</u>	<u>10,000</u>	<u>60,000</u>	<u>21,000</u>	-
-	-	<u>1.2</u>	<u>174,000</u>	<u>152,000</u>	<u>120,000</u>	<u>298,000</u>	-
-	<u>Total for component 1</u>	-	<u>189,000</u>	<u>162,000</u>	<u>180,000</u>	<u>319,000</u>	<u>850,000</u>
-	<u>Components 2: Mechanical control of aquatic weeds in the lake and co-generation of compost manures and animal forages</u>	-	-	-	-	-	-
-	-	<u>2.1</u>	<u>188,000</u>	<u>91,000</u>	-	-	-
-	-	<u>2.2</u>	<u>24,000</u>	<u>7,000</u>	-	<u>40,000</u>	-
-	<u>Total for component 2</u>	-	<u>212,000</u>	<u>98,000</u>	-	<u>40,000</u>	<u>350,000</u>
-	<u>Component 3: Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts</u>	-	-	-	-	-	-
-	-	<u>3.1</u>	-	<u>26,000</u>	<u>20,000</u>	<u>20,000</u>	-
-	-	<u>3.2</u>	-	<u>180,000</u>	<u>270,000</u>	<u>30,000</u>	-
-	<u>Total for component 3</u>	-	-	<u>206,000</u>	<u>290,000</u>	<u>50,000</u>	<u>546,000</u>

-	<i>Component 4: Supporting climate resilient and environment friendly livelihood activities</i>	-	-	-	-	-	-
-	-	<u>4.1</u>	<u>9,000</u>	<u>205,000</u>	<u>110,000</u>	-	-
-	-	<u>4.2</u>	<u>90,000</u>	<u>50,000</u>	-	-	-
-	-	<u>4.3</u>	<u>61,000</u>	<u>85,000</u>	-	<u>8000</u>	-
-	-	<u>4.4</u>	<u>95,000</u>	<u>85,000</u>	-	<u>7000</u>	-
-	-	<u>4.5</u>	<u>51,000</u>	<u>70,000</u>	<u>15,000</u>	<u>8000</u>	-
-	Total for Component 4	-	<u>306,000</u>	<u>495,000</u>	<u>125,000</u>	<u>23000</u>	<u>949,000</u>
-	<i>Component 5: . Institutional capacity building of Babati Town Council , Babati District Council and lake adjacent communities in planning , implementation of lake Babati restoration measures, climate change adaption actions and dissemination of project results and lessons learnt.</i>	-	-	-	-	-	-
-	-	<u>5.1</u>	-	<u>24,900</u>	-	-	-
-	-	<u>5.2</u>	-	<u>31,000</u>	-	-	-
-	-	<u>5.3</u>	<u>198,000</u>	<u>92,000</u>	<u>6,000</u>	<u>20,000</u>	-
-	-	<u>5.4</u>	<u>10500</u>	<u>19000</u>	<u>55000</u>	<u>114500</u>	-
-	-	<u>5.5</u>	<u>12000</u>	<u>7500</u>	<u>12500</u>	<u>18500</u>	-
-	-	<u>5.6</u>	<u>17000</u>	<u>17000</u>	<u>18000</u>	<u>19000</u>	-
-	Total for Component 5	-	<u>237,500</u>	<u>191,400</u>	<u>91,500</u>	<u>172,000</u>	<u>692,400</u>
-	Total Project Activities Cost (A)	-	<u>944,500</u>	<u>1,152,400</u>	<u>686,500</u>	<u>604,000</u>	<u>3,387,400</u>
-	-	-	-	-	-	-	-
-	Project Execution cost (B)	-	<u>88,216</u>	<u>107,634</u>	<u>64,119</u>	<u>56,414</u>	<u>316,383</u>
-	Total project cost (A+B)	-	<u>1,032,716</u>	<u>1,260,034</u>	<u>750,619</u>	<u>660,414</u>	<u>3,703,783</u>
-	Management fee (C)	-	<u>82,617</u>	<u>100,803</u>	<u>60,050</u>	<u>52,833</u>	<u>296,303</u>

-	GRAND TOTAL A+B+C	-	1,115,334	1,360,837	810,669	713,247	4,000,086
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(b) Output Budget

Table 15: Component 1 Budget

Component	Output	Activities	Year 1	Year 2	Year 3	Year 4	Notes
Component 1	1.1	Training of farmers on soil water conservation techniques	10,000				Transport allowance 100 farmersx 6 wards, conference hall costs and allowance for facilitators
		Establishment of demo sites (farmer field schools)	5,000	10,000			labour charges for 5 ha per ward x 6 wards @ \$ 500
		Tree nursery establishment	5,000	15,000			Labour charges and materials for 20 nurseries
		Supply of seedlings for tree planting					Transport costs

Total for Output 1.1			20,000	25,000			
	1.2	Construction of earthen dike along the lake buffer zone	200,000	200,000	50,000		Materials and labour charges for construction of an earthen dike with a circumference of 4 km
		Construction of charcoal dams along the lake buffer zone		250,000	120,000	80,000	labour charges and materials Construction of 10 charcoal dams along lake buffer. Each dam costs \$40,000
		Establishment of water users association (WUA)for lake Babati	4000				DSA, transport costs for awareness raising on importance of WUA
		Training of WUA leaders on good governance, financial management and catchment management		8,000			Costs for facilitators, allowance for participants and conference hall costs

Total for Output 1.2			204,000	458,000	170,000	80,000	
Total for Component 1			224,000	483,000	170,000	80,000	

Table 16: Component 2 Budget

Component 2	2.1	Removal of the aquatic weeds using a harvester machine and other specialized equipment	200,000	142,000			Labour charges and cost for equipment hiring and fuel
		Collection and sorting of the harvested water weeds	8,000	2,000			Labour charges
Total for Output 2.1			208,000	144,000			
	2.2	Using the harvested weeds to feed the livestock	5,000				Labour charges and transport to collection centers
		Production of compost manure from weed residues	8,000	7,000			Labour charges and transport to collection centers
		Training of farmers on compost manure production	8,000				Costs for facilitators, allowance for participants and conference hall costs
Total for Output 2.2			21,000	7,000			
Total for Component 2			229,000	151,000			

Table 17: Component 3 Budget

Component 3	3.1	Baseline assessment to estimate the hippo population		6,000			Consultancy fees
		Cropping the recommended number of hippos		60,000			Cost for capturing and translocating the hippos
Total for output 3.1				66,000			
	3.2	Procurement of materials		2000,000	100,000		Purchase of poles and barbed wires for 4 km lake circumference
		Installment of poles and barbed wire		100,000	120,000		Labour charges
		Tree planning along the wire fence			4,000		Labour charges
Total for Output 3.2				3000,000	224,000		
Total for component 3				366,000	224,000		

Table 18: Component 4 Budget

Component 4	4.1	Purchase & installation of drip irrigation equipment		65,000			Materials and labour charges
		Purchase & installation of greenhouse units		100,000			Materials and labour charges
		Contribution to Livelihoods Baseline Study	5000				Consultancy fees
		Training of farmers on horticulture production		5,000			Costs for facilitators, allowance for participants and conference hall costs
		Support farmer groups with capital		115,000	110,000		capital for seeds and other farm inputs for horticulture

Total for Output 4.1			5000	285,000	110,000	
	4.2	Contribution to Livelihoods Baseline Study	5000			Consultancy fees
		Construction of water supply system from the lake for watering livestock	30,000			Materials and labour charges
		Construction of water troughs	45,000	50,000		Materials and labour charges
Total for Output 4.2			80,000	50,000		
	4.3	Fish pond construction	34,000	80,000		Materials and labour charges
		Training of farmers	6,000			Costs for facilitators, allowance for participants and conference hall costs
		Contribution to Livelihoods Baseline Study	5,000			Consultancy fees
		Supply of fingerlings	10,000	5,000		
Total for Output 4.3			55,000	85,000		
	4.4	Contribution to Livelihoods Baseline Study	5,000			
		Purchase of hydraform machines	80,000	85,000		Cost for purchase of hydraform machine @10,000
		Training of brick makers on how to use the machines and other topics related to environmental protection	5,000			
Total for Output 4.4			90,000	85,000		
	4.5	Contribution to Livelihoods Baseline Study	25,000			
		Training of beekeepers on apiary management	7,000			Costs for facilitators, allowance for participants and conference hall costs

		Support beehive production	30,000	40,000			Costs for making modern beehives (materials and labir charges)
		Purchase of equipment and protective gears		30,000	15,000		purchase of Honey processing equipment
		Training on honey processing and packaging	8,000				Costs for facilitators, allowance for participants and conference hall costs
Total for output 4.5			70,000	70,000	15,000		
Total for Component 4			300,000	490,000	125,000		

Table 19: Component 5 Budget

Component 5	5.1	Training Needs Assessment	-	14,900	-	-	Consultancy
-	-	Training of District officials	-	10,000	-	-	Costs for facilitators, allowance for participants and conference hall costs
Total for Output 5.1	-	-	-	24,900	-	-	-
-	5.2	Training farmers associations on climate smart agriculture and sustainable and integrated water management practices	-	15,000	-	-	Costs for facilitators, allowance for participants and conference hall costs
-	-	Supporting Community Based Trainers (CBT) in training peer farmers	-	-	-	-	-
-	-	Farmer exechnge visist	-	16,000	-	-	-
Total for Output 5.2	-	-	-	31,000	-	-	-
-	5.3	Training on enforcement of natural resources laws	12000	-	-	-	Costs for facilitators, allowance for participants and conference hall costs

-	-	<u>Purchase of glass fibre boats to support fisheries management activities for Babati town Council</u>	-	<u>90,000</u>	-	-	-
-	-	<u>Purchase of vehicles to facilitate Lake catchment protection activities</u>	<u>184000</u>	-	-	-	<u>Costs for vehicles</u>
-	-	<u>Maintenance of the boats and vehicles</u>	<u>2000</u>	<u>2000</u>	<u>6000</u>	<u>20000</u>	-
<u>Total for Output 5.3</u>	-	-	<u>198000.00</u>	<u>92000.00</u>	<u>6000.00</u>	<u>20000.00</u>	-
-	<u>5.4</u>	<u>Knowledge management enhanced</u>	-	-	-	-	-
-	-	<u>Research and dissemination activities</u>	<u>5,500</u>	<u>10,500</u>	<u>45,000</u>	<u>75,000</u>	-
-	-	<u>Documentation of project results</u>	<u>5,000</u>	<u>8500</u>	<u>10000</u>	<u>39,500.00</u>	-
<u>Total for Output 5.4</u>	-	-	<u>10,500</u>	<u>19,000</u>	<u>55,000</u>	<u>114,500</u>	-
-	<u>5.5</u>	<u>Project accounting and Institutionalisation</u>	<u>17,000</u>	<u>17,000</u>	<u>18,000</u>	<u>19,000</u>	-
-	<u>5.6</u>	<u>Project auditing</u>	<u>12,000</u>	<u>7,500</u>	<u>12,500</u>	<u>18,500</u>	-
<u>Total for Component 5</u>	-	-	<u>237,500</u>	<u>191,400</u>	<u>91,500</u>	<u>172,000</u>	-

(C) Project Execution Cost

Table 20 : Project execution budget

Component	Output	Activities	Year 1	Year 2	Year 3	Year 4	Total	Notes
Management fee		Salary for project coordinator	24,000	24,000	24,000	23,000	95,000	Salary top up
		Salary for 2 project officers	28,800	28,800	28,800	28,800	115,200	Salaries
		computer and office consumables	9,703	10,400	1,468	614	22,185	
		Inception Workshop	9,609				9,609	DSAs for participants, transport costs and conference hall charges
		Monitoring visits by Project Steering Committee	7,100	7,000	3,000	0	17,100	DSAs and transport costs
		Fuel and vehicle maintenance costs	7,000	10,644	0	0	17,644	
		Mid term review		20,790			20,790	Consultancy
		Final Evaluation			6,200	4,000	10,200	Consultancy
		Bank charges	2,004	6,000	651	0	8,655	
Total Project Execution cost			88,216	107,634	64,119	56,414	316,383	

(d) Management Fee

Table 21: Project Management Budget for NIE

Component	Output	Activities	Year 1	Year 2	Year 3	Year 4	Total	Notes
Management fee		NEMC staff allowances	17,000	17,000	22,000	17,000	73,000	Salary top up
		Vehicle for monitoring visits	40,000				40,000	purchase of vehicle
		Project supervision and follow up missions	17,000	34000	16241	10,000	77,241	
		Fuel and vehicle maintenance costs	7,117	18,503	20,000	12,000	57,620	
		Mid Term Review		29,000			29,000	
		Final Project Evaluation				13,400	13,400	
		Bank charges	1500	2300	1809	433	6,042	
Total Project Management fee			82,617	100,803	60,050	52,833	296,303	

H. Include a disbursement schedule with time-bound milestones.

Table 22: Disbursement schedule

	Upon signature of Agreement	One Year after Project Start	Year 3	Year 4	Total
Scheduled date	October August 2022	October August 2023	October August 2024	October August 2025	
Project Funds	1,032,716-828,000	1,260,034 1,081,050	750,619 1,073,000	660,414 730,000	3,703,783 3,712,050
Implementing Entity Fees	82,617-143,388	48,288	48,238	48,236	288,150
Total	1,115,334-971,388	1,360,837 1,129,338	810,669 1,121,238	713,247 778,236	4,000,086 4,000,200

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PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

- A. Record of endorsement on behalf of the government¹⁴** *Provide the name and position of the government official and indicate date of endorsement. The endorsement letter should be attached as an annex to the project proposal.*

Mohammed Khamis Abdulla, Deputy Permanent Secretary, Vice President’s Office	Date: 9 th August 2021
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- B. Implementing Entity certification**

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person’s name, telephone number and email address

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (National Strategy for Growth and Reduction of Poverty 2010-2015; National Climate Change Strategy 2021, Tanzania Vision 2025 and in the National Adaptation Programme of Action (NAPA) 2007) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

⁶ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.



Fredrick F. Mulinda
Implementing Entity Coordinator

Date: 9th August 2021

Tel. and email: Tel. and email: **+255 753 240 517**,
nieaf@nemc.or.tz / kasigazi.koku@gmail.com

Project Contact Person: Dr Sixbert Mwanga

Tel: +255717313660 . Email: sixbert@cantz.or.tz/s.mwanga10@gmail.com

Field Code Changed

Annex 1: Endorsement Letter

Letter of Endorsement by Government

UNITED REPUBLIC OF TANZANIA VICE PRESIDENT'S OFFICE

Telegraphic address: "MAKAMU",
Telephone: +255 26 2329006
Fax. No.: +255 26 2329007
E-mail: km@vpo.go.tz



Government City,
Mtumba Area,
Vice President's Office Building,
P. O. Box 2502,
DODOMA.

In reply please quote:
Ref. No: BA.90/201/01/101

9th August, 2021

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for *Restoration of Lake Babati for enhanced Climate Change Adaptation in Babati District*

In my capacity as designated authority for the Adaptation Fund in United Republic of Tanzania, I confirm that the above national project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the country.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by National Environment Management Council (NEMC) and executed by World Vision Tanzania in collaboration with Babati Town Council.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mohammed Khamis Abdulla'.

Mohammed Khamis Abdulla
Deputy Permanent Secretary, Vice President's Office

Annex 2 : List of individuals and institutions consulted

STAKEHOLDERS REGISTRATION FORM DURING SITE VISIT FOR COLLECTION OF PROJECT FORMULATION INFORMATION IN BABATI TOWN COUNCIL

S/N	NAME	TITLE/OCCUPATION	SEX	MOBILE NUMBER
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Annex 3: Vulnerability assessment of Lake Babati



**VULNERABILITY ASSESSMENT OF LAKE BABATI IN BABATI
DISTRICT, MANYARA REGION**

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**VULNERABILITY ASSESSMENT OF LAKE BABATI IN BABATI
DISTRICT, MANYARA REGION**

EXECUTIVE SUMMARY

Lake Babati is within the East African Rift valley in Manyara region in Tanzania and it is a fresh water lake in semi-arid environment. Lake Babati basin covers approximately 18 km² whose water is collected from internal springs and surrounding hills of its catchment's areas.

In recent years, lake Babati has been experienced enormous spread of aquatic weeds, submerged in water with high growth rates. These aquatic weeds have rooted in the shallow water spreading towards the deep part of the lakes. The growth of these aquatic weeds is threatening other uses of the lake such as fishing and navigation activities. If no initiatives will be taken into consideration, there is a possibility that the surface area of the lake will be reduced rapidly. On this basis, Babati Town Council requested a support from National Environmental Management Council (NEMC) to uproot the aquatic weeds and propose the measures to reduce or eliminate these Aquatic weeds completely.

NEMC therefore, composed a team of experts from NEMC, UDSM, RS and BTC to assess at what extent the aquatic weeds affect the lake and the surrounding community. Specifically, the experts were requested to (i) identify anthropogenic activities associated with the increase of aquatic weeds in the lake, (ii) visit the lake and observe the aquatic plants and its coverage around and within the lake, and (iii) discuss with different stakeholders about ongoing activities/projects and measures to be taken to protect the lake.

The composed team visited the lake and collected the information for Four days from 8th -12nd June 2021. The information was collected through (i) Literature review (ii) Stakeholder consultations (iii) Physical field visits (iv) Field observation.

According to the group discussion with villagers, most of the activities that threaten the Lake include the poor farming upstream and around the lakes, over grazing, bricks making, illegal fishing, poor solid waste managements, Domestic uses (e.g., washing clothes around the lake and Car wash). The poor farming is the sources of nutrients input into Lake Babati. This nutrient which are in a form manure and fertilizers enter lakes through runoff. Both siltation and nutrients are the sources of the Aquatic weeds observed in the lake.

The aquatic weeds have been covering the large area around and, in the lake, Babati. The covered area with aquatic weeds starts from the shore spreading up to the depth of 3m of the lake. For the moment, the aquatic weeds are limited to around the depth of 3meters although there is a possibility of aquatic weeds spreading towards the deeper part of the lake. The growth and the spreading of these aquatic weeds has seriously affected about 760 fishers which relying on the fishing activities. The fishes hide into these submerged weeds and become difficult to be trapped.

Without taking initiatives, the current situation shows the lake Babati is heading towards dying and disappearing. This situation will cause significant economic impact because a higher percentage of their communities are engaged and depends on fisheries, livestock, agriculture and small entrepreneurship. In this regards, the lake's disappearance will significantly affect their living conditions and the economy as a whole. To ensure effective and sustainable management of Lake Babati, the study team recommends, to review the lake Boundaries including reestablishment of adequate buffer zones (60 meters). The team also recommends that the local communities adjacent to Lake Babati and other relevant stakeholders should be well informed on the noted land use changes and the associated impacts to the Lake resources. This can be done through awareness creation and capacity building in terms of both technical and financial capacity among local communities and district officials on how to ensure sustainable management of the Lake and its resources. It also recommended that the current mitigation measures in particular law enforcement should be reviewed and emphasized to be participatory so as to develop sense of ownership among all Lake Stakeholders including local communities who are main users of the Lake and its resources.

ACKNOWLEDGEMENT

The success of this work is due to the efforts of many people. It is not possible for a single individual to cover all the aspects that has made this assessment study into being and the National Environment Management Council (NEMC), I therefore deeply grateful to all those who have, with such good grace given their time and energy to supply valuable opinions, facts or even moral support.

NEMC would especially like to thank Manyara Region-RAS office and Babati Town Council office for their cooperation during the study in their area of jurisdiction.

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Special thanks are extended to fellow staffs particularly from Directorate of Environment Research and Management (Ms. Ritha R. Said-Team leader, Mr. Noel Kikwale -NEMC Northern Zone and Ms. Janeth Mwakyusa-NEMC Intern) for their efforts to the success of this study.

May God bless you all.

LIST OF ABBREVIATION

NEMC	National Environment Management Council
RAS	Regional Administrative Secretary
GDP	Gross Domestic Product
UN	United Nation
EMA	Environmental Management Act
URT	United Republic of Tanzania
BTC	Babati Town Council
VEOs	Village Executive Officers
WEOs	Ward Executive Officers
RS	Regional Secretariat
UDSM	University of Dar es Salaam
FGD	Focus Group Discussion
BMUs	Beach management Units
DO	Dissolved Oxygen

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1.0 INTRODUCTION

1.1 General Introduction

The freshwater Lakes of Tanzania including Victoria, Nyasa and Lake Tanganyika (URT,2013), and Babati, are undergoing successive dramatic changes. Intensive non-selective fisheries, extreme changes in the drainage basin vegetation, industrialization, agricultural developments dams and the introduction and invasion of exotic species are among the factors that have led to the destruction of the native and endemic components of the Lakes (Nonga, 2012). The lakes have been loaded with nutrients which accelerate the growth of Aquatic weeds.

Aquatic weeds are those unabated plants which grow and complete their life cycle in water and cause harm to aquatic environment directly and to related eco-environment relatively. Aquatic weeds often reduce the effectiveness of water bodies for fish production. They can assimilate large quantities of nutrients from the water reducing their availability for planktonic algae (Lancar and Krake, 2002).

Aquatic weeds interfere also with navigation and recreation. They may also cause reduction in oxygen levels and present gaseous exchange with water resulting in adverse fish production. Although excessive weed growth may provide protective cover in water for small fish growth it may also interfere with fish harvesting. Dense growth of aquatic weeds may provide ideal habitat for the development of mosquitoes causing malaria, encephalopathy filarasis. These weeds may also serve as vectors for disease causing organisms and can greatly reduce the aesthetic value of water bodies from a recreational point of view (Lancar and Krake, 2002).

Free-floating plants (e.g., water hyacinth) attract attention because their often-massive infestations are so obvious. They move with wind and floods, and some have stopped river or lake navigation. They float free and never root in soil. Submersed plants (e.g., hydrilla) complete their life cycle beneath the water. Emerged aquatic weeds (e.g., common cattail) grow with their root system anchored in bottom mud and have leaves and stems that float on water or stand above it. They grow in shallow water, but all can impede flow, block boat movement, clog intakes of electric power plants and irrigation systems, and hasten eutrophication (Lancar and Krake, 2002).

In Tanzania the aquatic weeds especially water hyacinth was observed in 1955 in river Sigi (LVEMP, 1999). Since its first appearance in the Lake Victoria in 1987 waterhyacinth has continued to invade water bodies and wetlands in most of Tanzania lakes (Ndunguru et al., 2001). Aquatic weeds have currently spreading in small lakes and lake Babati is not exception. They are progressively increasing in lake Babati due to ongoing siltation process. In late 1990s, Babati Lake was surrounded with Acacia trees and emerged aquatic plants such as cattils/Typha (Katonge, 2018), the submerged plants were not common. In recent years, lake Babati has been experienced enormous spread of aquatic

weeds, submerged in water with high growth rates. These aquatic weeds have rooted in the shallow water spreading towards the deep part of the lakes. The growth of these aquatic weeds is threatening other uses of the lake such as fishing and navigation activities. Also, if no initiative will be taken into consideration, there is a possibility that the surface area of the lake will be reduced rapidly. On this basis, Babati Town Council requested a support from National Environmental Management Council (NEMC) to uproot the aquatic weeds and propose the measures to reduce or eliminate these Aquatic weeds completely.

1.2 Objectives of the Assignment

NEMC therefore, composed a team of experts to assess at what extent the aquatic weeds affect the lake and the surrounding community. Specifically, the experts were requested to do the following:

- i. To identify anthropogenic activities associated with the increase of aquatic weeds in the lake.
- ii. To visit the lake and observe the aquatic plants and its coverage around and within the lake.
- iii. To discuss with different stakeholders about ongoing activities/projects and measures to be taken to protect the lake.

The team composed of experts from NEMC, UDSM, RS and BTC visited the lake and collected the information for Four days from 8th -12nd June 2021.

1.3 Overview of Babati Town Council

1.3.1 Location, Boundaries and Geographical Setting

Babati is a small town in Babati District of Manyara Region of Tanzania. It is the administrative capital of the district and also the administrative capital of Manyara Region. The new status boosted the town into rapid growth. Since Babati town received the role as district and regional capital, the urbanization process and economical activities increased. Babati town is accessible from the main road between the larger cities Arusha and Dodoma, which enable the food supply, marketing and retailing of processed and readymade foods from outside to Babati town (Lyding, 2009, Katonge 2018).

1.3.2 Climatic conditions and Vegetation

Babati receives an average rainfall between 450mm and 1,200mm per year, with two rainy seasons. The short rain begins in October and ends in December while the long rainy season starts in January with dry spell during February and ends in May. Also, the region has an average temperature ranging from 13^oC to 33^oC depending on altitude and season. The region is usually cool during June through September and warm from October to April. Some areas along the rift valley experience subtemperate type climate as a result of agroecological zone's influence.

1.3.3 Population

According to the 2002 population census, Babati town has a population of 31,077 people of which 28,000 equivalent to 90% of the total population live in the town proper, covering the areas of Babati, Maisaka, and Bagara. 3,077 people, equivalent to 10% live in the peri - urban area of Nangara village. The town's population Growth Rate is estimated at 3.8% annually (URT, 2003). Since 2002 Babati was promoted and become headquarter of Manyara Regional, many people from other regions immigrate into the town for business, work and looking for other opportunities. By 2009, population in Babati Town was estimated to be 74,000 of which 40,000 live in town proper and 34,000 in peri-urban (URT, 2003). According to the national population census of 2012, the Council had a population of 93,108.

1.3.4 Economic Activities

Main economic activities in Babati Township include agriculture, fisheries, livestock, small-scale industries and commercial activities. Agricultural and livestock keeping are the main economic activities carried out within the council at an average of 80% of total population. The main crops cultivated around Lake Babati are maize, beans sorghum, groundnuts, castor oil, pigeon peas and cotton. Agriculture is the major source of income in the area and maize is the main food crop. The vegetables most commonly cultivated are tomatoes, and cabbages which are grown around the lake and the horticultural crops cultivated are bananas, pawpaw, oranges, lemons, and guavas. A small amount of Robusta coffee and sugarcane is grown around the lake as cash crops; all these activities accelerate degradation of lake shores. Cattle are the dominant species of livestock kept around lake and other are goats and sheep (Waggoner, 2006; Gwandu, 2013).

1.4 Literature Reviews

1.4.1 Importance of Lakes

The importance of Lakes is not only accounted for their being highly productive, biologically rich and providing many ecological services, but also their support to both biodiversity and the economy (McCartney et al., 2004). They are natural assets which make significant contributions to the national economies (Munishi et al., 2003; McCartney et al., 2004; URT, 2007). Despite their large size, Lakes are sensitive to the effects of a broad range of environmental pollutants from anthropogenic activities such as agricultural and urban runoff, industrial and municipal facilities, spills and hazardous waste sites (Sunil and Chippa, 2013). Urbanization, accompanied by industrial growth, brings an increase in the number of municipal water and sewage treatment facilities and industrial plants that discharge effluents into the Lakes (Safari et al., 2012).

1.4.2 Description of Lake Babati

Lake Babati is within the East African Rift valley in Manyara region in Tanzania and it is a fresh water lake in semi-arid environment. Lake Babati basin covers approximately 18 km² whose water is collected from internal springs and surrounding hills of its catchment's areas. On the Northern East part of the lake there was mount Kwaraa and Ufyomi forest. However, the ecosystem of Lake Babati has been under pressure due to over exploitation of its resources mainly arable land, water resources, as well as fodder and its grazing land potential (Gwandu, 2013).

The Lake Babati is located in Babati town ship at a junction of equal distance from Arusha, Singida and Dodoma regions, which is about 168 km from Arusha, and 700 km from Dar es Salaam city and 650 km from Mwanza City. It is an approximate average attitude of 1300m above sea level. Lake Babati is located along longitude 35° 45'E and latitude 4° 15'S and 4° 18'S and 35° 42'E. The study was carried among local communities of five village namely: (i) Nangara Ziwani (ii) Nakwa (iii) Himiti (iv) Ngarenaro and (v) Majengo in Babati town ship.

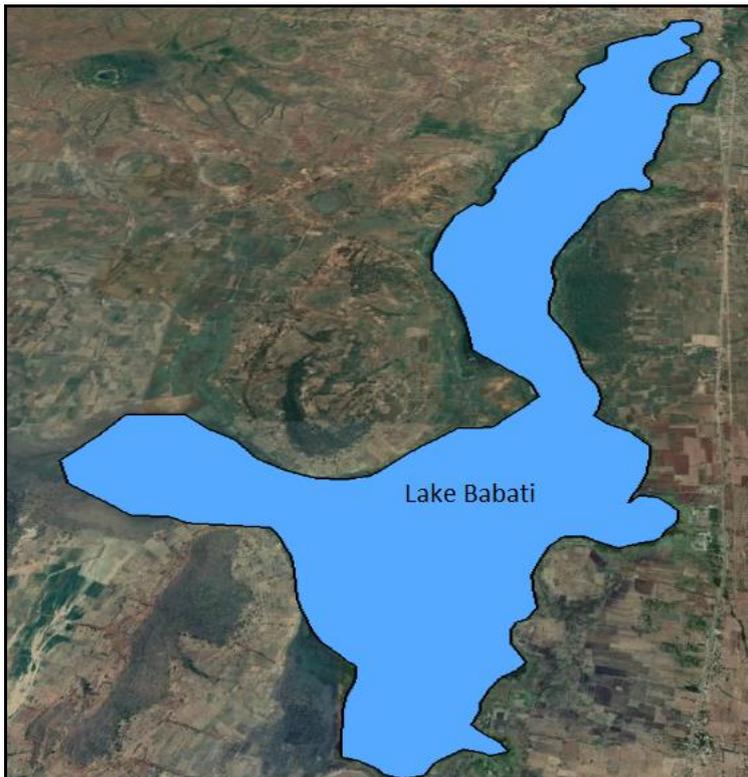


Figure 1.1: Google map showing the lake Babati

1.4.3 Anthropogenic Pressure on the Lake Babati

Lake Babati biodiversity is under stress from a number of factors. For example, in the Lake Babati watershed, invasive species, habitat loss, degradation and fragmentation, rapid residential growth and infrastructure development, unsustainable agriculture practices, pollution of tributaries and open waters, altered hydrology, mining and harvest of fish and forests (Anon, 2006; Gwandu, 2013).

The most anthropogenic activities carried out within and outside the area surrounding the lake include uncontrolled grazing, cultivation, extraction of building minerals (sand and stone), tree clearing, use of fishing gears and other human activities. This means that, any degrading factor due to outside activities has great influence inside the Lake on water purity, ecosystem performance and reduce water level (Anon, 2006; Gwandu, 2013).

1.4.3.1 Land use Changes

There are dramatic land use changes in Babati Town especially in the catchment area of Lake Babati in the period 1990 –2010 and these changes have negative impacts in terms of loss of natural habitats for both flora and fauna, causing negative impacts to both aquatic species and people (Lyding, 2009; Hariohay, 2013). Conservation educations, land use planning, family planning to reduce rate of natural population growth and income generating projects should be emphasized in the conservation of the lake Babati environment (Hariohay, 2013).

1.4.3.2 Population Expansion around Lake Babati

Babati is a fast-growing town. Since it became Town Council and Head Quarter for Manyara Region in 2002, more people have moved to the town looking for work and a lot of bureaucrats have also been transferred there. There are many challenges to a growing town. Housing, transport and working opportunities are the main concerns. But solid and liquid waste management is also a challenge (URT, 2003).

1.4.3.3 Overgrazing

Overgrazing around Lake Babati shore reduces lakeside vegetation and eliminating food for aquatic and wildlife (Obando, 2008). This causes the reduction of vegetation and exposing the lake shores into a risk of erosion. Sedimentation as a result of erosion tends to reduce the lake capacity, resulting in decreased water supply, flood control, water quality, and impairment of aquatic life and wetland habitat (Kent, 1994). The depletion of vegetation from lake shores areas causes increase erosion and gully formation. The cattle are dominant species of the animals kept around Lake Babati. The cattle are important sources of income and traditionally are sources of pride and status among the pastoralists. The impacts of heavy grazing of cattle are often readily apparent along the lake shores that affected water bodies (Moore et al., 1984; Glennly et al., 1987; de Winton et al., 1992). Livestock usage of lake margins is disproportionately high, particularly in

seasonally hot dry climates, because they provide access to drinking water and source of succulent vegetation. Cattle directly affect marginal vegetation (Ellison, 1960; Reinoldii et al., 1975; Platts, 1978; Belsky, 1986). Pastoralists such as the Maasai of East Africa adapted life in arid lands by designating wet and dry season grazing areas (Berger, 1993). Their use of the rangelands was based on mobility, splitting and dispersing livestock over the landscape during wet and dry seasons (Oba et al., 2000) to ensure limited dry concentrated continuous grazing around the wetland and degraded lake shore. The sphere of the Maasai in Kenya and Tanzania is continually experiencing dramatic changes in land tenure and land use, with broad consequences on the rangeland dynamics (Campbell et al., 2000) through the establishment of wildlife protection areas (Western and Wright, 1994). In Kenya, the Maasai land was transformed from communal into group ranches in the 1960s (Graham, 1989).

1.4.3.4 Illegal Fishing

The detrimental impact of illegal fishing in all its forms deplete fish stocks in Lake Babati, damaging fish ecosystems and disrupting the livelihood of lawful fishers (Agnew and Barnes, 2004). Fish are an unconfined resource and up until recently, exposed to uncontrolled exploitation. Most of illegal fishing practices in lake Babati are undersized fishing nets like mosquito net, kokoro (sein net), nets of timber. Others are katuli, chicken wire mesh and poisonous plants, which are illegal and harm surrounding habitat.

This exploitation has been exacerbated over the course of the twentieth century and into the current century through the use of large-haul, highly destructive fishing methods (e.g., Use of undersized nets, chicken wire mesh and mosquitos' nets), an indiscriminate approach from many fishing nations as to where, how and what they fished and soaring market prices (Balton, 2004). Some fishing techniques also may cause habitat destruction. Poisoning i.e., use Ichthyotoxic plants (*Utupa*) in fishing, which are illegal.

1.5 Aquatic Weeds

The simplest definition of a weed is a plant that is a nuisance. Thus, an aquatic weed is an aquatic plant which interferes with the use of water, or in some other way constitutes a nuisance to man or hazard to human welfare. However, in contrast with single purpose systems such as an agricultural crop in which weeds are readily identified as such, water bodies frequently have more than one use, and assessment of the weediness of a plant may be confused when it interferes with one use. such as navigation, while promoting another, such as fish production(Balton, 2004).

Submersed plants are rooted in the bottom sediments and grow up through the water. Flowers or flowering spikes sometimes emerge above the water surface. The main criteria for identification are leaf arrangement and leaf shape.

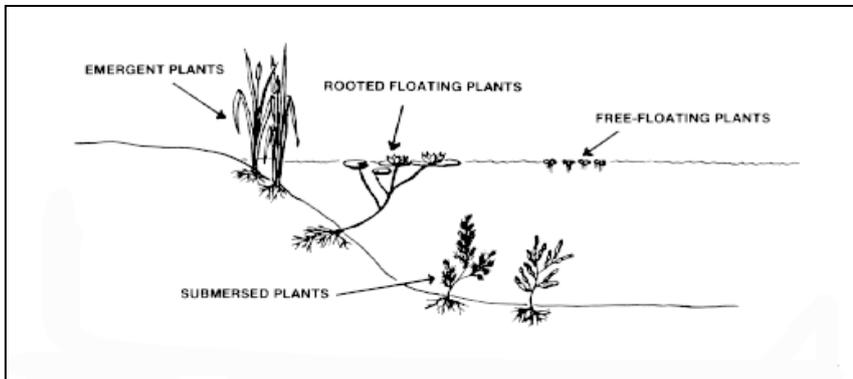


Figure 1.2: Different Aquatic weeds in the lake

1.5.1 Causes of Aquatic Weeds in Lakes

Many aquatic weeds or their seeds are carried into a lake by wind birds, fish introduction, fishermen, etc. These weeds infest a lake only if the water conditions are just right. This usually means that nutrients are entering the lake from runoff or stream inflow.

1.5.2 Effects of Aquatic Weeds in Lakes

Aquatic weeds can assimilate large quantities of nutrients from the water reducing their availability for planktonic algae. They may also cause reduction in oxygen levels and present gaseous exchange with water resulting in adverse fish production

Aquatic weeds cause a variety of problems in water bodies all over the world. They interfere with water flow in and out of the lakes; impede the movement of boats for transport, fishing and recreation; interfere with various methods of catching fish; degrade water quality by adding taints and odours to the water and by decreasing dissolved oxygen content; alter the flora and fauna of aquatic ecosystems by providing new habitats, removing others and by affecting light penetration in the water; and increasing water loss through evapotranspiration (Mitchell, 1985; Aloo *et al.*, 2013; Bansal *et al.*, 2019).

Apart from the negative effects, aquatic weeds form an important element of the aquatic environment as they provide food and shelter for insects, fish and various forms of wildlife. Other uses of aquatic weeds include: food for livestock; as compost manure, mulch or other forms of soil additives; for treatment of wastewaters; for pulp, paper and fibre production for building and weaving; and for energy either for burning directly or for generation of biogas and alcohol (Michell, 1985; National Research Council, 2002).

1.5.3 Controlling of Aquatic Weeds in Lakes

1.5.3.1 Mechanical Control

Manual and mechanical methods such as cutting and dredging are potential ways to deal with excessive growth of aquatic weeds in lakes. Mechanical devices such as dragline excavators, hydraulic back-actors, backhoes as well as small designed tools may be used to remove aquatic weeds (Lishawa *et al.*, 2017; Bansal *et al.*, 2019). However, parts of the weeds left in the water after cutting will decay and generate a considerable demand for oxygen. This can adversely affect aquatic life, for example, fish kills, may occur when a large amount of vegetation has been cut in a small water body. For this reason, this technique should combine both a system for cutting and harvesting/collection of the cut plants. This not only reduces the risk of oxygen deficits but also makes it possible to make use of the harvested material (Samiei and Mabaraki, 2019).

1.5.3.2 Water Level Manipulation

Water level manipulation is used in different parts of the world to control emergent aquatic weeds such as *Typha species* and *Cyperus species* through flooding and desiccating substrates (Asamoah and Bork, 2010; Bansal *et al.*, 2019). However, this method becomes most effective when combined with other management techniques for example burning and cutting. Also, the technique, needs to be carefully done as in some wetlands, especially those with organic soils, extensive desiccation increases inorganic nutrients which may exacerbate re-invasion of aquatic weeds (Bansal *et al.*, 2019).

1.5.3.3 Chemical Control

There are specific herbicides that are used to control aquatic weeds in lakes such as imazomox and imazapyr (Bansal *et al.*, 2019). These herbicides are classified as systemic (absorbed and translocated throughout the plant) and are considered non-selective (kill or damage all plants). Applications of these herbicides are typically carried out as foliar treatments by ground applicators using tank sprayers, but large treatments can be performed using aircraft. However, Herbicide treatment efficacy is reportedly season-dependent and needs to be selectively done to avoid damage of untargeted plants (Samiei and Mobaraki, 2019).

2.0 METHODS

2.1 Introduction

Methods used to collect data for this study were information obtained from literature; Stakeholder and key informant interviews; as well as Physical field visits. Details for each method used are given hereunder.

Literature review: Relevant documents were collected and reviewed, which included among others, relevant policies, legislation, study reports, District environmental, socio-economic and investment profiles.

Stakeholder consultations: Consultations with key stakeholders were done to offices of Regional Commissioner, Town Director, Environment and Fisheries Departments Respective Mtaa and Villages as well as individuals to get their views and perceptions on the causes and effects of aquatic weeds and the ecosystems surrounding Lake Babati area. Also, possible management actions that could be taken to ensure sustainable socio-economic development and environmental conservation were suggested.



Plate2.1: Stakeholders Consultation meetings at Nangara Ziwani and Majengo Mtaa

Physical field visits: Site visits were undertaken in specific areas to identify the extent/level of aquatic weed coverage, land degradation and pollution, human encroachment and siltation. Where necessary photographs were taken (See Plate 2.1). This method also assisted the team to compare the existing land uses with those provided by the key informants/stakeholders and to obtain reliable data of the study area.

Field observation: The field excursions were conducted in those specific areas for fact finding and to observe the current state of the environment and socio-economic activities in specific lake ecosystems. Key areas of focus in the assessment were: observe different types of activities undertaken by community members such as crop farming, livestock grazing, fishing, grasses and trees cutting and unplanned settlements. Also, the researcher observed different effects caused by human activities which found in the study

area. Field observation was used to collect data, specifically around the lake and agricultural principles employed in the villages surrounding Lake Babati.

3.0 RESULTS AND DISCUSSION

3.1 Anthropogenic activities associated with the increase of Aquatic Weeds

Through the stakeholder's consultation it was realized that various anthropogenic activities are prevailing in the study areas which include cultivation, fishing, livestock keeping, brick making and beekeeping. Regarding Lake Sustainability, numerous negative impacts due to anthropogenic activities (See Plates 3.1) were cited to threaten the Lake. Respondents in all villages revealed encroachment (See Plates 3.2). No environmental impact assessment was done before construction and deforestation as the major impacts to the Lake. These results could be because, communities have cultivated within the buffer zone leading to loss of pastures for hippo. Thus, degradation of riparian zones not only affects the riparian area but also the surface and ground water resources and the aquatic fauna and flora; and the terrestrial ecosystem (Roger, 2001). Himiti, Nakwa and Nangara Ziwani respondents on the other hand were having concern on soil erosion and siltation in which brick making was taking place at alarming rate leaving large gullies in the buffer zones. The ecological implication of such erosion could be the deposition of eroded sediments in the Lake hence damaging the spawning grounds of fish. Siltation process suggests the ongoing decrease of Lake Babati depth as it is documented by BTC (2007) that, it has changed from 8 to 5 meters between 2004 and 2011.

On the other hand, aquatic weeds both submerged and emergent need a substrate for their roots. Therefore, all activities that promote the increase of siltation in the lake also accelerate the increase of Aquatic Weeds in the lake. Siltation is associated with the decrease of the lake depth, and hence provide a right condition for aquatic weed especially submerged and emerged plants. The sediments that brought into the river from upstream, they are carrying nutrients into the lake which promote the growth of aquatic weeds. According to the group discussion with villagers, these activities; the poor farming upstream and around the lakes, over grazing, bricks making, illegal fishing, poor solid waste managements, Domestic uses (e.g., washing clothes around the lake and Car wash)

3.1.1 Poor Farming Practice

Poor farming practices around lake Babati strongly influences the presence of chemicals in water such as pesticides, herbicides and fungicides just to mention a few which on the other hand impacts the quality of water in the aquatic systems as these chemicals are carried by surface flowing water into the lakes. The cultivation along the lake also influences the presence of plant organic matter in rivers and lakes which results into a reduced amount of Dissolved Oxygen (DO) in water as this is the case the for presence of aquatic animals is also affected as these animals cannot survive at low level of DO. Therefore, the cultivation of crops along the lake should be strongly avoided, not just

because it influences the decreased amount of dissolved oxygen and loading of organic matter but the practice also encourages the siltation of rivers leading to the decrease of the depth of the lake.

Nutrients from manure and fertilizers enter lakes through runoff and soil erosion from upstream through big gully from Nakwa Village, Riroda, Hoshan, Bonga and Himiti. This runoff may contain a high level of these dissolved nutrients, increasing the risk of contaminating lakes. This facilitates aquatic weed in lake Babati.



Plates 3.1: Farming activities along Nangara Ziwani

3.1.2 Overgrazing

Most livestock keepers around lake Babati use green belt as grazing area with large number of livestock. Overgrazing reduces ground cover, enabling erosion and compaction of the land by wind and rain, which reduces the ability for plants to grow and water to penetrate soil which harms soil microbes and results in serious erosion of the land. This facilitates aquatic weed and reduce water quality.



Plates 3.2: Livestock activities along Nangara Ziwani

3.1.3 Fishing Activities

Fishing is among the important income generating activity of the local communities in Babati District. The lake Babati has the area of 18 km and depth of 5.9. The dominant fish species of the lake are Tilapia *Oreochromis esculentus* and African catfish *clarius gariepinus*. Others are Haplochromes and freshwater shrimps which mostly of the fishermen used them as fishing bait. Most fishing vessels used in the lake are traditional craft of dugout canouns made up of trees propelled by paddles. There are about 131 registered fishermen in the lake until March 2021. The mostly fishing gears used are monofilament, gillnets, hand line, castnets and chicken wire.



Plate 3.3: Fishing activities at Nangara and illegal fishing gears used

3.1.4 Bricks Making Activities

Most of these activities are conducted outside the lake area at Himiti and Managhat Village but has direct impact on land, bricks making leave land with holes making it not suitable for Agriculture and also contribute degradation of land and aquatic environment.



Plates 3.4: Bricks making activities and environmental degradation at Himiti village



Plate 3.5: Cutting of trees as a source of Energy for bricks making at lake buffer zone

3.1.5 Domestic Uses

Domestic activities such as washing clothes near the lake increases amount of Phosphate which is the nutrient requirement for aquatic weeds growth. Based on the observation, communities around use lake water directly for drinking, cooking, bathing and washing clothes (Plate 3.6).



Plate 3.6: Lake water use for washing clothes

3.2 Aquatic Weeds and its Coverage at Lake Babati

Aquatic weeds cover the large area around and within the lake Babati. The covered area with aquatic weeds starts from the shore spreading up to the depth of 3m of the lake. For the moment, the aquatic weeds are limited to around the depth of 3meters although there is a possibility of aquatic weeds spreading towards the deeper part of the Lake (Figure 3.1).

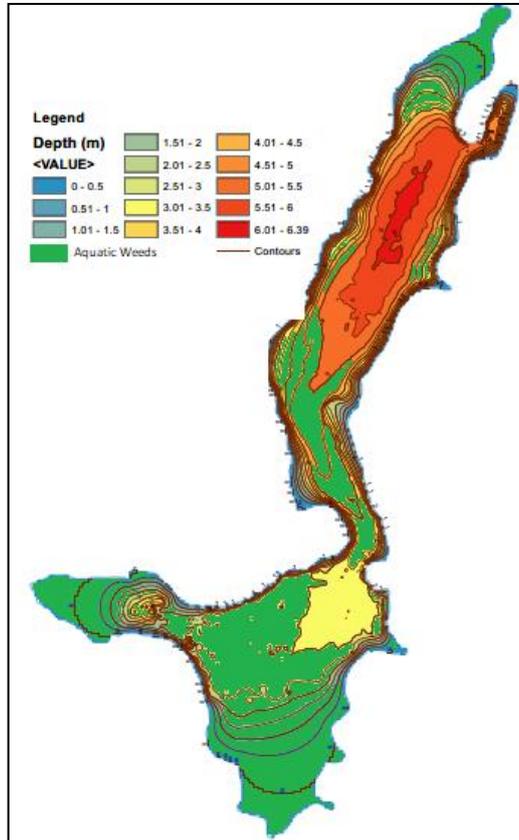


Figure 3.1: The coverage area of aquatic weeds in Babati Lake.

Based on the stakeholder meetings from the villages around the lake, the Local Government including experienced fishers explained that during 1990s, the lake had neither aquatic weeds nor mud. The lake was only surrounded by emergent aquatic weeds (*Typha* species) which were used for construction especially roofing their houses. The submerged and floating aquatic weeds was observed first after the El' Nino, in 1998. During this time, the lake invaded by new weeds which locally is known as "*Maranda*". This is the kind of aquatic weeds that grow and spread within the water without appearing at the surface water (Plate 3.7).

By then, the growth rate and spreading of "*Maranda*" (submerged weeds) was not significant due to the limit of nutrients, high-water level and low siltation of the lake. Approximately five years after the El 'Nino, the *Maranda* spread widely into the lake and

started to interfere with the fishing activities. The *Maranda* weeds have now grown massively creating a very serious problem in Lake Babati (Plate 3.7)



Plates 3.7: The extent and effects of aquatic weeds in Lake Babati

From the discussion with stakeholder and other scientific studies, we concluded that, the rapidly increase of aquatic weeds on the lake have been accelerated by anthropogenic activities including:

- (i) Agricultural activities contribute to lake damage because of the non-compliance of the 60-metre law along with water sources (Refer to Sub-section 3.1.1).
- (ii) Animal husbandry contributes to pollution in lake due to many livestock deployed directly to the lake for pasture hence causing muddying (Refer to sub-section 3.1.2).
- (iii) Fishing activities especially illegal fishing contributes to the pollution of the lake where local fishers are currently the main victims of such damage as well as the large increase in weeds in the lake (Refer to sub-section 3.1.3)

3.2.1 The Magnitude of Effects of Aquatic Weeds to Lake Babati

The growth and the spreading of Aquatic weeds into the Lake has seriously affected about 760 fishers which relying on the fishing activities. The fishes hide into these submerged weeds and become difficult to trap them.

Other effect of aquatic weeds includes reduction of the lake size because they spread and cover the large area of water that hinder fishing activities and providing the escaping route for illegal fishermen. The aquatic weeds also deteriorate water quality of the lake due to their decomposition after dying contributing to mud, thus reduce the lake depth and hinder navigation activities. Availability of dense aquatic weeds attracts some local brew to hide themselves during the process of making *Gongo*.

Without taking initiatives, the current situation shows the lake Babati is heading towards drying and disappearing. This situation will cause significant economic impact because a higher percentage of their communities are engaged and depends on fisheries, livestock, agriculture and small entrepreneurship. In this regards, the lake's disappearance will significantly affect their living conditions and the economy as a whole.

3.3 Ongoing Management of Lake Babati

The Babati Town Council in collaboration with locals manages Lake Babati communities adjacent to the Lake. Harvesting process of the Lake resources mainly fish is under license in which fishermen should acquire licenses from the Local Government prior to fishing. The study revealed some strength for the ongoing Lake management that could ensure the enhanced conservation of the Lake and its resources. These include forest conservation along the riparian zone, law enforcement and environmental education.

Provision of environmental education to local communities bordering the Lake was another strength noted by the study. Local people are educated on the negative impacts associated with their anthropogenic activities to the Lake. The local communities through FGD revealed to know the consequences of their illegal activities within and around the Lake but they were constrained by the rampant poverty which made them to continue harvest the Lake resources irrespective the negative ecological impacts likely to happen.

Despite the noted management strengths in ensuring sustainable conservation of Lake Babati, some weaknesses are likely to undermine the conservation efforts were revealed to include the village government through VEOs and WEOs revealed to lack support from Town Government Officials as there were some officials who are deliberately engaging in illegal fishing. However, the Town Council Fisheries Officer asserted shortage of skilled staff coupled with inadequate conservation fund to be the reason for not conducting regular patrols. The study revealed illegal fishing in the Lake even during the period when Lake was closed for sustainable management to ensure effective breeding of fish. Absence

of area for grazing away from the Lake was another weakness associated with poor Land Use Plan. Since Babati District is among the Tanzanian Districts with many livestock about 55, 110 livestock (BTC, 2011) there is a need to have grazing area for proper management of the Lake and avoiding unnecessary land use conflicts.

For proper conservation of the Lake resources and reduce illegal fishing. Similarly, for better results on conservation of the Lake Babati, the study revealed that community should participate in decision making, implementation stage, monitoring and evaluation of the Lake resources rather than remain as the mere beneficiaries. Host communities are valuable asset which must be carefully incorporated into management strategies for successful conservation programme of Lake Babati. Despite good laws for protection of the Lake environment, they were not effectively enforced. There is a lack of coordination among different law enforcement agencies.

3.3 Proposed measure for controlling Aquatic Weeds at Babati

There several methods for controlling the aquatic weeds at lake Babati that can be categorized in three groups. The first group is related to controlling the siltation of the lake by planting of trees for clear boundary demarcation and using contour ploughing, the second group is related to controlling the nutrients and the third category is to raise awareness and establish by laws. This will include, provision of environmental education, review the existing Land Use Plan, draft amendment of the by- laws, closing the Lake during breeding season, enforcement of the fishery and Environment Regulation.

4.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1 Introduction

This chapter summarizes the study and provides a conclusion discussion basing on the findings and related literatures. It also highlights recommendations in relation to the objectives of the study. It further points out the areas for future studies.

4.2 Summary of the Study

This study aimed at assessing the causes and effects of aquatic weeds in Lake Babati. Specifically, the study analyzed and evaluated the negative impacts due to anthropogenic activities to the Lake.

Study results indicate that, negative impacts to the Lake due to anthropogenic activities prevailing in the study area were mainly illegal fishing practices, soil erosion and siltation. Land use changes have occurred in all study villages for all zones such as cultivation, grazing and residence. On average, cultivation and residence zones increased by 3.1% and 4.9% respectively in the study area between 2000 and 2011 while grazing zone decreased by 5.3% in the study area during those years. All these activities increase siltation and substrate in the growth of aquatic weeds.

The major strengths of Lake Babati management are forest conservation along the riparian zone, law enforcement and provision of environmental education. The main weaknesses undermining the ongoing conservation strategies for the sustainable Management of Lake Babati were poor community participation and lack of proper land use plan that should allocate appropriate area for each land use category in particular grazing and cultivation.

4.3 Conclusion

The study concludes that, negative impacts to the Lake due to anthropogenic activities leads to siltation and eutrophication of the lake that accelerate the growth of weeds. The growth and the coverage rate of weeds are high and they spread from the shore towards the deep part of the lake. mainly illegal fishing activities, soil erosion and siltation. To large extent, land use changes have occurred in the study area for all zones such that cultivation and residence areas have increased while grazing area has decreased between 2000 and 2011. The noted land use changes have mainly resulted due to high rate of immigration into the area because of water availability and fertile soil that favor fishing and cultivation. High population in the urban areas leads to decrease in grazing land hence put much pressure on lake resources. However, it is possible to reverse the existing

situation in land use changes and its impacts to the lake if appropriate measures will be applied.

4.4 Recommendations

To ensure effective and sustainable management of Lake Babati, the study team recommends the following;

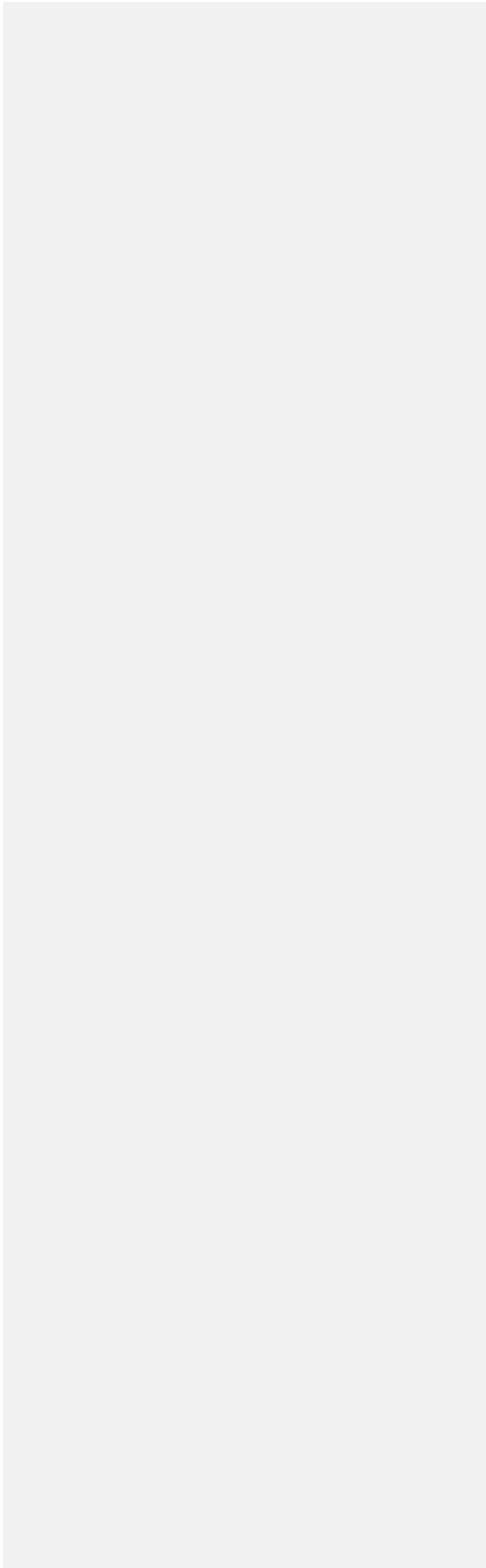
- i) There should be review of Lake Boundaries including reestablishment of adequate buffer zones (60 meters). This should be done through community participation so as to ensure effective settlements reallocation and placement of clear and apparent boundary marks to avoid unnecessary encroachment.
- ii) Local communities adjacent to Lake Babati and other relevant stakeholders should be well informed on the noted land use changes and the associated impacts to the Lake resources. This can be done through awareness creation and capacity building in terms of both technical and financial capacity among local communities and district officials on how to ensure sustainable management of the Lake and its resources.
- iii) The current mitigation measures in particular law enforcement should be reviewed and emphasized to be participatory so as to develop sense of ownership among all Lake Stakeholders including local communities who are main users of the Lake and its resources.
- iv) To create community awareness on the conservation of the lake including control aquatic weeds and siltation.
- v) To upgrade the lake Babati as the Protected area
- vi) To conduct several researches about the lake resources like TAFIRI, TAWIRI
- vii) To establish land use management plan around the lake
- viii) To facilitate environmental committee and beach management unit (BMUs) to manage the lake resources
- ix) Enforcement the law concerning to conservation of the lake.
- x) To support the community in alternative economic activities.
- xi) To identify the opportunities found in the lake in the future
- xii) VPOs to provide support and awareness about conservation of the lake and to enforce 60 meters law

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Annex 4 : Similar projects justifying no duplication

Initiative	DP/Agency	Objectives	Implementer	Project Area	Timeframe
Smallholders' Utilisation of Smart Technologies in Agricultural Industries and natural resources management	Norway	Up scaling agriculture sectors for smallholder farmers	Ministry of Agriculture (MoA)	Manyara and Arusha regions	2017-2021
SRMP	IFAD, Irish Aid (IA), International Land Coalition (ILC), ILRI and Tanzania Government.	Promoting traditional livestock keepers and farmers to acquire, own, and maintain sustainable land management.	Ministry of Livestock and Fisheries; National Land Use Planning Commission (NLUPC); International Livestock Research Institute (ILRI); Community Organisations dealing with Livestock; and LGAs	Districts of Chalinze, Kiteto, Kilindi, Mvomero and Morogoro rural	2017-2021
SWIOFish	WORLD BANK	To Improve Management Effectiveness of Selected Priority Fisheries at Regional, National and Community Level	The Ministry of Livestock and Fisheries, FETA, TAFIRI, MPRU and LGAs	17 LGAS along Indian Ocean	2017- 2021
Projection of Climate Change effects on Lake Tanganyika	DANIDA	To assess the impact of climate change on Lake Tanganyika	TAFIRI	Lake Tanganyika basin	2016 - 2019
Ocean Acidification Observation in Tanzanian	WIOMSA	Research based on Ocean Acidification	TAFIRI	Indian Ocean	2019 - 2022

Coastal Waters		Monitoring Programme			
Inclusive Green Growth of the Smallholder Agriculture Sector in SAGCOT	Norway	<ul style="list-style-type: none"> a) To increase access to inputs and improved agronomic practices b) To improve post-harvest handling, c) To improve access to markets, d) To improve the policy environment and advocacy for climate smart agriculture 	Ministry of Agriculture (MoA)	SAGCOT Region	2016-21
GCCA Programme: Integrated Approaches for Climate Change Adaptation in the East Usambara Mountains	EU	To support 8 communities living near high biodiversity forests in the East Usambara Mountains to increase and diversify incomes, strengthen resilience and reduce vulnerability to climate change-related impacts.	ONGAWA and TFCG	Tanga Region	2015-2019
GCCA Programme: Scalable Resilience: Outspreading Islands of Adaptation	EU	To increase the adaptive capacity of 18 at-risk Tanzanian communities while pioneering replicable solutions to climate change vulnerability.	Community Forest Pemba	Pemba Island, Zanzibar	2015-2019
GCCA Programme: Igunga Eco-Village	EU	To increase the resilience of 9 local farmer communities in Igunga by increasing resilience to the adverse effects of climate change	Heifer International	Tabora Region	2015-2019
GCCA Programme:	EU	To roll-out the best practices from Chololo	Eco ACT (IRDP)	Dodoma Region	2015-2019

Eco-village Adaptation to Climate Change in Central Tanzania (ECO-ACT)		Eco-Village and introduce new innovations based on vulnerability assessment; Strengthen the capacity of local government institutions in two districts on climate change adaptation strategies; Establish an effective knowledge management system for learning and sharing.			
GCCA Programme: ECO-BOMA: A climate-resilient model for Maasai Steppe pastoralists	EU	<ul style="list-style-type: none"> a) Access to ecosystem services protected and improved. b) Economic asset of pastoralist communities developed. c) Local government capacity to cope with climate change increased. d) Knowledge about climate-related vulnerabilities and impacts and climate change adaptation solutions increased 	ECO-BOMA	Arusha Region	2015-2019
Urban Resilience	DFID	Improving the urban resilience			
Scale up for water security and Agriculture resilience	DFID	Improving water security and agriculture resilience	Ministry of Water	National and basin level and LG	start April 2015
Assisting Institutions	DFID	Strengthening how institutions and		National Wide	2015 - 2020

and Markets for Resilience		markets deliver climate resilience and low carbon growth			
Developing Core Capacity to Address Adaptation to Climate Change in Tanzania in productive coastal zones (GEF Project)	Least Developed Countries Fund (LDCF)	Enhancing Adaptation to Climate Change in Tanzania in productive coastal zones	VPO-DoE	Pangani, Rufiji, Bagamoyo, Zanzibar	2012-2017
Concrete Adaptation Measures to Reduce Vulnerability of Livelihoods and Economy of Coastal Communities of Tanzania	Adaptation Fund (AF)	Reducing Vulnerability of Livelihoods and Economy of Coastal Communities	VPO-DoE	Coastal zone	2012 -2017
Integrated Planning to Implement CBD and Resilience to Climate Change	Germany	Improved application of legal tools for land-use planning and participation in decision-making towards implementation of the CBD convention	GIZ	Katavi- Rukwa protected landscape and catchment near Sumbawanga	2014-2018
Climate-sensitive Water Resources Management	Germany	A soft and research based climate change adaptation aimed for a) Improved (climate-sensitive) Water Resources Data and Information b) Inter-sectoral cooperation	GIZ	National, Lake Rukwa and Lake Nyasa Basins, up scaling to all other basins through multi-level approach	2013-2019

		<p>c) Climate change adaptation in Water Resources Management</p> <p>d) Organisational and Leadership Development</p>			
Ecosystem-Based Adaptation for Rural Resilience in Tanzania	GEF LDCF	To increase resilience to climate change in rural communities of Tanzania by strengthening ecosystem resilience and diversifying livelihoods	VPO	Kishapu, Mpwapwa, Mvomero, Simanjoro and Kaskazini A (Unguja)	December 2018- December 2022
Reversing Land Degradation Trends and Increasing Food Security in Degraded Ecosystems of Semi-arid areas of Tanzania	International Fund for Agricultural Development – IFAD	A climate change project promoting adaptation through reversing Land Degradation Trends and Increasing Food Security in Degraded Ecosystems of Semi-arid areas of Tanzania	Ministry of Agriculture	Nzega, Kondoa, Singida (Mkalama), Magu, na Pemba (Micheweni),	2018-2023
Capacity enhancement of policy makers and policy support institutions for climate information generation, management and integration into development plans and programmes	African Development Bank (AfDB)		VPO	Same and Mwangwa districts	2018-2022
Small Grants Programme - Community	UNDP	Adaptation	Bahi and Mnayoni		2013-2017

Based Adaptation					
Concrete Adaptation Measures to Reduce Vulnerability of Livelihoods and Economy of Coastal Communities of Tanzania (Adaptation Fund project)	Adaptation Fund (UNEP)	Reducing Vulnerability of Livelihoods and Economy of Coastal Communities	Coastal zone district		2012 -2017
Electrification of North Western Tanzania - Rural electrification component from Rusumo Hydropower source	EU-Africa Infrastructure Trust Fund	Access for rural households and businesses to sustainable, affordable and renewable energy services	North-West Tanzania		2012-18
Enhancing comprehensive climate change resilience in Zanzibar	UNDP	Capacity building	DoE Zanzibar		2019-2022
Enhancing national capacity for mainstreaming climate resilience in Zanzibar	AfDB	Enhancing capacity to adapt to the impacts of climate change in Zanzibar	DoE Zanzibar		2018-2020
DCFP	UK Aid	Climate Resilience for Cooperatives	ZACCA, Zanzibar		2016-2017
Simiyu Climate Resilience Project	GCF	To increase the climate resilience of rural and urban households, particularly small	Ministry of Water	Simiyu region covering Water, Agriculture and Health sectors	2019-2024

		scale farmers and women living in the Simiyu Region and to improve policies and regulation for cross-sectoral action towards climate adaptation			
Mainstreaming Environment & Climate Change Adaptation in the Implementation of National Policies	UNDP and One UN Fund	Policy based project to ensure that environment and climate change are mainstreamed in the most economically important and vulnerable sectors of the economy in Tanzania leading to reduced poverty levels while maintaining environmental integrity	VPO	Tanzania Mainland & Zanzibar	2013-2017
Strengthening Climate Information and Early Warning Systems (SCIEWS)	GEF through UNDP	To strengthen the weather, climate and hydrological monitoring capabilities, early warning systems and available information for responding to extreme weather and planning adaptation to climate change in Tanzania.	PMO –Disaster Management Office	Lindi, and Arusha, Mbeya, Tanga, Kigoma, Songea, Njombe, and Iringa regions: Mafia and Zanzibar Airport	2013-2019
Strengthening Climate Change Governance in Zanzibar	UNDP and One Fund	To support the Zanzibar Vice presidents Office(ZVPO) in strengthening climate change governance for Zanzibar through capacity building and mainstreaming of adaptation actions in development plans		Zanzibar	

Supporting the implementation of integrated ecosystem management approach for landscape restoration and biodiversity conservation in Tanzania	GEF through United Nations Environment Programme	To review and harmonize policies and legal and institutional framework for sustainable landscape restoration initiatives	VPO/NEMC	Great Ruaha, Lake Rukwa and Malagarasi River basins	
Securing watershed services through sustainable land use management in the Ruvu and Zigi catchments (Eastern Arc Region)	GEF/UNDP	Build institutional capacity and strengthening coordination among water basin authorities and relevant stakeholders in implementing practical sustainable land use management	Ministry of Water and Irrigation	Eastern Arc Region (Pangani and Wami Ruvu Basin-Tanga and Morogoro)	2015-2020
Decentralised Climate Finance Project (DCFP)	IIED	Pilot climate financing in selected district of Manyara region	TAMISEMI	Longido Ngorongoro Monduli	2016-2020
Building Capacity for Resilient Food Security Project in Tanzania	UNEP	Support URT in strengthening knowledge and Systems to target resilient food security in line with existing government agriculture policies.		Morogoro (Movomero) Dodoma (Bahi) Tabora (Uyui) Iringa (Kilolo) Lindi (Ruangwa) Zanzibar (Unguja Kusini, Kaskazini B-Unguja, Chakechake and Wete)	2018-2023

Annex 5: Gender analysis against project components

<u>Project Component</u>	<u>Gender Risks/Challenges</u>	<u>Proposed mitigation strategies</u>	<u>Benefits</u>
<p><i>Component 1:</i> <i>Promoting soil erosion and sediment control measures</i></p>	<ul style="list-style-type: none"> • <u>Gender based conflicts including incidents of abandonment or separation of couples linked to climate change issues such as water scarcity and food shortage</u> • <u>Low level of representation of gender groups in water management system as the current system in the district is dominated by men.</u> • <u>Women and children especially orphans suffer the most and are more vulnerable to food insecurity whenever crop failure happened due to drought and prolonged dry spell periods when compared to men</u> 	<p><u>Proper guidelines to establish gender sensitive water governance system to guide representation of women, youth and vulnerable groups in the village water management institutional structure</u></p> <p><u>Enable improved access to rural water supply systems and technologies</u></p> <p><u>Improve knowledge on best farming practices and transform traditional farming system through solid farmers tailored trainings using Farmer Field School Approach and smart micro-irrigation practices</u></p>	<p><u>Gender sensitive water and soil management institutional structures strengthened/established and functioning</u></p>
<p><i>Component 2:</i> <i>Mechanical control of aquatic weeds in the lake and co-generation</i></p>	<ul style="list-style-type: none"> • <u>The presence of aquatic weeds affects fish availability. This has disproportionately affected women engaged in the small business of frying fish and selling</u> 	<p><u>Proper guideline for selection members of farmer and women groups</u></p>	

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<u>of compost manures and animal forages</u>	<ul style="list-style-type: none"> Inadequate manures and prolonged dry spells have led to low crop yield thus 	Enhance inclusive knowledge on compost manure	<ul style="list-style-type: none"> Increased use of aquatic weeds as manures in crop
	affecting household food security whereby men, women and youth will also be affected	and forage conservation	production and forage for domestic animals; thus benefiting all gender groups including women.
<u>Component 3: Securing the Lake Buffer Zone for improved conservation and reduction of hippo-human conflicts</u>	<ul style="list-style-type: none"> Hippo-human conflicts exacerbate the vulnerability of communities to climate change impacts as they lead to crop damage and loss of human life. Crop damages affects crop yield thus affecting household food security. Hunger affects not only women, children and the youth, but also men, people with disability and the elderly As most of death cases caused by hippos involve men. Some women become widows and remain incapacitated to support their families 	Clear guidelines and by laws on management of hippo-human conflicts	<ul style="list-style-type: none"> Improved crop yield for the benefit of all Reduced death cases due to hippos

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<p><u>Component 4:</u> <u>Supporting climate resilient and environment friendly livelihood activities</u></p>	<p><u>Inactive and low participation of women and girls climate resilient and environment friendly income generating activities especially marginalization of women, youth and vulnerable groups</u></p>	<p><u>Proper and inclusive criteria for selection of beneficiaries to ensure 50% of all people involved to implement activities under this component are women</u></p> <p><u>Ensure that all groups are equally represented on managing ecological and environmental quality and involved in restoration activities</u></p>	<p><u>Increased alternative income generating options, contributing to reduction of income poverty and building climate resilience of vulnerable communities especially women and girls</u></p>
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<p><u>Component 5:</u> <u>Institutional capacity building of Babati Town Council, Babati District Council and lake adjacent communities in planning, implementation of lake Babati restoration measures, climate change adaption</u></p>	<ul style="list-style-type: none"> <u>Existence of social, economic and political barriers that limit women to actively engage in climate change adaptation activities which make them to suffer the most whenever climate calamities happen</u> <u>Low participation by vulnerable groups due to low literacy levels and existence of groups with special/individual interest over others</u> 	<p><u>Proper guidelines on participation of vulnerable groups in capacity building and other project activities will be put in place and adhered to ensure selection of at least 45% of women as beneficiaries for participation in Capacity and knowledge management and other project interventions</u></p>	<ul style="list-style-type: none"> <u>Improved knowledge of village communities, technical staff of Kongwa District Council and civil societies on climate change, its impacts and adaptation strategies</u> <u>Capacities of beneficiaries to implement concrete adaptation actions for climate resilient and sustainable</u> 	<p>Formatted Table</p>
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actions and dissemination of project results and lessons learnt.

Gender groups especially women need to be supported and empowered to participate in capacity and knowledge management activities

livelihood systems strengthened

- Demonstration centers, eco- schools and eco-villages for ecosystems management and alternative income generating activities established
- Review and mainstream climate change adaptation measures into sustainable development plans at district, wards to village levels