ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I:PROJECT/PROGRAMMEINFORMATION

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Project/Programme Category:	Regular Project
Title of Project/Programme:	**Enhancing Climate Change Resilience of Coastal Communities of Zanzibar**
Type of Implementing Entity:	National Implementing Entity (NIE)
Implementing Entity:	Do not fill
Executing Entity/ies:	**Department of Environment, Second Vice President's Office, Zanzibar**
Amount of Financing Requested:	**US$ 1,000,000**

1.0 Project Background and Context

Zanzibar is one of the two countries that form the United Republic of Tanzania (URT). Located in the Indian Ocean, just south of the Equator, the Zanzibar archipelago comprises two major islands - Unguja and Pemba - and more than 50 other small and remote islets. In the last census, of 2012, Zanzibar had 1,303,569 inhabitants. The population had increased by 33% since the previous census of 2002, with an average annual growth rate of 2.8. Population growth rates are projected to be high.

While Zanzibar is working towards alleviating abject poverty, climate change is yet another bottleneck to its socio.-economic development. Climate variability has caused prolonged dry periods and unpredictable rainfall patterns making crop cultivation unproductive. Freshwater resources are also in limited supply mainly dependent on seasonal rains that store water in inefficient groundwater aquifers consisting of freshwater lenses floating on the underlying seawater[1].Furthermore, increasing temperatures have occasionally caused seal level rise leading to saltwater intrusion in low-lying farm fields, notably rice farms. To this end, the Revolutionary Government of Zanzibar in consultation with stakeholders and guided by Zanzibar's development Vision 2020 and the MKUZA-III development plans, has developed a Zanzibar Climate Change Strategy (ZCCS) in 2014. The Strategy has been developed to spearhead the development of climate change interventions in Zanzibar. The ZCCS provides strategic priorities and prioritized sectors for implementation. Among the strategic priorities include the building adaptive capacity and intervention for Resilient Coastal and Marine Areas and Ecosystems. A broad set of potential adaptation options has been identified in the Zanzibar Climate Change Action Plan (2016). These have been prioritized in a short and long-term priority plan, built around an adaptation pathway that maximizes economic opportunities whilst building information to help decisions in the future, especially in the face of uncertainty. However, the island is inadequately adapted to the current climate stress, and there is an urgent need to curb the existing adaptation shortfall.

1.1Socio-economic context

[1]Gössling, S. (2001). The consequences of tourism for sustainable water use on a tropical island: Zanzibar, Tanzania. Journal of Environmental Management 61 (179 – 191)

The economy of the islands is very dependent on climate with reliance on agriculture, natural resources and ecosystems exploitation. Agriculture sector has direct contribution to the livelihoods of many people, providing more than 75% of the foreign exchange earnings. However, the coastal climate regime of Zanzibar is changing, and increasing wave activity and wave heights are a factor in recent increase in salt water intrusion on the islands. In recent decades, Zanzibar has seen rising temperature, increased rainfall variability, higher wind speed and extreme weather events. Around 150 sites on the islands have been identified as being affected by salt water intrusion and are now not suitable for agriculture. This has contributed to food insecurity whereby 26% of Zanzibaris are food insecure and 3.6% are facing chronic food insecurity. Overall, the frequency and intensity of extreme events (e.g. drought and floods) are expected to increase. Negative impacts will include reduced water availability, vegetation and land degradation, and ecosystem and biodiversity destruction, as well as negative impacts on poverty eradication, economic development, food production and health. The country's rural poor, particularly subsistence farmers who are mostly women and livestock keepers, will be affected the most. Indeed, Zanzibar is at risk in terms of agricultural productivity loss due to climate change impacts. Livelihood enhancement through application of innovative adaptation mechanisms in the agricultural sector is urgently needed to improve food production and support livelihood activities especially in coastal rural communities.

This project will be implemented in selected two districts of North B in Unguja and Wete district in Pemba. North B and Wete are poor districts in Zanzibar where majority of the inhabitants practice small scale businesses. The most important economic activity of the community is agriculture followed by fishing and other small enterprises for income generation. The communities face a number of challenges such as low crop production, minimum fish catch, high temperatures and low rainfall periods, beach erosion, long periods of droughts and sea water rise, encroaching most of paddy farming areas along the coastal belts. To ensure their food security, the communities have decided to engage into other income generating activities such as sea-weed farming, charcoal and small-scale enterprises aimed at boosting their income for livelihood development. Climate change impacts have the potential to undermine and even undo progress made in improving the socio-economic well-being of these people from low production rate of agricultural products. The negative impacts associated with climate change are also compounded by many factors, including widespread poverty, human diseases, and high population dynamics, which could be exacerbated by migration of farmers from place to place as a result of salt water intrusion on crop fields. Sea-level rise and unexpected rainfall patterns represent important components of climate change for these districts, with significant implications to deterioration and degradation of natural resources of coastal environments. Subsistence agriculture is dramatically affected by the stress of climate change and farmers will be left extremely impacted without many other options to turn to.

Figure 1: Farm affected by salt water inundation

1.2 Development context

Like any other country, agriculture is vital for the economy of Zanzibar and is accorded high priority in the government policy and planning as it contributes to food security and food self-sufficiency. Furthermore, Agriculture is the main economic activity accounting for more than 70 percent of merchandise export earnings. Zanzibar agriculture is smallholder, largely dependent of rainfall. The Revolutionary Government of Zanzibar (RGZ) had envisioned eradicating abject poverty and attaining sustainable human development by 2020. This vision is also reflected in the Zanzibar Strategy for Growth and Reduction of Poverty III (ZSGRP III also known as MKUZA III in Swahili) 2016- 2020 which carries an overall theme "Economic Growth and Social Development for the Well-Being of All". While the RGZ had put forward strategies to bring about economic and social development, climate change seems to impede the development efforts especially in the agriculture and water sectors. The erratic rainfall patterns have caused low agriculture production leading to food shortage. For example during the period 2016 -2017 there were prolonged dry spell which left smallholder farmers severely affected. Zanzibar experienced prolonged dry spell from July to October 2016 following delayed and below normal rainfall which resulted into crop failure and reduced harvest in all districts of Zanzibar. Moreover, in the period March to May 2017 during the rainy season, the rains were far above the normal resulting into flooding which affected planted crops, damaged infrastructure and caused the outbreak of cholera which all together disrupted the livelihood of many population especially farming households[2]. Saltwater intrusion is another challenge affecting the economic development of Zanzibar due to sea level rise. Sea level rise leads to increased tides and thus flooding the low-lying areas including the crop fields. This reduces crop yield, notably rice which is grown in flood plains. The reduction of rice production has economic implication as some rice will have to be imported and thus increasing the price or government expenditure by subsidizing the imported rice.

The UKAID funded study on Economics of Climate Change in Zanzibar demonstrated that a large proportion of Zanzibar's economy is associated with climate sensitivity activities such as agriculture, tourism and through the use of natural resources. Thus, the economy of the islands, and the livelihoods of the people, depends on weather and

[2]https://reliefweb.int/sites/reliefweb.int/files/resources/1_IPC_Tanzania_Zanzibar_AcuteFI_Report_2017JulySept.pdf

the climate. In the report published in 2012 and available on the website[3] it can be found that Zanzibar already suffers major impacts from current climate variability. It is periodically affected by the extremes associated with El Niño and La Niña years, which leads to floods and droughts. Such extreme events have major economic costs on Zanzibar, which are significant at the macro-economic level, as well as affecting many livelihoods. Therefore, the islands have an adaptation deficit. Considering the role of agriculture in providing food to the people of Zanzibar and supporting the livelihoods of smallholder farmers many of whom are still poor, it is imperative that some interventions are implemented to enhance their resilience to climate change impacts. By addressing water shortage in the climate stricken semi-arid areas and saltwater intrusions, agriculture production will be improved and thus building climate resilient economy of Zanzibar.

1.3Environmentalcontext

Both MKUZA III and Zanzibar Environmental Policy 2013 recognize the fact that the islands have experienced economic growth and social development which came at a cost of environmental degradation. This is influenced by population growth, expanding tourism industry, rising energy demand and depletion of natural resources. Urbanization and tourist industry have led to increased degradation of vegetation and wetlands thus putting pressure on fresh water resources which are scarce. The scarcity of freshwater in Zanzibar is attributed to limited rainfall and its geographical location; it consists of two islands found in the Indian Ocean which contain saltwater. Generally, the groundwater in the islands contains salt and may be easily affected by sea water intrusion even under minimum pressure. Thus, piped water is normally supplied from distant sources[4]. The hydrological cycle of oceanic islands like Zanzibar suggests that the depth of water lenses decreases as distance increases from the central, hence making the shorelines less resilient to sea level rise and associated sea water intrusion[5]. The rapidly growing tourism industry consumes a large amount of freshwater and the fixed tariff allows for unrestrained use of freshwater by hotels at a minimal cost[6]. Groundwater which is the main source of freshwater has been utilized at rate higher than its recharge rate leading to the movement of saltwater towards the freshwater aquifers and hence reducing freshwater. To date many ordinary households in Zanzibar struggle to find water for domestic use. To recover freshwater, the Zanzibar Water Authority has to apply desalinization technology. Moreover, population growth has led to increase in energy demand for cooking. Since fuelwood is largely used, a sizeable forest area has been deforested as a result of charcoal production. Generally, destruction of forests along the coast of Zanzibar is a result of limited livelihood activities, population increase and high demand of wood-based products. Forest clearing is usually for agriculture, settlements and development projects[7]. In particular, rice farms were created by clearing of mangrove forests. The farmers could grow rice throughout the year owing to water availability in the freshwater frontier of the mangrove ecosystem. However, currently the rice farms are no longer suitable for rice production due to saltwater intrusion which is partly attributed to sea level rise, an impact of global warning and climate change. The clearing of mangroves for construction of tourist hotels and agricultural expansion have had detrimental environmental effects, notably increased beach erosion owing to sea waves which were in the past absorbed by mangroves.

Zanzibar is dominated by a tropical low land humid type of climate with an average annual rainfall of 1700mm and mean maximum temperature of 26^0C. The cropping calendar is influenced by rainfall which is bimodal, i.e. the long rains (Masika) from March to June and the short rains (Vuli) from October to December. Generally, Pemba Island receives more rainfall than Unguja with Unguja receiving more rainfall during the short rainy season, while Pemba

[3] http://www.economics-of-cc-inzanzibar.org

[4] Hansson, E. (2010). Groundwater on Zanzibar - use and pollutants, Institutionenförväxt- ochmiljövetenskaper, Göteborgsuniversitet. Retrieved July1 8, 2019, from http://www.bioenv.gu.se/digitalAssets/1322/1322530_erik-hansson.pdf

[5] Halcrow. (1994). The development of water resources in Zanzibar. Final report. Revolutionary Government of Zanzibar, Zanzibar, Tanzania.

[6] Slade, Lorna, Ali Thani, Hajj M. Hajj and SalumN.Mbaruok. 2012. "Water Equity In Tourism: Zanzibar Case Study". Mwambao Coastal Community Network

[7] Nordic Development Fund (2014). Coastal Profile for Zanzibar

receives more long rains than Unguja[8] (see Figure 2). The rain-dependent crop cultivation is highly affected by climate variability characterized by erratic rainfall and increasing dry periods. Sea level rise and prolonged dry periods are two main climate issues affecting the livelihoods of people of Zanzibar. The prolonged dry periods make agriculture production impossible as it is dependent on rainfall. No irrigation schemes are in place to cope with dry conditions.

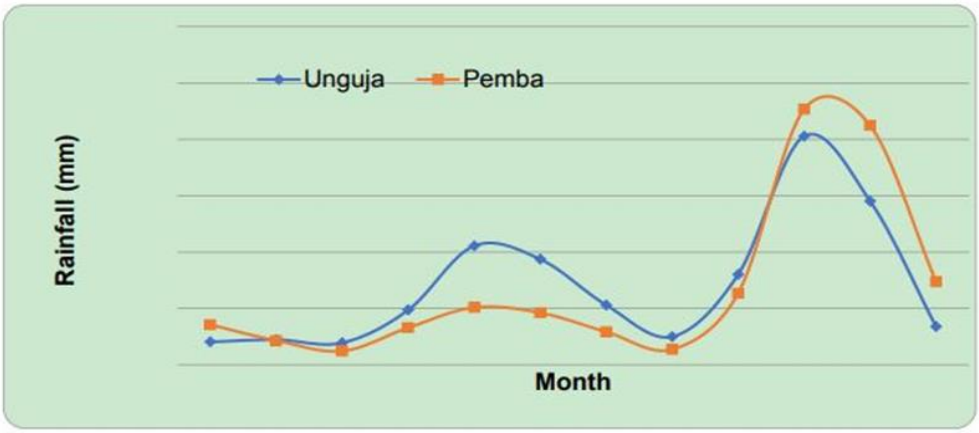
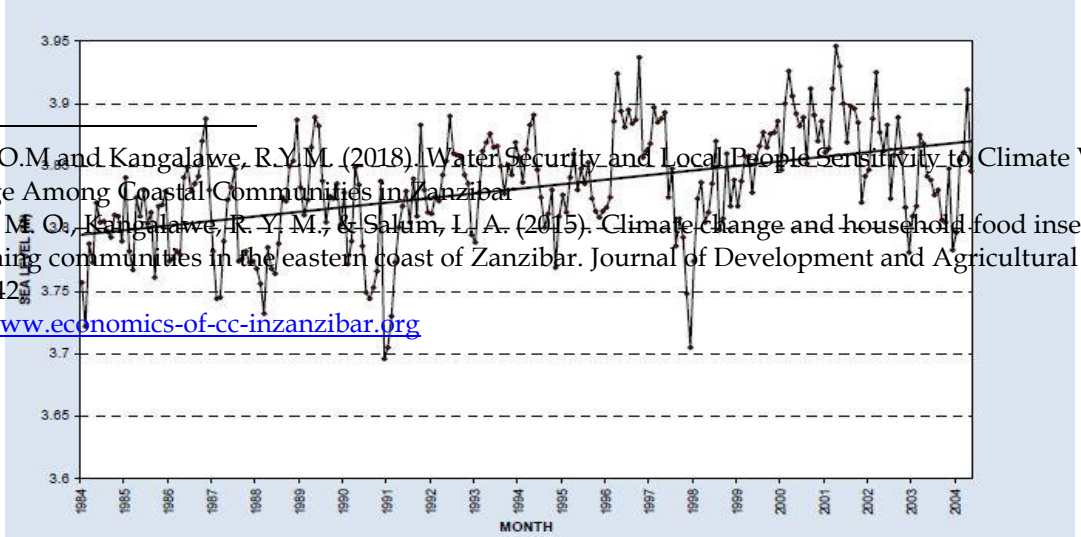


Figure 2:Monthly rainfall showing the two rainfall peaks for Zanzibar during the Vuli (left) and Masika (right) rains[9]

The tide measurements for Zanzibar indicate some increasing inter-decadal trends, with some variations over time. In particular, alongside increasing wind speeds on the islands, there have been increases in wave heights and high-water levels (see Figure 3a). This suggests that the wave climate regime could be changing, and increasing wave activity contributes to enhanced coastal erosion, especially in areas without natural protection[10]



[8]Makame, O.M and Kangalawe, R.Y.M. (2018) Water Security and Local People Sensitivity to Climate Variability and Change Among Coastal Communities in Zanzibar

[9] Makame, M. O., Kangalawe, R. Y. M., & Salum, L. A. (2015). Climate change and household food insecurity among fishing communities in the eastern coast of Zanzibar. Journal of Development and Agricultural Economics, 7(4), 131-142.

[10]http://www.economics-of-cc-inzanzibar.org

Figure 3 (a): Monthly Mean High-Water Level for Zanzibar for the period 1984 – 2004: This shows significant increases, indicating changes that are highly relevant to coastal impacts.

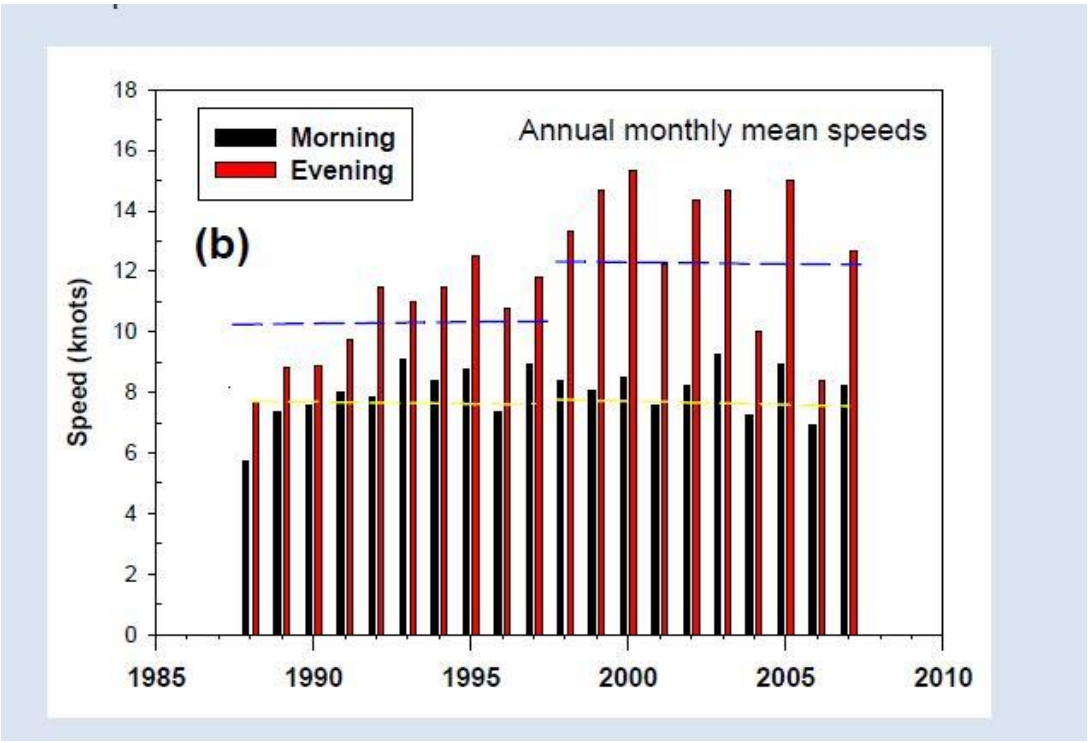


Figure 3(b): Annual monthly mean wind speeds for Zanzibar[11,12]. The dotted blue lines and the dotted yellow lines in (b) indicates the ten years monthly mean averages for the evenings and mornings wind speeds, respectively.

The historical meteorological data shows that the climate of the islands is changing. The data indicates a strong

[11]Shaghude, Y.W. and Dubi, A.M. (2008). Survey of beach erosion problems at La Gemma Dell'Est Hotel, Nungwi, Zanzibar. Report submitted to La Gemma Hotel, Nungwi, September 2008

[12] Tanzania Meteorological Agency, Zanzibar Station

temperature increase over recent decades (Figure 4). The temperatures in January and February in Unguja have increased strongly over the last 40 years. This may be linked with increasing trend of sea level rise in Figure 2 above. There seems to be unclear or rather complex rainfall trends in both Unguja and Pemba. Future climate projections (Figure 5) also shows a similar trend in which temperatures are likely to increase around 2 degrees by 2050 while the rainfall trends are uncertain.

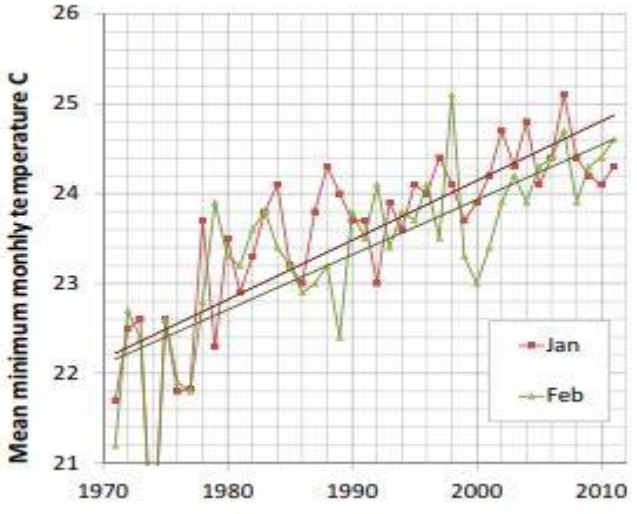


Figure 4: Mean monthly minimum temperature in January and February in Unguja[13]

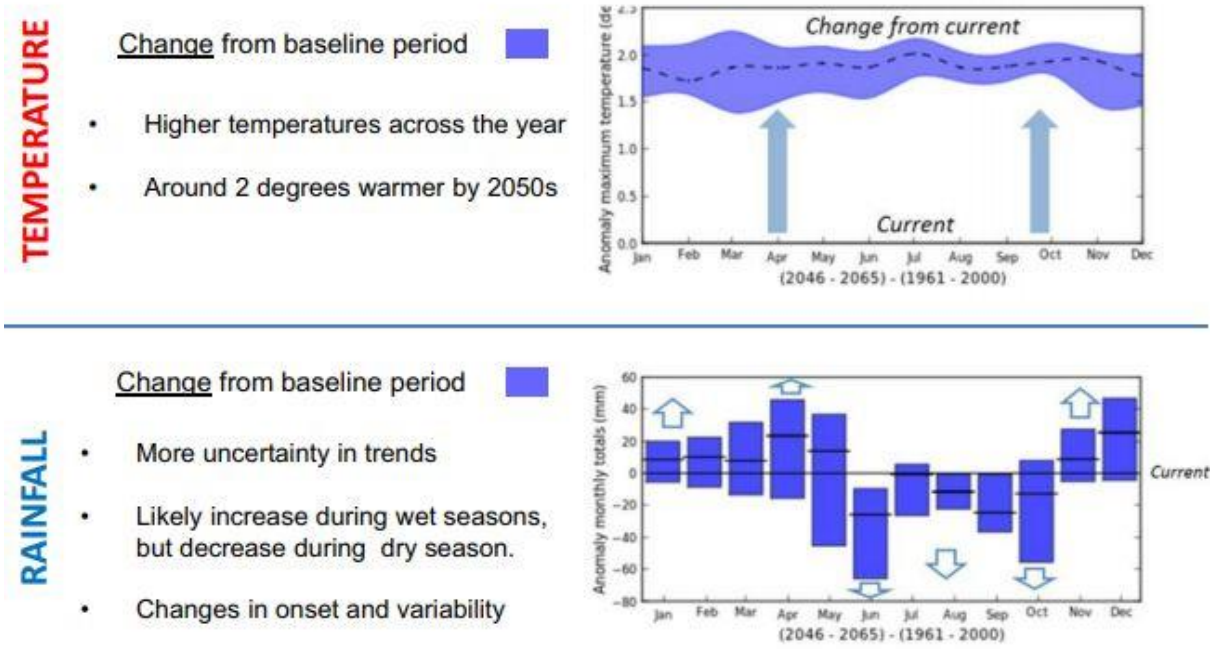


Figure 5: Change in Future Monthly Daily Maximum Temperature and Precipitation (2040- 2060) Relative to Baseline Zanzibar[14]

[13] Zanzibar Climate Change Strategy 2013, TMA

[14]Watkiss et al, (2012). The Economics of Climate Change in Zanzibar

1.4 Scope of the project and location of project areas

The project will be implemented in the selected sites of North B and Wete districts. Such sites were selected during the project pre-design phase involving the targeted beneficiaries and other stakeholders such as officers from the district councils, ward and shehia officers. NorthB district is one of two districts of North Unguja Region. It is located south of North A district, about 11 miles from Urban West, and also shares boundaries with the Central district on the south-east, West district on the south-west and the Indian Ocean on the west and east. According to the Population Census of 2012, North B district has a total population of 81,675, which is equivalent to 6.2 per cent of Zanzibar's population.

The main economic activities of North B district include: agriculture, forestry, fishing, hunting, livestock, mining and quarrying, manufacturing, services, construction, merchandise trade, hotels and lodges, and provision of other services such as financial and insurance. These sectors contribute in different ways to the district's economy. Major crops produced within the district are paddy, sweet potato, cassava, yam, millet, banana, and different varieties of fruit and vegetables.

Available statistics depict a relatively low level of productivity, especially when the district is compared to other crop-producing areas. A very good example here is paddy which in the island, is considered a priority crop by the people. However, the land area under crop production has been declining over the years due to various factors, such as increasing encroachment on farmland caused by high population, coupled with a growth in demand for better housing. Rising seawater is yet another factor. This is among the major determinants of the future of agriculture. According to the 2014/15 Zanzibar Household Budget Survey, incidence of poverty declined only marginally from 26.2 per cent in 2009/10 to 23.3 per cent in 2014/15. This means that poverty declined by 3 per cent only. On the other hand, the level of food poverty in respect to the head count rate was 7 in 2014/15, compared to 6.9 reported in the 2009/10. This means that food poverty did not change from what was reported in the previous Household Budget Survey (2009/10).

Proposed areas in North B

Bumbwini which is one of the four constituencies is the proposed project site for North B district. This includes the three shehia[15]s of Makoba, Mafufuni and Kiongwe located in Mafufuni ward. In total there are about 17,700 inhabitants in the three shehias most of them are engaged in agricultural activities. However, to a large extent the paddy fields in these areas are affected by sea water intrusion

Wete District

Wete district is one of the two districts in North Pemba Region, in Pemba Island. The other district in the region is Micheweni, which is along the eastern part of the island. Wete district has a total population of 107,916, which is equivalent to 8.3 per cent of the population of Zanzibar, based on the 2012 population census. The economy of Wete district constitutes several sectors such as agriculture, fishery, livestock, hotels, merchandise trade and tourism. Fishery is one of the sectors that supports the livelihood of several people within the district. Fishermen and others employed in allied segments of the fishery value chain make a living through this sector. However, this sector is not well developed partly because participants do not have adequate education and lack necessary credentials to access loan facilities from banks. Besides fishing from the sea, the number of households engaged in fishing, farming or aquaculture is growing within the district.

[15] Shehia is the lowest administrative unit in Zanzibar. A shehia is made of several villages. A leader of the shehia is known as sheha.

The incidence of poverty in the district has declined marginally from 50.8 in 2009/10 to 47.7 in 2014/15. This means that poverty declined by a magnitude of only 3 percentage points. Meanwhile, the level of food poverty in respect to head count rate was 15.7 in 2014/15, compared to 21.1 reported in 2009/10. This means that food poverty has declined by 5 per cent from the previous level.

The key issues in relation to agriculture in the district are modernization of agriculture and protection of agricultural land against encroachment by expanding construction activities and seawater. Modernization of agriculture should mainly seek to improve productivity and achieve self-sufficiency in food.

Proposed area in Wete District

In Wete District there are at least 12 shehias already affected by sea water intrusion/inundation. These include Ukunjwi, Gando, Kiuyuminungwini, Kiungoni, Chwale, Shengejuu, Piki, Kisiwani, Junguni, Kangagani, Mjio ole and Mtambwe Kusini. However, the proposed project intends to address the needs of Tovuni which is the most affected area. In Tovuni there are 77.5 ha of which 12 ha are already affected by seawater inundation. About 270 farmers mostly women are engaged in agriculture in this area. In recent years the production of rice has decreased significantly due to environmental changes (see Figure 6)

Figure 6: Farm affected by saltwater inundation in Tovuni

1.4 Project objectives

The project will progress activities geared towards enabling climate resilient livelihoods in climate impacted areas of Zanzibar. Thus, the project's main objective is to build the capacity of smallholder farmers in tackling climate change impacts through practical and innovative solutions; that have concrete and tangible outputs. Specifically, the project envisages achieving the following:

(i) Constructing water harvesting infrastructures for supplying water throughout the year in selected sites
(ii) Promoting soil and water conservation techniques for improved water protection and crop productivity
(iii) Developing integrated climate resilient livelihoods diversification systems in selected sites
(iv) Institutional capacity building of local government authorities and communities in planning , implementation of 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. Construction of water harvesting infrastructures for supplying water throughout the year in selected sites	1.1 At least 2 reservoirs constructed for improved water availability	1.1.1Technical designing of the reservoirs considering the location and capacity (liters of water) 1.1.2Construction of the reservoirs 1.1.3Training of communities on reservoirs operation and maintenance procedures	Increased water supply leading to improved production in various sub sectors	202,334
	1.2Water efficient irrigation schemes established	1.3.1 Site selection and community mobilization to agree on the selected site for the irrigation schemes 1.3.2 Installation of drip irrigation system 1.3.3 Establishment of irrigators organization (IO) 1.3.3 Training of leaders of IO on various topics including operation and maintenance of the irrigation system		

2.Promoting soil and water conservation techniques for improved water protection and crop productivity	2.1Improved land management for improved crop yield	2.1.1 Training of smallholder farmers on soil and water conservation techniques 2.1.2 Support smallholder farmers to implement selected techniques 2.1.3 Establishment of demo farms 2.1.4 Tree planting for restoration of degraded ecosystems including mangroves 2.1.5 Supporting saline agriculture trials for selected crops 2.1.6 Dike construction to prevent salt water inundation	Increased agricultural production Increased water resources protection	342,966
	2.2:Improved water resources management	2.2.1 Community awareness raising on integrated water resources management 2.2.2 Situational analysis of water resources in the project sites 2.2.3 Establishment of WUAs 2.2.4 Training of WUA leaders on good governance, financial management, water use conflict management and water resources management		
3.Developing integrated climate resilient livelihoods diversification systems in selected sites	3.1Tress nurseries for supplying seedlings promoted	3.1.1 Awareness raising on the need for restoration of coastal vegetation 3.1.2 Training of communities on tree nursery establishment 3.1.3 Support the establishment of tree nurseries by communities 3.1.4 Mangrove tree planting 3.1.5 Planting of other tree species	Increased income, food security and resilience to climate change impacts	214,300
	3.2 Poultry farming improved	3.2.1 Training on Poultry production 3.2.2 Provision of startup capital in form of chicks and equipment to the needy farmers 3.2.3 Establishment and building capacity poultry producers cooperative		

	3.3Ponds for aquaculture production constructed	3.3.1Training of farmers on Tilapia and Milkfish production 3.3.2 Designing and construction of ponds/enclosures 3.3.3 Purchase and distribution of fingerlings to farmers 3.3.4 Provide startup capital for feeds 3.3.5Establishment and building capacity for fish farmers cooperative		
	3.4 Beekeeping production improved	3.4.1 Training on sustainable beekeeping practices 3.4.2 Provision of modern beehives and other related items 3.4.3 Training on honey processing and packaging 3.4.4 Provision of honey processing equipment such as honey centrifuge machine 3.4.5 Establishment and building capacity honey producers cooperative		
	3.5 The production of high value horticultural crops increased	3.5.1 Training on horticulture production for selected crops 3.5.2 Provision of start up capital to farmers groups and support extension services 3.5.3 Support business development activities and enabling farmers to access local and international markets 3.5.4 Establishment and building capacity horticulture producers cooperative		
4. Institutional capacity building of local government authorities and communities in planning ,implementation of climate change adaption actions and dissemination of project results	4. 1 The capacity of local government authorities in facilitating the adoption of climate smart agriculture practices strengthened	4.1.1Training Needs Assessment 4.1.2 Training of local government officials in two targeted districts on climate smart agriculture including mainstreaming of climate change into development plans and budgeting process. 4.1.3 Facilitating district officers to provide technical assistance to farmers on climate smart technologies and practices	Improved capacity of local government authorities and communities in planning and	86,000

and lessons learnt		4.1.4 Disseminating project results and share lessons learnt through various communication methods and channels including monthly reflection meetings	implementing adaption actions	
	4.2 Capacity of the farmers associations and communities in promoting the adoption of climate smart agriculture practices is strengthened	4.2.1 Build capacity of farmers associations on planning for climate related action 4.2.2 Train farmers associations on climate smart agriculture and sustainable and integrated water management practices 4.2.3 Supporting Community Based Trainers (CBT) in training peer farmers 4.2.4 Facilitate farmers exchange visits/study tours		
1. Project execution cost				80,400
2. Total Project cost				847,600
3. Project cycle Management Fee charged by the Implementing Entity				72,000
4. Amount of financing requested				**1,000,000**

Projected Calendar

Milestones	Expected Dates
Start of Project Implementation	August 2020
Mid-term Review	February 2022
Project Closing	August 2023
Terminal Evaluation	February 2024

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 matter that it comprises of concrete adaptation activities. Such activities are envisaged to contribute to climate resilience among coastal communities in Zanzibar most of whom are vulnerable to climate impacts. The project will include four components, the details of which are provided below.

Component 1: Construction of water harvesting infrastructures for supplying water throughout the year in selected sites

This component aims to address the water challenge by investing in rainwater harvesting, irrigation system development and rural water supply. Zanzibar is facing critical shortage of freshwater resources owing to environmental degradation and climate change. Generally, it is water stressed, relying on freshwater obtained from unpredictable rains and stored in shallow aquifers consisting freshwater lenses floating on seawater. Tourism in Zanzibar has grown rapidly putting additional pressure on the dwindling freshwater resources. The freshwater

exploitation beyond the aquifers` recharge rate leads to lowering of groundwater table, deterioration of groundwater quality and saltwater intrusion[16]. According to Zanzibar Water Authority, about 200 million liters of freshwater are needed to supply the entire population per day. However, the supply is limited with much of freshwater aquifers being intruded by saltwater. The salt water intrusion in the aquifers has been associated with environmental degradation, particularly the removal of mangrove forest cover and climate change. Due to this, desalination techniques have been used an adaptation measure for recovering the freshwater. But the desalination technology is not a best option on long term, because it is relatively expensive and has some environmental risks. In rural areas women and children have to walk long distances (sometimes up to 7 hours) fetching for water that is often contaminated and unsafe[17], thus affecting other household activities. In some rural households, children are unable to do school homework because when they come back home after many hours of fetching water are already very tired. Therefore, the construction of water harvesting infrastructures will demonstrate concrete adaption action for enhancing climate resilience in a water scarce Zanzibar thus contributing to socio-economic development. While drilling of boreholes may appear to be a solution as well, hydrological evidence suggests that increased pumping of groundwater may degrade the freshwater aquifers leading to increased saltwater intrusion.

Output 1.1 Two water reservoirs constructed for improved water availability

The project will support construction of 2 reservoirs for rainwater harvesting (RWH) in the project sites. The reservoirs will be constructed in North B District (1 in Makoba shehia and 1 in Mafufuni shehia).Each reservoir will be cylindrical with a capacity is 1800 m^3 (1.8 million liters of water). The reservoir will have a radius of 10.7 m and a height of 5 m (Figure 7). The reservoir will have a catchment area consisting of 3 open channels collecting rainwater to the check dam (small size) which traps and filters the incoming sediments. The check dam then drains sediment –free rainwater to the main reservoir which will be made of concrete. The reservoir floor will also be made of concrete to avoid rainwater percolation in the soil. To prevent evaporation water losses , the reservoirs will be covered. The channel draining water from the check dam to the main reservoir will be a closed channel, notably a large pipe fitted with a screen to filter sediments. The harvested water will be used to cope with rainfall shortage in the area and it is envisaged to improve agricultural production through irrigation for at least 400farm households. Overall, water supply will potentially benefit about 250households in North B district and 200 households people in Wete district. From gender perspective, water availability will minimize cases of street children and early marriages since one of the causatives of such issues is travelling long distances in search of water, whereby women and adolescent girls are sexually abused leading to unplanned pregnancies. Furthermore, water efficient irrigation system such as drip irrigation will be promoted to avoid water loss and increase crop water productivity. The irrigation schemes will not only enhance yield of cereals but also horticultural crops thus improving the livelihoods of communities building their resilience to climate change impacts.

The district water engineer in collaboration with officers from DOE, ZAWA and MANRLF will arrange for technical design and supervise the construction of the reservoirs. Once the water reservoirs are constructed, it is crucial that they are properly managed to ensure their sustainability. Thus the communities will be trained on how to operate the reservoirs and maintain them. Operation and maintenance (O&M) of water reservoirs refers to all the activities required to keep the reservoirs functional. O&M activities are necessary to ensure an efficiency and sustainability of the reservoirs.

Before embarking on training of communities, a shehia water reservoir committee (SWRC) will be established and tasked with a duty of managing the reservoir. The established VWRC will have an operation manual including by-laws to be enforced. Each reservoir shall have a buffer of about 100m strip beyond which some other activities will

[16]Gössling, S. (2001). The consequences of tourism for sustainable water use on a tropical island: Zanzibar, Tanzania. Journal of Environmental Management 61 (179 – 191)

[17]https://drop4drop.org/water-crisis-zanzibar/

be permitted. The buffer strip will be planted with grasses and water friendly trees . No any activities will be allowed within the buffer strip.

Thus the following activities will be implemented:

- Technical design of rainwater harvesting reservoir
- Construction of the reservoirs
- Training of communities on reservoirs operation and maintenance procedure

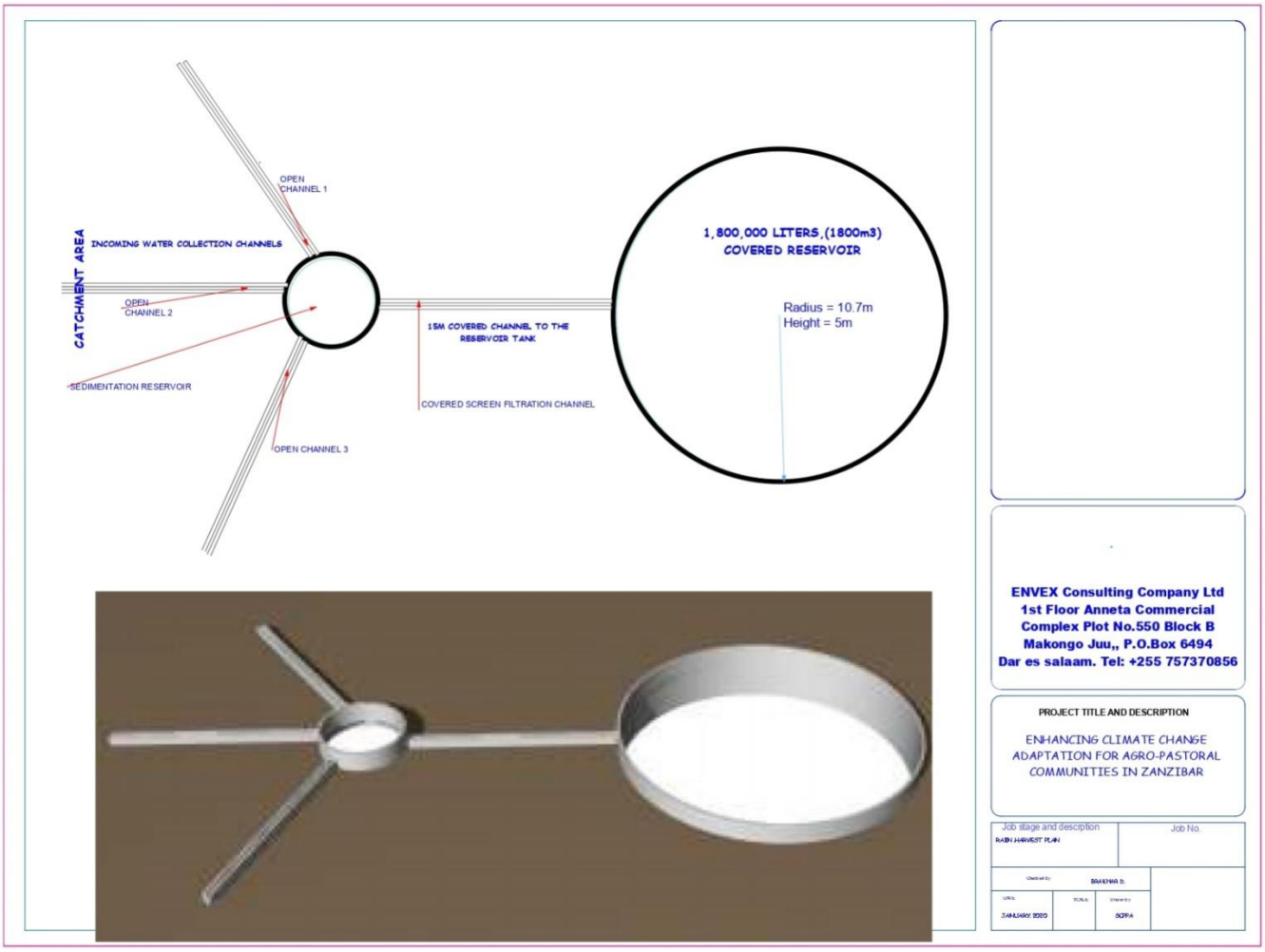


Figure 7: Technical drawing of the proposed rainwater harvesting reservoir

Output 1.2 Water efficient irrigation schemes established

The project will support the establishment of irrigation schemes with a view of supplementing rainfall shortages and thus improving crop production in the selected project sites. The water to be used for irrigation will be taken from rainwater harvesting reservoirs. Water efficient irrigation systems such as drip irrigation will be promoted. The irrigation systems will be established in selected farms located in one area and approved by local government authorities.

Activities

- Site selection and community mobilization to agree on the selected site for the irrigation schemes
- Installation of drip irrigation system
- Establishment of irrigators organization (IO)
- Training of leaders of IO on various topics including operation and maintenance of the irrigation system

Component 2: Promoting soil and water conservation techniques for improved water protection and crop productivity

This component aims at restoration of the degraded coastal ecosystem. The vast majority of the coastline of Unguja and Pemba islands which was previously covered by mangrove vegetation is devoid of mangroves. Today many farmers are unable to do farming owning to sea water inundation. This resulted from deforestation of mangroves which acted as shock absorbers by reducing the wave action during high tides. River catchments are not well management leading to degradation. The productive capacity of land has declined due to poor farming practices which affect the soil health and cause unnecessary water loss.

Output 2.1 Improved land management for improved crop yield

In water limited areas like Zanzibar, the implementation of soil and water conservation (SWC) techniques is very pivotal as it increases water storage in the soil. Moisture stress and decline of soil fertility are the major obstacles for crop production in Zanzibar, associated with climate change, poor crop husbandry, excessive use of chemicals, poor conservation of catchment areas and deforestation.[18]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 Zanzibar, technologies such as sunken bed, water spreading and pitting will be promoted for enhanced water retention in the soil. Moreover, mulching will be promoted for reducing evaporative water losses. SWC approaches which are expected to maintain freshwater resources in the soil, will include mangrove restoration and dike construction with a view of preventing salt water inundation in arable land. Mangroves are very important vegetation in coastal settings not only for their role in reducing the erosive force of high tide water, but also for preventing the spread of brackish water in offshore areas (e.g. farmlands and residential areas). The project aims at restoring at least 20 ha of vegetation including 5 ha of terrestrial vegetation through tree planting and 15 ha of mangroves (10 ha in North B and 5 ha in Wete district. In areas, where mangroves vegetation was completely removed such as Makoba, Mafufuni and Kiongwe Kidogo besides restoration; dike construction is necessary for enabling the restoration procedures and other adaptation investment in this project (component 1 and 3). In addition to dike construction, in Tovuni area (Wete-Pemba) there is a need for

[18] Zanzibar Research Agenda 2015-2020

creating a drainage canal as the area is highly waterlogged making rice cultivation impossible especially during the wet season. Furthermore, the project will support the formation of plot bunds so that the rice farms are clearly delineated. At least 300 farm households will be trained on soil and water conservation methods in both districts. The training will be conducted in two phases whereby the first phase will involve training of Community Based Trainers who will then train their peers in the second phase.

The project will also support some field trials on saline agriculture. With the increasing trend of saltwater intrusion and inundation in many parts of Zanzibar and dwindling fresh water resources, saline agriculture is inevitable for a long term climate adaptation planning. Saline agriculture involves growing crops /cultivars in salt-affected land or areas dominated by brackish water. The crops to be grown must be salt tolerant. This is possible given the fact that tolerance to salinity varies from one crop to another. While most of conventional horticultural and non-horticultural crops have low tolerance to salinity, some literatures suggest that there are some crop varieties which have proved to perform well in tolerable saline conditions[19]. Furthermore, a study by Saline Agriculture Worldwide in 2018[20] on "effects of salinity on the growth of different crops and the potential for saline farming", which tested the salt tolerance of 8 crops namely potato, carrot, onion, cauliflower, cabbage, kohlrabi, grass pea and a triplex concluded that such crops can be grown under moderately saline conditions (EC 5-7 dS/m). This means that many hectares of salt-affected farmland can be cultivated successfully. The performance of crops in saline conditions may be improved through selective breeding procedures.

Saline agriculture saves freshwater resources because the saline water from the sea will be used for irrigation, thus crops will have constant supply of water throughout the year. Furthermore, it improves and re-uses the salt-affected farmlands. While saline agriculture may provide a promising future in light of sea water intrusion and inundation, it is important to recognize that there are some key principles to be observed for a successful saline agriculture intervention. According to Salt Farm Foundation (2018)[21] there are four pillars of saline agriculture namely (i) crop and cultivar choice; (ii) Irrigation management; (iii) Fertilizer application; and (iv) soil management. Different crop species differ in their tolerance to salinity, thus it is important to select a right crop/cultivar. Irrigation has to be done regularly to avoid salt accumulation/concentration in the soil, thus soil moisture content should be kept constant. Foliar fertilizers are recommended as the conventional fertilizers will stress the already salt-affect soil. Salinized soils must be well managed to reduce salt stress especially during the beginning of the growing season. Some soil addictive such as gypsum may be useful for reducing senility. Furthermore, maintaining the soil organic matter by applying manures will keep the soil healthy and thus boosting yield.

In view of the above, the project will support some field experiments by agricultural researchers from MANRLF of RGZ in collaboration with Researchers from Sokoine University of Agriculture to test salinity tolerance of selected crop species grown in Zanzibar. The field trials will involve among others measuring salinity of soils and water in each experimental site and recording crop growth performance. The experimental design will subject the selected crops to different salinity levels after which data on crop performance will be recorded at a given time interval. The trial findings will inform the project and RGZ at large on crops which can be grown in salt-affected farmlands and thus enhancing the resilience of smallholder farmers to sea water inundation.

Activities

- Training of smallholder farmers on soil and water conservation techniques

[19] Gul, B and Khan, M.A. (2003). Saline Agriculture: Promises and Prospects for Future Agriculture in Degraded Saline Lands in Azhar, A., Siddiqui, A and Khan, M.A.(Eds): Technology and Development in the New Millennium, 149-156pp

[20] https://www.salineagriculturworldwide.com/report-crop-trials-2018

[21] https://www.salineagriculturworldwide.com/uploads/file_uploads/files/Four%20pillars%20of%20Saline%20Agriculture%20-%20Salt%20Farm%20Foundation%202018.pdf

- Support smallholder farmers to implement selected techniques
- Establishment of demo farms for SWC
- Tree planting for restoration of degraded ecosystems including mangroves
- Supporting saline agriculture trials for selected crops
- Dike construction for preventing saltwater inundation in farmlands
- Drainage canal making
- Plot bund formation

Output 2.2: Improved water resources management

The project will also foster catchment conservation with a view of protecting the dwindling freshwater resources. To this end, local government authorities and communities will be in involved in catchment conservation activities. In particular, community engagement in water resources management is one of the principles of integrated water resources management (IWRM). 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 indicative activities to be implemented under this output include the following:

Activities
- Community awareness raising on integrated water resources management
- Situational analysis of water resources in the project sites
- Establishment of WUAs
- Training of WUA leaders on good governance, financial management, water use conflict management and water resources management

Component 3: Developing integrated climate resilient livelihoods diversification systems in selected sites
Considering the fact that Zanzibar's economy and the livelihoods of its people depend on climate sensitive resources, it is crucial 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, poultry, aquaculture and beekeeping on the same farm creates synergies. 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 600 farm households are expected to benefit from the livelihood intervention in both districts either directly or indirectly. The adoption of integrated climate resilient livelihoods diversification system is envisaged to improve the household income by at least 20 % by the end of the project.

Output 3.1 Tress nurseries for supplying seedlings promoted

The project will promote the establishment of tree nurseries with a view of not only restoring the coastal vegetation in degraded areas, but also generating income from the sale of seedlings. Population growth and economic development involving increased urbanization and increased investment in the tourism industry have led to clearing of coastal forests. Furthermore, the increased population has increased biomass energy demand hence causing more tree cutting for charcoal making. The removal of mangrove cover has led to the salt water inundation into farmlands

and scarcity of freshwater for the coastal communities, resulting to food insecurity and scarcity of freshwater. The communities in Tovuni (Pemba), Makoba , Mafufuni and Kiongwe Kidogo (Unguja) admitted that, salt water inundation into their farms started when the shoreline mangrove cover decreased. To curb this situation, it is important to support mangrove restoration initiatives and support communities to have alternative source of energy and livelihoods. Therefore, the seedlings will be supplied to institutions and individuals. Mangrove tree seedlings will be given priority given the ecosystem services they provide in the marine ecosystem. Besides preventing beach erosion, mangroves have higher carbon sequestration potential than terrestrial trees as they have higher below ground carbon to above ground carbon ratio than terrestrial counterparts[22]. Furthermore, mangroves are nursery grounds and breeding sites for birds, fish, crustaceans, shellfish, reptiles and mammals .

Seedlings of other tree species will also be supplied. Indigenous trees species will be promoted so as to restore the natural vegetation. While all people in Zanzibar have a right to use natural resources including mangroves and other coastal resources, the government has crafted some laws and regulations that govern resource use. However, due to weak enforcement, destructive use of mangroves and other coastal resources was on rise. Therefore, this project will build the capacity of local institutions to supervise restoration activities and enforce resource use laws and regulations. The project will support 6 tree nursery groups in Unguja and 3 groups in Pemba. 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 5,000 seedlings which includes mangroves and other tree species.

Activities

- Awareness raising on importance of mangrove to the people and the environment
- Stakeholders engagement in the mangrove restoration activities
- Establishment of tree nurseries
- Training communities on Ecological Mangrove Restoration approach by the use of action research approach /on farm training
- Mangrove tree planting
- Planting of other tree species

Output 3.2 Poultry farming improved

According to Zanzibar's Agricultural Transformation Initiatives 2010-2020[23], poultry production constitutes higher proportion in total livestock keeping in Zanzibar, and emerges as important livelihood option for the majority of people. In particular, the current poultry production does not meet the demand and hence some poultry products are imported. Therefore, the project will provide some technical assistance to interested farmers on how to establish and run poultry enterprise. The project will support small scale commercial poultry enterprises with a view of enabling farmers to produce broilers and eggs in very short time. This is envisaged to bolster the income of farmers thus enabling them to cope with climate induced losses in crop production, notably salt water inundation caused by sea level rise. The project will support 6 poultry groups in Unguja and 2 poultry groups in Pemba whereby each group will have at least 25 members consisting of men, women and youth. Thus

Activities

- Training on poultry production (broilers and layers)
- Provision of startup capital in form of chicken or chicks to the needy farmers
- Provision of marketing support to farmers

[22]Along, D.M (2012). Carbon sequestration in mangrove forests. Carbon Management 3, 313–322

[23] RGoZ, Agricultural Transformation Initiatives 2010-2020

Output 3.3 At 3 aquaculture livelihood activities supported

Considering the climate induced challenges facing Zanzibar such as saltwater intrusion due to sea level rise, aquaculture has a huge potential for climate change adaptation. Aquaculture which means cultivation of aquatic animals and plants, involves freshwater and marine products. In the integrated farming system, freshwater fish production is recommended as the farm will have other activities requiring freshwater. Mariculture will be supported along the shoreline whereby some ponds/enclosures will be constructed for cultivating seaweeds, crabs, sea cucumber and milk fish. Mariculture is a key livelihood activity for coastal communities and has good prospect for increasing resilience to climate change impacts. While sea level rise may affect crop production due to saltwater intrusion, mariculture may offset the damages through sale of mariculture products, the proceeds of which can be used to purchase rice and other food items whose production is affected by saltwater intrusion. In the integrated farm, 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 3 aquaculture livelihood interventions particularly tilapia farming, milkfish and sea cucumber farming . The support will be extended to least120 fish farmers in Unguja and 60 fish farmers in Pemba. Such fish farmers will be in groups and shall include men, women and youth. They will be able to supply fish to least 350 households in Unguja and to at least 250households in Pemba.

Activities

- 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 3.4 Beekeeping production improved

Beekeeping is another livelihood activity with a potential to increase resilience to climate change impacts. With the significant mangrove forest vegetation still remaining in the shoreline, beekeeping is a viable livelihood based enterprise benefiting communities living in and around forests. The mangrove honey is considered to fetch good price as compared to terrestrial honey. People have high preference for mangrove honey because it is smooth and has medicinal value. Unlike the normal honey which contains much sugar, the mangrove honey has a different test, somewhat bitter and salty. The mangroves absorb various nutrients from the ocean thus making the nectar absorbed by the bees and subsequently the honey to be rich in nutrients making it to have a high medicinal value. Most importantly beekeeping can also be a practical tool for raising the awareness of communities on the importance of forest management and conservation[24].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 5 beekeeping groups in Unguja and 3 beekeeping groups in Pemba 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

[24]Gebru, 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)

- Training on honey processing and packaging
- Provision of honey processing equipment such as honey centrifuge machine

Output 3.5 The production of high value horticultural crops increased

Horticulture farming involves growing fruits and vegetables, products highly needed in daily meals. In Zanzibar, the horticulture sub sector is largely dependent on imports owing to low production. With the increasing population and growing tourism industry, the demand for horticultural crops is increasingly high. The smallholder farmers engaged in horticulture production do not the suffice the demand of tourist hotels. This is partly due to limited resources for increasing production and inadequate water supply during the dry season. To this end, through the project supported water harvesting and irrigation schemes the smallholder farmers will be able to grow horticultural crops throughout the year. Horticulture if well practiced can improve the climate-stressed livelihoods of communities in North B and Wete districts. Studies show that farmers engaged in horticultural crop production are well placed to earn higher net farm incomes than those growing staple crops[25]. For example, a study by the Volunteer Services Overseas (VSO)[26] in 2015 indicated the profits accrued from horticulture production may be up to eight times more than of cereal crops. About 250 women, 200 men and 100 youth are envisaged to directly benefit from horticulture in both districts. Such men , women and youth will be in groups whereby each group will have 25 farmers. In Unguja 6 groups of women , 5 groups of men and 2 groups of youth will be established/ strengthed whereas 4 groups of women , 3 groups of men and 2 groups of youth will be established/ strengthened in Pemba. The project will provide support to farmer groups in terms of training, inputs and marketing for horticulture undertakings. In particular, the project will support cultivation of three horticultural crops which fetch a good price in Zanzibar namely tomatoes, sweet peppers and water melons. Such crops will be grown in greenhouses with a view of reducing diseases risks and saving water. The greenhouses will have a length of 30 m and width of 11m whereby 3 greenhouses will be constructed in Unguja (1 in Mafufuni , 1 in Makoba and 1 in Kiongwe Kidogo) and 1 in Pemba.

Activities

- Training on horticulture production for selected crops
- 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

Component 4: Institutional capacity building of local government authorities and communities in planning, implementation of climate change adaption actions and dissemination of project results and lessons learnt

Institutional capacity building for planning and management of adaptation interventions is vital for successful implementation. The project will work in an integrated manner on strengthening capacity of the local institutions, farmers associations and communities regarding promoting the adoption of climate smart agriculture practices. At one level, the project will seek to influence and involve local people in relation to adopting smart agriculture by developing capacities among communities. This approach will be especially effective in proposed project areas given the well-developed local organization structures that exist in local communities. Farmer associations will be supported (through the provision of encouragement and technical advice) to promote the adoption of climate smart

[25]Bengesi, K.M.K., &Abdalla, J. O. (2018). Forces Driving Purchasing Behaviour of Tourists Hotels Along Tourist-Agricultural Supply Chain in Zanzibar. International Journal of Marketing Studies, 10(2):36-46

[26] VSO (2015). Value Chain Analysis of the Fruit and Vegetable Market for Smallholder Farmers in Zanzibar. Volunteer Services Overseas, Dar Es Salaam. 38pp.

agriculture practices. In addition, communities will be also capacitated to practice 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 project districts and Zanzibar at large.

Output 4.1 The capacity of local government authorities in facilitating the adoption of climate smart agriculture practices strengthened

The local institutions operating within project areas have a potential influence of transforming agricultural practices from non-smart to smart agriculture. 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. This will result in among others increasing farmers' capacity on how to practice smart agriculture under climate uncertainty. This will assist the implementation of climate smart agricultural technologies and practices by farmers and thus amplifying the adaptation mechanism as well as increase farmers' resilience.

The capacity building of both local and central government institutions is in line with Zanzibar Climate Change Strategy 2014. At present, the North B and Wete districts are not well capacitated to integrate climate change adaption activities in their district 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. As this project will be executed by DOE, SVPO in collaboration with ZEMA and the Ministry of Agriculture, Natural Resources, Livestock and Fisheries of Zanzibar, some officers from the ministry and other related ministries will participate in the capacity building activities so as to integrate with other existing climate adaptation plans and initiatives as guided by the Zanzibar Climate Change Strategy. The capacity building activities will involve 5 officers from the ministry, 10 district officers in each district and 15 shehia leaders including the Shehas and members of the environmental committee. In Pemba, 5 Shehia leaders will be involved. At local level, the project will facilitate monthly reflection meetings that will aim at harmonizing work plans, reviewing monthly progress of the activities and discussing challenges, opportunities and lessons learnt in implementation of field activities. It is envisaged that such meetings will ensure the accountability of the officers in serving the communities. About 36 monthly reflection meetings will be organized during the project life time and shall bring together all key stakeholders in the project. They will include district officers, Shehas , Shehia Councils , Shehia Environmental Committees and Livelihood groups. At national level, the reflection meetings will be conducted once per quarter whereby all key project stakeholders will be involved. The meetings will involve presentations from the project coordinator on project progress, key results and lessons learnt.

Activities:

- Training needs assessment
- Development of training modules
- Training of local government officials in two targeted districts on climate smart agriculture 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
- Monthly reflection meetings

- Disseminate project results and share lessons learnt through various communication methods and channels

Output 4.2 Capacity of the farmers associations and communities in promoting the adoption of climate smart agriculture practices is strengthened

Building capacity of the farmers associations/cooperatives and communities in promoting the adoption of climate smart agriculture practices is very important. Farmers association in project areas are mainly composed of farmers and lead by farmers themselves who for a large extent live within the respective project areas. Adoption of climate smart agriculture practices is 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 in promoting the adoption of climate smart agriculture practices. The training will be provided to 60 selected members of farmers cooperatives in Unguja and 30 selected members in Pemba. 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 climate smart agriculture and sustainable and integrated water management practices
- Supporting Community Based Trainers (CBT) in training peer farmers
- Facilitate farmers exchange visits/study tours

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 four 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 climate smart agriculture practices (which promotes soil and water conservation) 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. In particular, tree planting will significantly contribute to the restoration of forests which were previously cleared for various reasons. Restoration of mangrove forests along the shorelines will reduce beach erosion and enhance other ecosystem services provided by mangroves. To address water shortage challenge, the project will support the construction of rainwater harvesting reservoirs which assist in collecting and storage of rainwater which would otherwise be lost as runoff. While the project recognizes the potential of boreholes in addressing water scarcity in Zanzibar, it is not promoting boreholes due to environmental reasons. The boreholes contributes to increased pumping of freshwater from the groundwater aquifers leading to destabilization of the freshwater - saltwater equilibrium and hence increasing saltwater intrusion. Therefore, by promoting rainwater harvesting structures the project will enhance the protection of freshwater aquifers. Furthermore, the project will contribute to water resources

management through the formation of Water Users Associations which among others will be required to ensure protection of river catchments. The establishment of integrated farming systems the project will contribute to nutrient cycling, soil fertility and crop pollination through honey bees. All these are essential for enhancing the resilience of the ecosystems and communities in the targeted project sites.

Economic benefits

The project has been designed to transform the economic situation of rural communities in the target sites of Zanzibar. The project will be supporting the availability of water which is a very vital resource in agricultural production systems. With the irrigation system in place over 600 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 alternative livelihood strategies as explained in component 3 of the project. The activities to be implemented under components 1 and 3 will transform the economic status of communities from resource-poor and vulnerable to resource-rich and resilient to climate shocks. 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	**2020/2021**	**2021/2022**	**2022/2023**
Rice farming	1 and 2	-310	450	460	3,400
Horticulture	3	250	2500	6000	12,500
Poultry		380	920	3600	6,250
Aquaculture		1000	2200	4,300	5,730
Beekeeping		1200	6,000	7,200	9,600
Tree nurseries		0	950	1,000	1,200

Social benefits

The project offers many social benefits which can be realized through the proposed interventions aiming at livelihood improvement. In particular, the availability of water throughout the year will reduce the workload of women and school girls who would otherwise travel long distances to fetch water. Tree planning in private lands will create woodlots which can be used for firewood and charcoal making and thus reducing women's task of collecting firewood. In rural settings, besides fetching water women also have a duty of gathering firewood for household's heating energy. 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. At least 600 farm households will benefit from the project interventions. Women economic empowerment through livelihood activities to be conducted by women groups will revitalize the women of Zanzibar 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. By supplying water, the lives of vulnerable groups such as children, disables and the elderly will be enhanced.

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

Cost-effectiveness aims to achieve the greatest development impacts from less resource. The cost-effectiveness of the project's adaptation interventions will be greatly be 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 coastal communities of Zanzibar and increased adaption cost (e.g. buying food for feeding people as they can't grow food due to salt inundation). Therefore, the fact that the project will focus on coastal agrarian communities which highly depend on agriculture for their livelihood, enhancing their capacity in adapting to the climate change impacts will reduce costs associated with the hidden costs resulted from these impacts. The accessibility to water, for example, will mean less time will be spent in the search for water, thus time saved could be used for other economic activities to generate more income.

Comparing with other measures to solve the water shortage problem in Zanzibar, the proposed intervention of construction of water reservoirs for rainwater harvesting is cost effective as compared to borehole drilling. While borehole drilling may be cheap, considering the fact that groundwater in Zanzibar is easily invaded by saltwater, the drilled water may not be suitable for human and animal consumption and thus necessitating the application of desalination technique which is very expensive and unfriendly to the environment. Furthermore, the boreholes will lead to the depletion of freshwater resources in the aquifers. The water reservoirs to be constructed will be able to store freshwater from one rainy season to another. This will ensure supply of freshwater for domestic use, crop and animal production. There were three options regarding the type of rainwater harvesting reservoirs to be used. The first option (option A) was to make open earthen reservoirs whereby once the dam excavation is completed, the reservoir is ready for use. Option B is similar to A but with the exception that the dam floor would have a water proof membrane liner that prevents rainwater percolation into the soil and groundwater flow to the reservoir. Option C involves excavation of the dam, building the concrete floor, rising the cylindrical walls and the top. Option A was not selected as would lead to water loss through percolation into the soil and evaporation making the reservoir to dry within a short period. While option B offsets water loss through percolation and possibility of saltwater intrusion, it does not offset evaporation losses. Option C was selected due to the fact it offsets water loss by percolation and evaporation as the reservoir has a concrete top. Thus, the rainwater harvested can be stored for a relatively long time. Moreover, unlike options A and B which may be affected by sedimentation due to soil erosion, under option C the reservoir is protected against sediment deposition. Furthermore, option C will protect the stored rainwater against seawater intrusion.

With regards to dike construction, the feasibility analysis considered two options, namely a concrete sea dike and an earthen sea dike. While concrete sea dike is more efficient in preventing seawater inundation, it is very costly. In Unguja for example, a stretch of about 3 km requires a dike to enable the farmers to reclaim their farmlands which are currently inundated by seawater. Therefore, the earthen sea dike option has been selected as it is more cost effective than the concrete option. Even within this option of earthen sea dike, the project will support only a dike with the length 900 m costing US $ 152,942 with much of the labour to be provided by the communities in form of in-kind contribution. This is about 40% cheaper than engaging a contractor. The same has been considered for the construction of rainwater harvesting reservoirs. Therefore, the investment alternatives proposed by this project are committed to demonstrate a high level of cost effectiveness and value for money. The Mangrove restoration approach proposed under component 2 is more cost effective than the traditional method of tree planting only; because it adopts an ecosystem based approach whereby the mangroves are enabled to regenerate naturally by creating the

conducive environment (micro climate) notably hydrology and soil conditions. Direct tree planting is done to complement natural regeneration and normally is done as enrichment planting or in areas where natural regeneration has failed . Successful mangrove restoration requires among others good knowledge of type of mangrove species to be planted and its site requirements. Considering the fact that there are about 10 mangrove species which differ in salinity tolerance, soil and moisture preference, it is likely that direct tree planting may lead to the risk of planting trees in a wrong place. Experience in Tanzania and other parts of the world where mangroves were planted shows that the trees did not perform well, leading to project failure. It is important to understand that mangrove restoration through direct planting is costly, it ranges from USD$225/ha to USD$216,000/ha, and even much higher to up to USD$500,000/ha[27]. Despite the fact millions of dollars have been spent in the restoration work in the recent years, majority of projects failed, the success rate range between 15 - 20%[28]. To avoid such a risk, the project will apply an ecosystem based approach as detailed in annex 3.

Cost effectiveness is also demonstrated in component 3 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 poultry, 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 Zanzibar but also their resilience to climate change impacts. Table 3 provides more analysis of cost effectiveness.

This project will be implemented through the government ministries and local authorities such as the Department of Environment (DOE) in the Second Vice President`s Office, Zanzibar Environmental Management Authority (ZEMA) and the Ministry of Agriculture, Natural Resources, Livestock and Fisheries (MANRLF). Therefore, operationallythere will be no need for a new office and new staff. Furthermore, pensions and insurance will be paid by the executing agencies as these costs are already covered by the employer and can be accounted for as co-financing by the government. The operational costs will also be reduced through the involvement of the local government authorities where the interventions will be implemented to support in some aspects of the project including monitoring and evaluation.

[27] http://www.fao.org/forestry/10560-0fe87b898806287615fceb95a76f613cf.pdf

[28] Primavera, J and Esteban, J. (2008). A review of mangrove rehabilitation in the Philippines: Successes, failures and future prospects. Wetlands Ecology and Management, 16: 345- 358.

Table 3: Project costs and benefits

Project Component	**Project Cost (USD)**	**Concrete adaption benefits**	**Avoided losses**	**Trade-offs**
1.Construction of water harvesting infrastructures for supplying water throughout the year in selected sites	202,334	• Easy access to water for domestic use , crop and livestock production • Increased agricultural productivity • Increased food security food • Reduced time spent by women and children in fetching water • Increased household income • Increased knowledge on water resources management • Increased resilience to climate change impacts	• Crop and livestock loss due to drought and flooding • Food insecurity • Malnutrition	• Rural water supply –through desalinization techniques which increases costs to the government • More government spending for purchasing food for feeding the farmers affected by salt intrusion and drought • Water supply by boreholes depletes the freshwater resources which are in limited supply leading to more saltwater intrusion in the freshwater aquifers
2.Promoting soil and water conservation techniques for improved water protection and crop productivity	342,966	• Increased soil fertility • Increased water resources management	• Soil erosion • Beach erosion • Loss of life and property due to floods	• Increased government spending on supporting flood victims • Increasing government spending on food for feeding people affected by drought • Loss of soil • Loss of vegetation cover

		• Increase forest cover • Increased crop productivity	• Degradation of water resources • Low agricultural productivity • Food insecurity	• Loss of biodiversity
3.Developing integrated climate resilient livelihoods diversification systems in selected sites	214,300	• Enhanced resilience to climate change impacts • Increased household income • Reduced income poverty • Improved management of marine ecosystems	• Abject poverty • Degradation of marine and coastal resources • Food insecurity • Malnutrition • Health problems	• Increased degradation of marine and coastal resources • Loss of biodiversity • Increased vulnerability to climate change impacts • High adaption cost – the government will have to spent more by providing food and other social services to the vulnerable and incapacitated communities
4. Institutional capacity building of local government authorities and communities in planning ,and implementation of climate change adaption actions and dissemination of project results and lessons learnt	86,000	• 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	• Inability to foresee climate impacts • Increased vulnerability to climate change impacts • Loss of livelihoods • Food insecurity • Abject poverty	• 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)

		climate change impacts • Increased capacity to communicate project outcomes and key lessons learnt		

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.

The proposed project is consistent with both national and international plans. It is particularly consistent with plans of the Revolutionary Government of Zanzibar including Zanzibar Development Vision 2020 (2000/2020), Zanzibar Strategy for Growth and Reduction of Poverty III (2016/2020), Zanzibar Climate Change Strategy (2014), Economics of climate change in Zanzibar (2012), Agriculture Sector Review (2015), National program under the Tanzania Social Action Fund (TASAF), Environmental Policy (2013), African Union Agenda (2063), East Africa Community Climate Change Policy (2011),Sustainable Development Goals (SDGs) 2030, National Adaptation Programme of Action (NAPA), 2007 and Tanzania Intended Nationally Determined Contributions (INDCS)

Zanzibar Development Vision 2020
Zanzibar Development Vision 2020 is the basic tools toward development of Zanzibar. The Vision 2020 gives the important direction on various issues including Climate change and Sustainable Environment Management by encourage renewable energy resources, conservation and protection of the environment, rational and sustainable utilization of natural resources. The strategy direction for Zanzibar Vision 2020 guides on promoting sustainable tourism, fishing and industrial sector, strengthen trade sector, promote human resources development, encourage information and information technology, encourage environmental protection and the promotion of good governance, capacity building and peace and stability.

Zanzibar Strategy for Growth and Reduction of Poverty III, 2016 - 2020
The Zanzibar Strategy for Growth and Reduction of Poverty III comes up with key results areas to ensure that the strategy is focused, prioritized and results-based (i) Enabling Sustainable and Inclusive Growth (ii) Promoting Human Capital Development (iii) Providing quality services for all (iv) Environmental Sustainability and Climate Resilience (v) Adhering to Good Governance Principles.

Zanzibar Climate Change Strategy, 2014
One among other objectives of the Zanzibar Climate Change Strategy is to guide mainstreaming of climate change adaptation and low carbon sustainable development across the government and provide the enabling environment for all stakeholders (private sectors, civil society, and communities) to advance relevant activities.

Economics of climate change in Zanzibar, 2012
This document indicates key issues on climate change including the projection of climate change, sea rise level, Socio-Economic Projections and Climate Screening of Development, climate risk, opportunity for adaptation, Impacts of Climate Change and Possible Adaptation Options and Coastal and Marine Ecosystems and Ecosystem Services.

Zanzibar Environmental Policy, 2013
The overall objective of Zanzibar Environmental Policy (ZEP) is to pave the way for the protection, conservation, restoration and management of Zanzibar's environmental resources, such that their capacity to sustain development and maintain the rich environmental endowment for the present and future generations is not impaired.

EAC Climate Change Policy, 2011
The purpose of the Policy is to guide EAC Partner States and other stakeholders on the implementation of collective measures to address climate change impacts and causes in the region through adaptation and mitigation measures while sustaining social and economic development. The adaptation objective for EAC Climate Change Policy is to institute

and implement measures which will improve the adaptive capacity and resilience of the East African region to the negative impacts of climate change.

Sustainable Development Goals (SDGs)
The proposed project will tackle the issues directly related to the SDGs such as Goal 1. End poverty in all its forms everywhere, Goal 2. End hunger achieve food security and improved nutrition and promote sustainable agriculture, Goal 6. Ensure availability and sustainable management of water and sanitation for all, Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all, Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable, Goal 13. Take urgent action to combat climate change and its impacts, Goal 14, Conserve and sustainably use the oceans, seas and marine resources for sustainable development and Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

National Adaptation Programme of Action (NAPA), 2007.
The overall vision of Tanzania's NAPA is to identify immediate and urgent Climate Change Adaptation Actions that are robust enough to lead to long-term sustainable development in a changing climate. It will also identify climate change adaptation activities that most effectively reduce the risks that a changing climate poses to sustainable development.

Tanzania Nationally Determined Contributions (NDCS)
Tanzania Nationally Determined Contributions (NDCS) has put much emphases on Intended Contributions 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.

Zanzibar Climate Change Action Plan
The aim of the Action Plan is to identify the specific implementation activities to deliver the Strategy, setting out the priority options for adaptation and low carbon development, and providing a costed, climate-finance ready pipeline of projects and programmes.

PART IIE. 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 aligned with relevant national technical standards and meets 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). Furthermore the project is line with Zanzibar Environmental Management Act, 2015 (Act No.3 of 2015) and Zanzibar National Forest Resources Management Plan (2010 – 2020). Other important and relevant national standards (both for for Tanzania and Zanzibar) related to rural water supply, agriculture, forestry, aquaculture, fisheries, environment, tree planting, coastal management, food security and land use planning will be considered during further steps of project design and during implementation. In so doing the project will comply and contribute to national policies, plans , strategies and programs designed by both the United Republic of Tanzania and the Revolutionary Government of Zanzibar. Furthermore, this project is relevant to the Environmental and Social Safeguard

policy of the Adaptation Fund (AF). The project design has adhered to the "free, prior and informed consent" principle by working with local communities at each stage of the project design. This will also be adhered to during the development of full proposal.

According to Environmental Act of Zanzibar, 2015 (section 45), this project does not require a full Environmental Impact Assessment, but rather an Environmental Report detailing potential impacts and mitigation 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 an ESMP.

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 North B and Wete district councils and relevant sector ministries whereby it was clear that no similar interventions exists in such districts and shehias. Furthermore, during the development of the full project proposal, various stakeholders including NIE were involved. This ensured that no duplication of project or funding sources is done. However, there some projects in other sites of Zanzibar which were proposed or implemented or are implementing some of the aspects of the project. The table below shows some of related projects for climate change adaptation conducted in Zanzibar.

Table 4: Climate change related projects/programs in Zanzibar

Project/Program	**Objectives**	**Synergy with the proposed project**
Enhancing climate change resilience in Zanzibar	Institutional support to the Revolutionary Government of Zanzibar in developing climate strategy and adaption action plan. The project was implemented by UNDP	**No duplication**. The proposed project does not target decision makers but rather communities vulnerable to climate chocks. As such the proposed project seeks to implement concrete adaption actions that will tangibly transform livelihoods.
Economics of Climate Change in Zanzibar with funding from UKAID	To quantify the economic impact of climate change to Zanzibar.	**No duplication.** This was purely a research project/program. However, the proposed project focuses on concrete adaption interventions.
Decentralized Climate Finance Project	Piloting climate resilient investments.	**No duplication**. Much of the interventions were conducted in Tanzanian mainland. Furthermore, the project targeted SMEs while this proposed project targets poor and vulnerable communities
Developing core capacity to address adaptation to climate change in productive coastal zones of Tanzania	Capacity building in climate change adaptation. Was implemented by UN Environment with funding from GEF, Least Developed Countries Fund (LDCF).	**No duplication**. The project constructed sea walls in Kisiwa Panza ward, Mkoani District in Pemba (75 m) and Kilimani ward, Kaskazini District, Unguja (5 groynes), benefited more than 5,000 and 3,000 people, respectively, as well as supported of planting more 231.5 ha of

		mangroves and 10 ha of coastal vegetation in Ukele, Tovuni, Tumbe and KisiwaPanza in Pemba and Kilimani and Kisakasaka, in Unguja. It is can be seen that none of the sites covered by the LDCF project are included in the proposed project with exception of Tovuni in which the project will augment to mangrove restoration efforts The proposed project will build on the mangrove restoration initiatives in Tovuni-Pemba whereby it plants to restore 5 ha. Thus , this project will not duplicate what was done in Tovuni but rather augments to what was done already.
Action for Strengthening Civil Society Organisations on Climate Change Governance and Accountability in Zanzibar.	The project is being implemented by Zanzibar Climate Change Alliance (ZACCA) and involves both Unguja and Pemba. Its main objective is capacity building through community radio programmes and Training of Trainers.	**No duplication.** The project sites include Donge, Jozani, and Kitogani in Unguja and Mgelema in Pemba. The project interventions include restoration and planting mangroves, cookstoves, beekeeping, and climate-smart agriculture. While the project interventions are similar to what is proposed in this proposal, it is important to recognize that none of the sites targeted by ZACCA are included in the proposed project. Thus, the proposed project will not duplicate what has already done in the project site. It will support new interventions in the shehias of Makoba, Mafufuni, Kiongwe Kidogo and Tovuni whereby none has attempted to curb the sea water inundation in such areas. For example in Mafufuni, to date about 30 ha of rice farms have been flooded with sea water and no solution exist.
TASAF supported Beekeeping and Aquaculture livelihood-based enterprises in Makoba shehia.	The main objective of Tanzania Social Action Fund (TASAF) is to support community development initiatives with a special emphasis on vulnerable groups. TASAF is a Social Action Fund of the United Republic of Tanzania	**No duplication.** Given the fact that such livelihood activities are conducted in a group setting, the individuals already involved in such activities will not be considered in the proposed interventions under this project . Furthermore, the group members were found to lack most of important skills in beekeeping and aquaculture. Therefore, the proposed project will provide training to both beneficiaries of TASAF supported projects and beneficiaries of this proposed project

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 4, activities 4.1.3 and 4.2.4 It will entail dissemination positive project results and lesson learned. . The project will organize and conduct study visits within the project sites (Unguja and Pemba) to help farmers learn and sharing experience. Study visits to Mainland Tanzania in 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 coastal communities of Zanzibar. 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. 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- Therefore, the M&E officer will be required to collect , document and facilitate the dissemination of all the project results and lessons learnt.

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. The project idea was conceptualized during a meeting held in August 2018 in which NIE visited Zanzibar to introduce the funding opportunities from the AF. This was followed by a series of meeting between the Ministry of Finance and Planning with DOE, SVPO, ZEMA, MANRLF and ZAWA. This led to the formation of project design team which among others identified and visited communities which are highly vulnerable to climate change impacts in Zanzibar. The project design team in collaboration with district officers developed a concept note and submitted to AF through NIE for review and approval.

Following the approval of concept note, a more comprehensive 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 and climate change initiatives in Zanzibar. During field visits in communities notably in shehias of Makoba, Mafufuni ,Kiongwe Kidogo (Ugunja) and Tovuni (Pemba), among others , a participatory rural appraisal (PRA) technique of pairwise ranking was used with an objective of understanding the community properties . Prior to that, focus group discussion was conducted with a view of capturing the issues and adaptation hardships from the communities themselves. Figure 8 demonstrates a pairwise ranking exercise conducted in the project sites. It can be observed that in Makoba shehia the community priorities are in the order of dike, water reservoir, beekeeping, aquaculture , poultry, horticulture and tree nurseries.

(b) Community consultations

(a)Consultative meeting at Ministry of Finance and Planning, Zanzibar

(c) Focus group discussions in Makoba shehia at salt affected rice farms

Figure 8: Stakeholders consultations

	Dike	Reservoir	Beekeeping	Poultry	Aquaculture	Tree nurseries	Horticulture	Rank

Dike		←	←		←	←	←	**1**
Reservoirs	↑		↑	←	←	←	←	**2**
Beekeeping	↑	↑		←	↑	←	←	**3**
Poultry	↑	↑	←		←	←	←	**4**
Aquaculture	↑	↑	←	←		←	←	**3**
Tree nurseries	↑	↑	↑	↑	↑		↑	**6**
Horticulture	↑	↑	↑	↑	↑	←		**5**
Total score	**6**	**5**	**3**	**2**	**3**	**0**	**1**	

Figure 9: Pairwise ranking of livelihoods activities in Makoba shehia

Community Priorities based on Results of Pairwise Ranking

Table 5: Community priorities in the proposed project

Shehia	Priorities
Makoba	1.Dike 2.Rainwater harvesting reservoir 3.Beekeeping 4.Aquaculture 5.Poultry 6.Horticulture 7. Tree nurseries
Mafufuni	1.Rainwater harvesting reservoir 2.Dike 3.Beekeeping 4. Poultry 5.Aquaculture 6.Horticulture 7. Tree nurseries

KiongweKidogo	1.Dike 2.Beekeeping 3.Aquaculture 4. Horticulture 5.Poultry 6. Tree nurseries 7. Rainwater harvesting reservoir
Tovuni	1. Dike repair 2. Drainage canal 3. Plot bunds formation 4.Rainwater harvesting reservoir 5. Horticulture 6. Poultry 7. Tree nurseries

Besides understanding the stakeholders' views on the project, the consultations also aimed at conducting Environmental and Social Impact Assessment of the proposed project in line with the requirements of the ZEMA and AF's Environmental and Social Policy. A list of individuals and institutions consulted can be found in annex 4.

Findings of Stakeholders consultations

Key issues raised

- The project should focus on few things but with concrete and tangible output
- Deforestation of mangrove vegetation is underlying factor for community vulnerability to seawater inundation following sea level rise
- In Zanzibar, tomatoes and sweet chill are the preferred horticultural crops, thus the project should support such crops especially under greenhouse farming
- Mangrove restoration is beyond tree planting, thus care must be taken as planting of mangrove seedlings may not guarantee vegetation recovery. Natural regeneration is preferred to seedling planting.
- The communities depend solely on mangroves for fuelwood and there is no reliable alternative source of heating energy
- 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 should consider short term and long term measures for seawater inundation due to the fact that many hectors of arable land is regularly inundated with seawater making the land unsuitable for agriculture
- To save about 300 ha of arable land found in project sites of Unguja which may potentially soon inundated by seawater , a dike of about 3km should be constructed. However, given the available project budget, it is possible to possible cover the whole area.
- The DOE, SVPO should be the executing entity of the project since it has the mandate to oversee all environmental matters including climate change in Zanzibar

Recommendations /Way Forward

- Given the available budget, the 3km stretch of the area requiring a dike (inUnguja) should be constructed in phases. In this project, about 900m of earthen dike should be constructed
- The dike in Pemba can be reasonably repaired under the available project budget
- Natural regeneration of mangroves should be encouraged, but it should done hand in hand with correction of hydrological and soil conditions
- DOE, SVPO should be the executing entity, MANRLF will still be part of PMU through its officers seconded to the project
- Communities should be encouraged to integrate trees in the farmlands so that they get alternative source of fuelwood instead of using mangroves
- The most vulnerable groups notably widows, orphans, people with disabilities and the elderly group should be given first priority during implementation of livelihood activities

Key issues raised on Environmental and Social Impact Assessment

- 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 rainwater harvesting reservoirs requires land clearing and involves heavy equipment especially during excavation , thus care must be taken not to disturb the un intended vegetation
- Traditional honey harvesting methods should be banned as they pose wildfire risks as they involving setting fire to scare bees.

Categories of Stakeholders consulted

a) Sectoral level Stakeholders (MDAs):

- SVPO – DoE (Unguja and Pemba)
- Ministry of Finance and Planning
- Planning Commission
- Ministry of Land, House, Water, and Energy (MLHWE) Planning Commission
- Zanzibar Environmental Management Authority (ZEMA)
- Department of Irrigation
- Department of Agriculture
- Department of Fisheries
- Department of Forestry and Non-Renewable Natural Resources (DFNR)
- Zanzibar Water Authority (ZAWA)
- Head of Ministry of Agriculture, Natural Resources, Livestock and Fisheries, Pemba

b) LGAs Level Stakeholders:

i) Wete Town Council, Pemba
ii) North B District Council, Unguja

c) Community, Famers Associations and NGOs Level Stakeholders:

i) Community Forest Pemba (CFP) – Wete, Pemba
- Makoba and Mafufuni Community, North B District, Unguja
- Tovuni community, Wete District, Pemba
- Tanzania Horticulture Association (TAHA) Zanzibar
- Organized women groups in the targeted areas
- Jozani Environmental Conservation Association (JECA)
- Pemba Association of Civil Organisations (PASCO)
- Zanzibar Climate Change Alliance (ZACCA)

Table 6: Stakeholders Analysis

Potential Stakeholders	Description of the Roles
Local government authorities (Wete Town Councils and North B District Council)	The project activities will be executed in the rural areas of the District authorities where key actors within the District Councils have direct role of managing project activities. These include district officers (forestry, land, environment, community development, fisheries) and extension officers.. 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.
Sectoral government	All sector Ministries and their Departments relevant to this project are key and the project will be keen to ensure they are widely consulted. Sectors such as Agriculture, Forestry, Environment, Fisheries, Water and Lands are relevant to this project and their inputs are necessary during project implementation at both PMU and Steering Committee levels.
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 organisations	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.
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.

PARTII 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 coastal communities in Unguja and Pemba 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, communities in Wet and North B districts 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: Construction of water harvesting infrastructures for supplying water throughout the year in selected sites (US $ 202,334)

Without funds from the Adaptation Fund (AF), no activity will be implemented to address the challenge of inadequate sustainable water supply for irrigation farming and domestic use in the project area. This means that communities will continue to depend on rainfed agriculture which is not sustainable due to unpredictable nature of the rainfall patterns. This will lead to food insecurity problem and poor household income resulting from poor agricultural production. Field surveys in the project sites show that women and other marginalized groups are highly affected. Women, in particular, are highly impacted compared to men due to their increased workload of fetching water and farming activities for the household. For example, in Makoba shehia there is such an acute water shortage that hundreds of women visit a natural spring well for fetching drinking water and washing household clothes on daily basis. It is estimated that an average of 2000 people, mostly women visit the well to fetch water weekly. According to the community members, the well has been in existence for over 50 years and it never dried. However, due to climate change the well dries during the dry season and currently it produces fresh water with some traces of salinity as a result of saltwater intrusion. If this trend continues, there is a likelihood that the well will be abandoned due to increased salinity and the community is posed to suffer even more as that well is their only hope. In the same area , there is aanother well which was abandoned following saltwater intrusion

(a)Abandoned well due to saltwater intrusion (b) Women fetching water and washing clothes (c) The natural spring well

Figure 10: The situation of water in the project sites

AF funding to construct water infrastructures will enable water availability throughout for both farmers and livestock keepers. Moreover, the construction of water reservoirs for rainwater harvesting will not only reduce flood risks and supply water for irrigation systems but also enable water supply for domestic use. By funding rainwater harvesting

structures the AF will have enabled Zanzibar to achieve Sustainable Development Goal 6 (Ensure availability and sustainable management of water and sanitation for all).

Component 2: Promoting soil and water conservation techniques for improved water protection and crop productivity (US $ 342,966)

Without AF funding, more degradation of soil and water resources is expected given the prevailing land management practices coupled with urbanization pressure. In particular, the degradation of mangrove vegetation through charcoal making, salt pans and building poles business is a key factor contributing to the current problem of sea water inundation in most of farmlands. In Unguja (Makoba,Mafufuni and Kiongwe Kidogo) about 250 ha of arable land which was previously buffered by a healthy mangrove forest, are now exposed to sea water inundation. In Pemba (Tovuni), Out of 77.5 ha of rice fields, 12 ha are already affected by saltwater inundation. The communities constructed an earthen dike to block the saltwater from the sea, but the dike requires some repairs for it to be effective. Furthermore, the presence of a dike has created another problem of waterlogging especially during wet season as there are no drainage channels for draining the water out. Thus the accumulated water becomes too much for the rice, hence unable to grow well and produce as required. Therefore, without AF funding to support the restoration of mangroves, woodlots for fuelwood and construction of dikes to prevent saltwater inundation, the communities will continue to suffer from the effects of climate change given the fact that RGZ has a significantly high adaptation deficit.

This project intends to progress soil and water conservation innovations that will ensure restoration of mangrove vegetation, degraded land and improve the protection of river catchments. By funding mangrove restoration activities and construction of dikes , the AF will enable communities to cope with sea water inundation in their farmlands thus being able to resume with farming activities. With AF funding the soil and water conservation interventions will enhance soil fertility, soil structure and soil moisture which is critical for plant growth. This is envisaged to not only boost crop yield but also increased groundwater recharge through increased water infiltration in the soil, though this may be offset by evapotranspiration losses. Furthermore, With AF funding the project will facilitate the establishment of Water Users Associations which will play very important role in protection of river catchment areas.

Component 3: Developing integrated climate resilient livelihoods diversification systems in selected sites (US $ 214,300)

Given the current situation in the target districts whereby the livelihoods of rural 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. Saltwater intrusion has caused more harm to farmers as they are forced to abandon their farms. The economic cost of losing land which has been previously used for agriculture cannot be compensated if there are no alternative generating activities that can produce equally socio-economic benefits to the affected communities.

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. In particular, farmers affected by saltwater inundation will be capacitated to implement alternative and climate resilient livelihoods the proceeds of which can be used to purchase food. Livelihood diversification will not only enable communities to have assured income for buying foods and other household needs, but also create employments. Activities such as horticulture production and poultry require some labor inputs; hence some people will be employed and hence contributing to the economic development of the country. The activities to be implemented will complement other climate adaptation initiatives by the government of Zanzibar in the framework of Zanzibar Strategy for Growth and Reduction of Poverty III, and Zanzibar Climate Change Strategy 2014. Furthermore,

the project will complement to coastal management plan and other initiatives geared towards conservation of coastal resources for enhanced resilience to climate change impacts. Thus the project will contribute to poverty reduction, economic growth and national climate adaptation efforts. Since the project will be executed by the DOE,SVPO which oversees all environmental and climate changes issues in the country, no potential larger scale adaptation options will undermine the project investments. For example, tourism investments under Zanzibar Coastal and Marine Tourism Management Plan will have to consider all the environmental regulations and standards as enforced by the Zanzibar Environmental Authority.

Component 4: Strengthen capacity of the local institutions, farmers associations and communities in promoting the adoption of climate smart agriculture practices in the targeted districts (US 86,000)

At present the target districts 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 on will be slow and may in some instances be impossible. Without AF resources climate change vulnerable communities in North B and Wete districts are more likely to continue suffering. With AF funding the districts will be able to facilitate the implementation of adaptation actions with a possibility to scale up the interventions in other sites found in their respective districts. Furthermore, the districts 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 involving North B and Wete district councils which have legal mandate to oversee development activities in the project sites. In particular, the shehia leaders (Shehas and members of environmental committees) and the community members. The water infrastructures to be developed in the project sites will remain under overall supervision of the districts after project termination. Moreover, the project will build the capacity of shehia 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.

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. 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 Shehas and members of Representative Council of Zanzibar. Relevant policies in Zanzibar support all project components. Thus, the project has full support from at all levels. Therefore, the district and shehia extension 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 Medium Term Expenditure Framework. This will be particularly possible because the district and shehia officers will have gained sufficient capacity building sessions under component 4 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 there are no/low negative impacts, in which analysis and identification was conducted with amenability of Zanzibar Environmental Policy, 2013 and Zanzibar Development Vision 2020.

Compliance with the Law

Zanzibar Environmental Management Act, 2015 explains all requirement to be done during implementation of development projects whereas before implementation of this project activities a detailed Environmental and Social Impact assessment (ESIA) will be done. ESIA will set out environmental and social guideline to be followed to minimize the impacts that will be encountered for all activities during implementation of this Project.

Zanzibar Environmental Policy, 2013: Being the Policy guiding Environmental management in all Sectors, ZEP appropriately sets broad goals committing Zanzibar to sustainable development of its natural resources heritage. The policy provides the framework for the formulation of plans, programs and guidelines for the achievement of sustainable development hence ensuring this project activities abides to its requirement.

Access and Equity

The project is set for the requirement of individuals living in Zanzibar, 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, all resources are accessed following laws, human lights in Zanzibar are well controlled by government from local government level to national level. Zanzibar Development Vision, 2020 enhance 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. Sustainable Development Goals (SDGs) Goal 6. Ensure availability and sustainable management of water and sanitation for all. This project will adhere to this vision and suitable goal.

Gender Equity and Women's Empowerment

Zanzibar Development Vision, 2020 caters on development of social environment conducive for peace harmony, protection and development for all, whereas empower 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, improves the position of women in society and it reviews laws regulations 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.

Human Rights

The Constitution of Zanzibar has stipulated requirement of ensuring that all human rights are preserved and protected and that the duties of every person are faithful discharged, it requires all government organs and its servant to adhere the international treaties on human rights and good governance, in this regard Zanzibar constitutional will be complied.

Core Labor Rights

During implementation of this project, all workforce will be sourced from Zanzibar 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.

Involuntary Resettlement

Implementation of project activities does not require resettlement good enough tree transplanting proposal will help protection of houses and crops, but also it will increases production of honey for individuals who will be practicing beekeeping as trees will provide breading areas for bees.

Protection of Natural Habitats

This project aims at Promoting soil and water conservation techniques for improved water protection and crop productivity, In particular, the degradation of mangrove vegetation through charcoal making, salt pans and building poles business is a key factor contributing to the current problem of sea water inundation in most of farmlands. Most of areas in project site which was previously buffered by a healthy mangrove forest, are now exposed to sea water inundation. This project intends to progress soil and water conservation innovations that will ensure restoration of mangrove vegetation, degraded land and improve the protection of river catchments. By promoting soil and water conservation interventions will enhance soil fertility, soil structure and soil moisture which is critical for plant growth. This is envisaged to not only boost crop yield but also increased groundwater recharge through increased water infiltration in the soil.

Conservation of Biological Diversity

Convention on Biological Diversity, Rio de Janeiro 1992-Tanzania signed the CBD in 1992 and ratified it in March 1996, thereby committing to the conservation and sustainable use of biological diversity. The objective of the Convention on Biological Diversity (CBD; 1992) is to conserve biological diversity, promote the sustainable use of its components, and encourage equitable sharing of the benefits arising from the utilization of genetic resources. Relevant to this project is Article 6 of the CBD, which provides general measures for conservation and sustainable use of biodiversity. The project site does not have any significant biological diversity since it has been long disturbed by human activities and climate change. However implementation of this project activities shall avoid/minimize disturbance to any areas that are not required to be altered.

Climate Change

United Nations Framework Convention on Climate Change (1992)-The objective of UNFCCC is to stabilize the

concentration of greenhouse gas (GHG) in the atmosphere, at a level that allows ecosystems to adapt naturally and protects food production and economic development. It commits parties to mitigate GHG as far as practicable. Since Tanzania is a Party to the Convention will have to account for all sources of GHG in the implementation of project activities. However implementation of the project like tree planting will cater for increase of GHG.

Pollution Prevention and Resource Efficiency

During project implementation there is a chance of environmental pollution to occur and there will be waste generation, Proper preventative maintenance for all machines and vehicles to be used in project activities will be done to reduce chance of spillage incase spills occurs spill kits will be used. Wastes produced will be managed in line with best environmental and health requirements with emphasize on reuse or recycle. The proposed project works are expected to generate three types of wastes. These include: Solid, Liquid and Gaseous, which can be Grouped/Categories as: Hazardous/Non-Hazardous, Organic/In-organic, Reusable/Non-Reusable and Recyclable.

The Bellow Hierarchy of Waste Management will be employed to deal with waste.

Figure 11: Hierarchy of waste management

Public Health

Project activities implementations shall involve social interactions among workforce of project from various local and foreign origins into the project site area and other neighboring areas exacerbating the HIV/AIDS epidemic. Induction and awareness programs for project workers on HIV/AIDS shall be prepared.

There will be hazards resulted from project activities implementation like dust emission, noise and vibration from machines this will be controlled by provision of personal protective equipment like dust mask, ear plugs and gloves for workers involved in the project.

Physical and Cultural Heritage

Presence of the project can attract different people from different areas, hence influx of people from outside the area for search of good living area and jobs with different backgrounds may influence a change in local customs and traditions. Such interactions could introduce a new way of living, hence awareness, training and implementation of local rules will be hardly implemented.

Lands and Soil Conservation

This project intends to progress soil and water conservation innovations that will ensure restoration of mangrove vegetation, degraded land and improve the protection of river catchments, for that Lands and soil will be conserved automatically y though during project implementation pro measures will be implemented following Environmental and Social Impact Assessment conducted

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	Requirement	Management/Measures to Address Risk
Compliance with the Law	Review has to be done annually during implementation of project to ensure compliance with change in law and regulation, also conformity with baseline conditionset.	Risk: **Low,** Potential impact:**High** -WorkplaceAccidents -Child labor and women empowerment	-Induction training, workplace awareness, provide Personal Protective equipment -Prohibit child labor and Implement laws and regulation specifically Zanzibar Vision, 2020	-Conduct a detailed Environmental and Social Impact Assessment (ESIA) before starting of any activity in which EMP and Monitoring plan will be implemented during project Activities -Work closely with ZEMA and other regulatory bodies like ZAWA -The full proposal will be compliant with all relevant national laws and regulation including the bylaws set by North B district, Wete district and project sites.
Access and *Equity*	x	Risk: **Low** Potential impact: **Low** -Misunderstanding can arises during member selection of committee or employment	-Ensure highly motivated, skilled and understanding members and employees are selected from different community where local leaders/government has to be involved	-The project will ensure equitable access to project benefits by all community members. -Involve the local community in decision making

Marginalized and Vulnerable Groups	No change in vulnerable groups observed and were consulted	Risk: **Moderate** Potential impact: **Moderate/High** -Misunderstanding and discrimination may arises	-Failure to consult marginalized and vulnerable groups may cause the project to overlook their needs and hence denying them access to project benefits.	-Vulnerable groups has to considered and be given chance to participate/access the project activities and follow law requirement like Zanazibar Development Vision, 2020 -Though during concept note development marginalized and vulnerable groups were consulted, more intensive consultations will be done during full proposal development
Human Rights	All Rights are under control of National &	Risk: **Low**	Not envisaged	The project will adhere to national and international human rights standards, policies,

	International Laws	Potential impact: **Moderate/High**		rules and regulation
Gender Equity and Women's Empowerment	Counting of number of Men and Women involved in the project implementation	Risk: **Moderate** Potential impact: **Moderate/High** -Failure to involve women in project implementations and decision making as well	Establish a base/procedure of involving women	-Gender will be mainstreamed in all project components
Core Labor *Rights*	x	Risk: **Low** Potential impact: **Moderate/High** -Recurrence of Incidents & Accidents -Miss understanding between employee and employer -Workplace hazards -Child labor	-Investigate all accident & Incidents and provide protective measure -Make employee to be member of trade union -Provide workplace protective equipment -Stop child labor	-The project will adhere to core labor rights during implementation of the project by involving government and it regulatory bodies like ZEMA, -Employee a dedicated person to control all risk and accident also to conduct training and awareness during project implementation
Indigenous *Peoples*	Control for awareness of Immigrants	Risk: **Moderate** Potential impact: **Moderate/High** -Destruction of the project due to lack of awareness and involvement, strike and insecurity because they are skipped	-Involve the indigenous people in the project site for project sustainability	-The project main target will be to address the needs of indigenous people for that make sure they understand the positivity of the project

Involuntary *Resettlement*	Stop settlement in selected project implementation site	Risk: **Low** Potential impact: **High**	Not expected	The project design does not require involuntary resettlement.
Protection of Natural	Soil profile study	Risk: **Low**	Project interventions should not lead	All project interventions will be conducted in a manner that leads to significant threat to natural

Habitats	during ESIA	Potential impact: **High**	to destruction of natural habitats.	habitats
Conservation of Biological Diversity	Consultation with Tanzania Forest Service Agency (TFS) and Wildlife Management Authority (TAWA)	Risk: **Low** Potential impact: **High** -Introduction of trees can alter behavior of microorganisms, reptiles, and birds life adaptation hence lead to loss of biodiversity	-Local tree species has to be planted rather than favoring exotic species -Follow regulatory bodies	The sites for construction of rainwater harvesting reservoirs and dikes will be subjected to baseline assessment to determine existing species and assess any potential risk
Climate Change	Not required	Risk: **Low** Potential impact: **High**	Not anticipated	The project will contribute to climate change adaptation. No GHG emissions are anticipated.
Pollution Prevention and Resource Efficiency	Not required	Risk: **Low** Potential impact: **High** -Waste generation causing disease eruption -Oil Spills leads to hydrocarbons pollution -	-Follow waste management hierarch and laws in place -Use spill kits and conduct preventive maintenance on all vehicles and machines involved in project implementations	-Adhere to established national and international pollution standards. -Develop plan and Procedures for waste management, -Correct waste and dump in designated areas under government

Public Health	Health Screening for Malaria and STD/STIs	Risk: **Low** Potential impact: **High** -Emerge of respiratory diseases -Sexitiual Transmitted Disease outbreaks -Water born diseases	-Provision of Personal Protective Equipment for people employed in project implementation -STD awareness -Boiling and chlorination of drinking water	-The project design will ensure that public health is not adversely affected by following sanitation procedures -Abide with all requirement for Association of Tanzania for Employers (ATE)

Physical and Cultural Heritage	X	Risk: **Low** Potential impact: **Moderate/High** -Deterioration of archeological site Without thorough and careful site selection especially during construction of water infrastructures	. Conduct ESIA identify all archeological and heritage site	-Involve indigenous people during project implementation and ensure consultations with Archeologists -Stop activities for the area where cultural heritage being identified and inform the authority.
Lands and Soil *Conservation*	Soil profile study	Risk: **Low** Potential impact: **Moderate/High** -Alteration and modification of soil profile and structure -Soil and land pollution/degradation	-Ensure soil leveling at the end of job -Soil grouping respect to structure and profile during striping and or pushing/dozing -Sensitize the use of fertilizer	-The project will promote conservation of soil and land resources - Proper fertilizer applications

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 the Revolutionary Government of Zanzibar through the DOE, SVPO which is responsible for overseeing all environmental issues including climate change in Zanzibar. DOE will work closely with MANRLF, ZEMA, ZAWA, Districts of North B and Wete in Unguja and Pemba respectively.

The Project Management Unit (PMU) will be comprised of Project Coordinator, Irrigation Engineer, Project Accountant, M & E officer and Project driver, all to be seconded within the government through DOE, ZEMA and MANRLF. The PMU will be guided by the Project Steering Committee (PSC), which will be constituted by members from the relevant ministries and departments , SVPO, MANRLF; Ministry of Finance and Planning; Ministry of Land, House, Water and Energy and local government authorities notably North B and Wete districts

The project coordinator will be seconded to the project from DOE, SVPO, the Irrigation Engineer from MANRLF, the project accountant and M&E officer from ZEMA, project driver from DOE, SVPO and Livelihoods officer from MANRLF. Those seconded to the project 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 4.

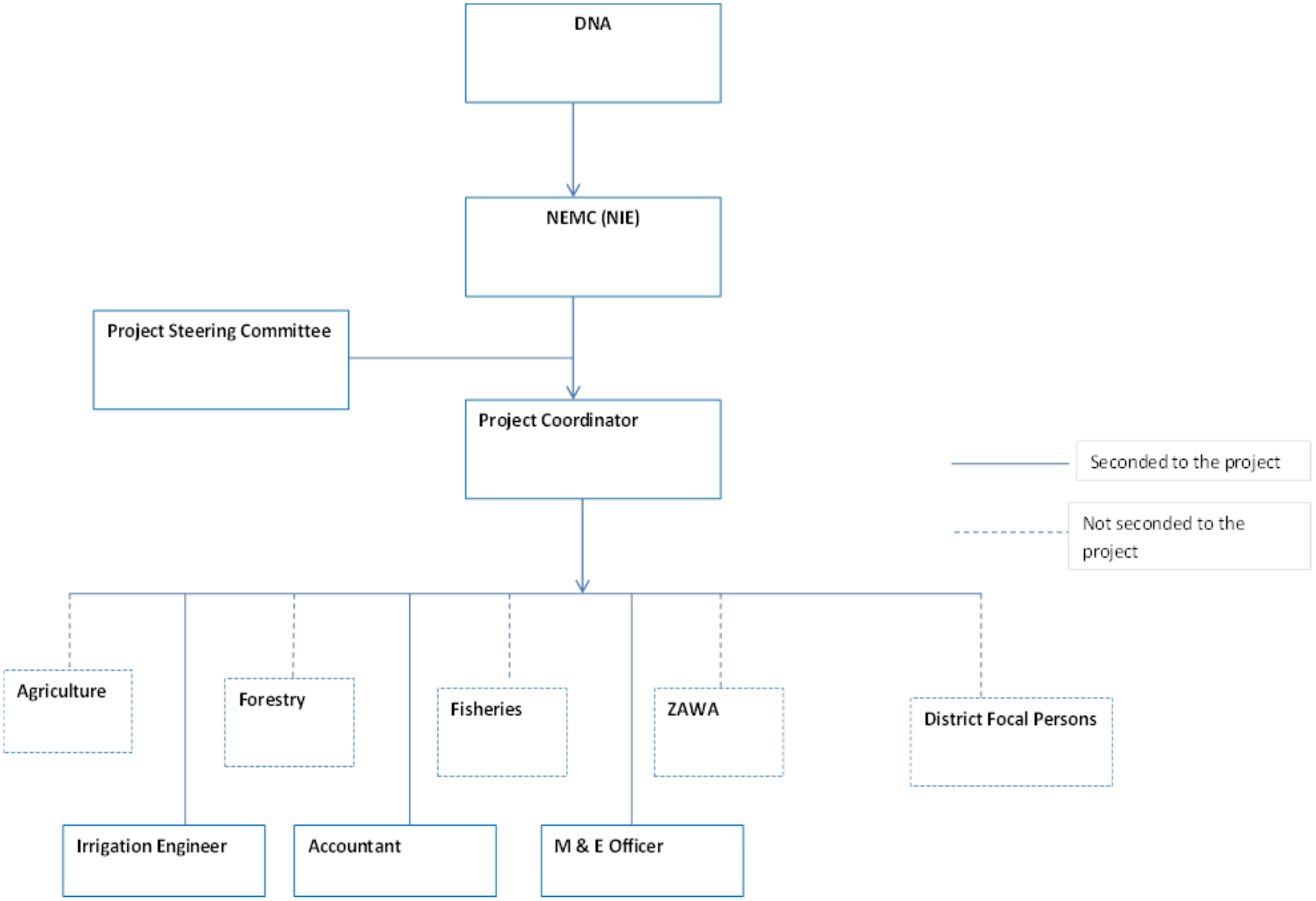


Figure 12: The Project Implementation Arrangement

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 TASAF[29] 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.

A Grievance Committee will be established at the shehia and District levels for dealing with any grievances as they arise. At Shehia level, the Committee will include the Sheha, Shehia Coordinator, Environmental Officer, Land Officer and Community Development Officer/Social Welfare Officer. At District level, the Committee will include District Administrative Executive Secretary, Assistant Director of District Council responsible for Agriculture, Natural Resources and Environment. Others include District Land Officer, District fisheries Officer District Legal Officer and other invited members related to the grievance.

The procedure for handling grievances will be as follows:

1) The affected person shall file his/her grievance in writing, to the Shehia. The grievance note should be signed and dated by the aggrieved person. Where the affected person is unable to write, he/she shall obtain assistance to write the note and emboss the letter with his/her thumbprint.

2) The Shehia may resolve those disputes it can, depending on the nature of the complaint and where the mandate lies for the issue concerned. Unresolved issues/disputes beyond their mandate are referred to adjudication to the Shehia Grievance Committee (SGC). The SGC will record all the complaints received, whether and how the Shehia resolved them and which complaints were forwarded to the Shehia Project Focal Person (SPFP).

3) If the aggrieved person does not receive a response or is not satisfied with the outcome within the agreed time, s/he may lodge her grievance to the District Grievance Committee. The District Grievance Committee will then attempt to resolve the problem (through dialogue and negotiation) within 14 days of the complaint being lodged. If no agreement is reached at this stage, then the complaint can be taken through the formal court process, i.e. to the Village Land Council, the Ward Tribunal where relevant, District Tribunal and the High Court (Land Division) at the National level (this is in case the grievance is related to land)

[29] URT, (2016). TASAF III Vulnerable Groups Planning Framework

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.
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.
	Participation of stakeholders	Low	Participation of stakeholders will consider widely involved from early stages of the project design, implementation, monitoring and evaluation during the entire life of project cycle. Involvement of key stakeholders at community level and inclusion of vulnerable to climate change adaptation communities and groups such as youth, women, local leaders, community beneficiaries, and farmers association as well as responsible ministries will facilitate to mitigating any risks related to stakeholders' involvement.

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 the Zanzibar Environmental Act,2015 and National Environmental Management Act, 2015 (Tanzania mainland) the project was subjected to an environmental and social assessment; and an environmental and social management plan was developed.

The construction of water reservoirs and fish ponds 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, sea 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 the ZEMA's , 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 include in the project budget.

Table 9: Environmental and Social Management Plan

Principle	Environmental and social Risk Category	Requirement	Management/Measures to be taken	Responsible	Cost (USD)
Compliance with Laws	Risk: **Low,** Potential impact: **High** -Workplace Accidents -Child labor and women empowerment	-Induction training, workplace awareness, provide Personal Protective equipment -Prohibit child labor and Implement laws and regulation specifically Zanzibar Vision, 2020	-Work closely with ZEMA and other regulatory bodies like Water basin, ZAWA. -The project will be compliant with all relevant national laws and regulation including the bylaws set by North B district, Wete district and project sites.	PMU	1,000
Access and Equity	Risk: **Low** Potential impact: **Low** -Misunderstanding can arises during member selection of committee or employment	-Ensure highly motivated, skilled and understanding members and employees are selected from different community where local leaders/government has to be involved	-The project will ensure equitable access to project benefits by all community members. -Involve the local community in decision making	-PMU	2,000
Marginalized and Vulnerable Groups	Risk: **Moderate** Potential impact: **Moderate/High** -Misunderstanding and discrimination may arises	-Failure to consult marginalized and vulnerable groups may cause the project to overlook their needs and hence denying them access to project benefits.	-Vulnerable groups has to be considered and be given chance to participate/access the project activities	PMU	1,000
Human Lights	Risk: **Low** Potential impact: **Moderate/High**	Not envisaged	The project will adhere to national and international human rights standards, policies, rules and regulation	PMU	1,200
Gender	Risk: **Moderate**	Establish a	-Gender will be mainstreamed in all		2,000

Equity and Women's Empowerment	Potential impact: **Moderate/High** -Failure to involve women in project implementations and decision making as well	base/procedure of involving women	project components		
Core Labor Rights	Risk: **Low** Potential impact: **Moderate/High** -Recurrence of Incidents & Accidents -Miss understanding between employee and employer -Workplace hazards -Child labor	-Investigate all accident & Incidents and provide protective measure -Make employee to be member of trade union -Provide workplace protective equipment -Stop child labor	-The project will adhere to core labor rights during implementation of the project by involving government and it regulatory bodies like ZEMA, -Employee a dedicated person to control all risk and accident also to conduct training and awareness during project implementation	PMU	3,000
Indigenous Peoples	Risk: **Moderate** Potential impact: **Moderate/High** -Destruction of the project due to lack of awareness and involvement, strike and insecurity because they are skipped	-Involve the indigenous people in the project site for project sustainability	-The project main target is to address the needs of indigenous people	PMU	1,000
Involuntary Resettlement	Risk: **Low** Potential impact: **High**	Not expected	The project design does not require involuntary resettlement.	PMU	0
Protection of Natural Habitats	Risk: **Low** Potential impact: **High**	Project interventions should not lead to destruction of natural habitats.	All project interventions will be conducted in a manner that does not lead to significant threat to natural habitats	PMU	2,000
Conservation of Biological Diversity	Risk: **Low** Potential impact: **High** -Introduction of trees can alter behavior of microorganisms,	-Local tree species has to be planted rather than favoring exotic species -Follow regulatory bodies	The sites for construction of rainwater harvesting reservoirs will be subjected to baseline assessment to determine existing species and assess any potential risk	PMU	1,500

	reptiles, and birds life adaptation hence lead to loss of biodiversity				
Climate Change	Risk: **Low** Potential impact: **High**	Not anticipated	The project will contribute to climate change adaptation. No GHG emissions are anticipated.	PMU	0
Pollution Prevention and Resource Efficiency	Risk: **Low** Potential impact: **High** -Waste generation causing disease eruption -Oil Spills leads to hydrocarbons pollution -	-Follow waste management hierarch and laws in place -Use spill kits and conduct preventive maintenance on all vehicles and machines involved in project implementations	-Adhere to established national and international pollution standards. -Develop plan and Procedures for waste management, -Correct waste and dump in designated areas under government	PMU	2,000
Public Health	Risk: **Low** Potential impact: **High** -Emerge of respiratory diseases -Sexually Transmitted Disease outbreaks (e.g. HIV/AIDS) -Water borne diseases	-Provision of Personal Protective Equipment for people employed in project implementation -HIV/AIDS awareness -Boiling of drinking water	-The project design will ensure that public health is not adversely affected by following sanitation procedures -Abide with all requirement for Association of Tanzania for Employers (ATE)	PMU	2,500
Physical and Cultural	Risk: **Low** Potential impact: **Moderate/High** -Deterioration of archeological site	. Conduct ESIA identify all archeological and heritage site	-Involve indigenous people during project implementation and ensure consultations with Archeologists -Stop activities for the area where cultural heritage being identified and	PMU	2,000

Heritage	Without thorough and careful site selection especially during construction of water infrastructures		inform the authority.		
Lands and Soil Conservation	Risk: **Low** Potential impact: **Moderate/High** -Alteration and modification of soil profile and structure -Soil and land pollution/degradation	-Ensure soil leveling at the end of job -Soil grouping respect to structure and profile during striping and or pushing/dozing -Encouraging use of manures and organic fertilizers	-The project will promote conservation of soil and land resources	PMU	1,000
Overall Total					**22,200**

Table 10: Environmental and Social Monitoring Plan

Component	Potential impacts	Monitoring parameters	Monitoring Frequency	Monitoring Area	Measurement Unit /Indicator	Target Level	Responsible	Costs (USD)
Construction of water harvesting infrastructures	Loss of biodiversity	Microorganisms, reptiles and rodents loosed	Annually	Project site	Quantity of biodiversity lost	Minimal loss of biodiversity	PMU	1,500
	Dust emission and Air Pollution	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	Plants and vegetation loosed	Annually	Project site	Lost vegetation per m^2	Minimal loss of plants/vegetation	PMU	1,000
	Soil erosion	Soil washout	Quarterly	Project site and surrounding areas	Eroded area size (ha)	Minimal soil washout	PMU	1,500
	Potential for occurrence/outbreak of accidents	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	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	Chemical, Biological & Physical	Quarterly and on discharge	Project site	Kgs, ppm	EMA, 2015 Standards Regulations	PMU	1,100
	Generation of wastes	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	1,000

	Occurrence of HIV/AIDS	HIV /AIDS infection	Annually	Project site	Number of individuals infected	No HIV/AIDS infections	PMU	1,500
Promoting soil and water conservation techniques (Dike construction)	Alteration of soil profile	Soil level	Quarterly	Project Site	m	Standards and Regulations	PMU	1,000
	Soil and land pollution/degradation	Contaminant level	Twice a year	Project Site	ppm, mg/m3	Standards and Regulations	PMU	2,000
	Soil erosion	Soil washout	Quarterly	Project site and surrounding areas	Eroded area size	Minimal soil washout	PMU	1,500
	Dust emission	NOx, CH4, SOx, particulate matter	Twice in a year	Project site and surrounding areas	ppm, mg/m3 ,µg/m3	Tanzania Standards	PMU	2,000
Developing integrated climate resilient livelihoods	Dust emission during digging of fish ponds	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	Heavy metals, Ammonia, Nitrates	Quarterly	Project site and nearby river streams	mg/m^3	Tanzania Standards	PMU	1,000
	Occurrence of HIV/AIDS	HIV /AIDS infection	Annually	Project site	Number of individuals infected	No HIV/AIDS infections	PMU	0
TOTAL COST								**22,200**

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

The Monitoring and Evaluation framework of the project will be designed according to the procedures set by the NEMC and by the AF. The Results framework gives the performance indicators against which the project will be evaluated and specifies the baseline as well the objectives to be achieved. The M&E plan includes monitoring of environmental parameters to meet the requirements of ESMP. The detailed M&E plan will be prepared and agreed upon within a month after the project starts.

Table 11: Monitoring and Evaluation Framework

Activity	**Responsible Person**	**Budget**	**Timeframe**
Inception	Project Coordinator	5,000	Within 2 months of project starting
Develop a detailed M&E Plan	PMU, NEMC		Within one month of project starting
Baseline study	Consultant	21,000	Within 3 months of project starting
Regular monitoring	Project coordinator and project staff	19,600	Quarterly
Annual progress report	M &E officer/ Project Coordinator	2000	Annually
Steering committee meetings	Project coordinator	6000	Semi annual
Final project evaluation	Consultant	6000	Four months before the end of the project
Final project Report	Project coordinator	3000	End of the project
Audit report	External Audit	3000	By the end of the project
Monitoring environmental parameters	M &E officer	22,200	Annually
Total		**87,800**	

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

Table 12: Project results framework

Expected Results	Indicators	Baseline	Targets	Means of Verificatio	Milestones
Project Goal: Enhancing resilience of coastal community to climate change-induced challenges of drought, floods and saltwater intrusion in North B and Wete districts, Zanzibar					
Enhanced resilience to climate change impacts caused by drought, floods and saltwater intrusion	The percentage of community members resilient to climate chocks	To be established during project Inception whereby a baseline study will be conducted	At 50% of the community members have access to freshwater At least 20% of farmers hare practicing irrigation agriculture Household income increased by at least 30% by the end of the project Crop yield increased atleast by 20%.	• Project progress report • Midterm review report • End of project evaluation • Publication in journal articles	By the end of the project and beyond
Component 1: Construction of water harvesting infrastructures for supplying water throughout the year in selected sites					
Improved access to water for various uses such as irrigation farming, livestock and domestic use	• The percentage of households supplied with water • Number of farmers benefiting from the irrigation schemes • Type and number of other production activities benefiting from water supply system	To be established during the baseline survey	At least 50% of target population has access to freshwater At least 30 % of farm households practice irrigation farming	• Project progress reports • Midterm review report • End of project evaluation • Publication in journal articles	By the end of Year 2
Component 2: Promoting soil and water conservation techniques for improved water protection and crop productivity					

Improved crop yield and water resources protection	• Number of bags/kgs produced from a farm under soil and water conservation interventions • Area of catchment conserved • Water quality and quantity • Number of Water Users Associations formulated.	To be established during the baseline survey	Crop yield increase by at least 10% in farms under soil and water conservation At least 30% of the river catchment area restored and conserved Form at least 2 Water Users Associations in each district	• Project progress reports • Midterm review report • End of project evaluation • Publication in journal articles	By first half of Year 3
Component 3: Developing integrated climate resilient livelihoods diversification systems in selected sites					
Increased resilience to climate challenges through livelihood integration and diversification	• Number of farmers engaged in tree nurseries and sale of seedlings • Number of farmers engaged in poultry • Number of farmers doing aquaculture both freshwater and mariculture • Number of farmers engaged horticulture farming • Number of farmers engaged in beekeeping	To be established during the baseline survey	At least 10% of target farm households engage in tree nurseries At least 20 % of farm household has more than one livelihood activities At least 10 % of farmhouse practice poultry and aquaculture Al least 30% of farm households engage in horticulture production At least 10 % of farm household engage in beekeeping	• Project progress reports • Midterm review report • End of project evaluation • Publication in journal articles	By end of Year 2

			At least 5 % of farm households integrate tree planting, poultry, aquaculture, horticulture production and beekeeping		
Component 4:.Institutional capacity building of local government authorities and communities in planning ,implementation of climate change adaption actions and dissemination of project results and lessons learnt					
Improved capacity of local government authorities and communities in planning and implementing adaption actions	• Number of district officers trained on climate change adaption issues • Number of shehia officers trained • Number of project messages disseminated • Number of project documentaries • Number of monthly reflection meetings	To be established during the baseline survey	• At least 5 % of district planning and budget account for climate change related actions • At least 2 officers from the districts and 2 officers from the shehias are dedicated to supporting rural communities on climate related interventions • At least 5 different project messages disseminated • At least 3 project documentaries created • At least 6 news articles about the project appears in national newspapers	• Project progress reports • Midterm review report • End of project evaluation • Publication in journal articles	By first half of Year 3

F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Table 14: 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.Construction of water harvesting infrastructures for supplying water throughout the year in selected sites	Number of rainwater harvesting reservoirs constructed	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	202,334
2.Promoting soil and water conservation techniques for improved water protection and crop productivity	Number of soil and water conservation techniques implemented Number of Water User Associations formed	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	342,966
3.Developing integrated climate resilient livelihoods diversification systems in selected sites	• Number of farmers engaged in tree nurseries and sale of seedlings • Number of farmers engaged in poultry • Number of farmers doing aquaculture both freshwater and mariculture • Number of farmers engaged horticulture farming • Number of farmers engaged in beekeeping	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	214,300

4. Institutional capacity building of local government authorities and communities in planning and implementation of climate change adaption actions	• 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	86,000
Project Outcome(s)	***Project Outcome Indicator(s)***	***Fund Output***	***Fund Output Indicator***	***Grant Amount (USD)***
1.Increased water supply leading to improved production in various sub sectors	Number of rainwater harvesting reservoirs constructed Number of farmers covered by the irrigation schemes Number of households supplied with water	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities Output 4:Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability Output 6:Targeted individual and community livelihood strategies strengthened in relation to climate change impacts,	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) 4.1.2Number of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types 6.1.1.No. and type of adaptation assets (physical as well as knowledge)	202,334

		including variability	created in support of individual- or community- livelihood strategies 6.1.2. Type of income sources for households generated under climate change scenario	
2.Increased agricultural production and water resources protection	Number of soil and water conservation techniques implemented Number of Water User Associations formed.			342,966
3.Increased income, food security and resilience to climate change impacts	• Number of farmers engaged in tree nurseries and sale of seedlings • Number of farmers engaged in poultry • Number of farmers doing aquaculture both freshwater and mariculture • Number of farmers engaged horticulture farming • Number of farmers engaged in beekeeping	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities Output 4:Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	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) 4.1.2Number of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types 5.1.1 Number of natural	

		Output 5.Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts including variability Output 6:Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities Output 5.Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts including variability	resources assets created ,maintained or improved to withstand conditions resulting from climate variability and change(by type and scale) 6.1.1.No. and type of adaptation assets (physical as well as knowledge) created in support of individual- or community- livelihood strategies 6.1.2. Type of income sources for households generated under climate change scenario 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) 5.1.1 Number of natural	

		Output 6:Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	resources assets created ,maintained or improved to withstand conditions resulting from climate variability and change(by type and scale) 6.1.1.No. and type of adaptation assets (physical as well as knowledge) created in support of individual- or community- livelihood strategies 6.1.2. Type of income sources for households generated under climate change scenario.	
4. Improved capacity of local government authorities and communities in planning and implementing adaption actions	• 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	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities Output 6:Targeted individual and community livelihood strategies strengthened in relation to climate change impacts,	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events 3.1.1 Number and type of risk reduction actions or strategies introduced at local level	86,000

		including variability	3.1.2 No. of news outlets in the local press and media that 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 15: Project indicators and Beneficiaries

Core indicators	**Information on the core indicators**
Number of Beneficiaries	**1525 direct beneficiaries and 17,413 indirect beneficiaries** ***Detailed calculation of the direct beneficiaries*** - 200 households **(1525persons)** - Enhanced capacity of local institutions to mainstream climate change in community development planning, sustainable natural resources management strategies and to record and communicate the lessons learned of **120** persons (60 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 **512** persons (310 adult women, 160 adult men, 42 students (21 girls and 21boys) ***Detailed calculation of the indirect beneficiaries*** - All project activities will have an impact on the entirepopulation
Assets produced, developed, improved or strengthened" with the rehabilitation of Dike in Tovuni, construction dikes in Mafufuni and Kiongwe Kidogo, construction of rainwater harvesting, irrigation and water supply and infrastructures	**Assets improved or strengthened (in short-term)** - 183 acres of rice - 500 m of dike in Kiongwe Kidogo - 400 m dike in Mafufuni - 450 m dike in Tovuni - 200 households - 2 water reservoirs - 4 greenhouses **Assets improved or strengthened(long-term)** – Shehias of Makoba, Mafufuni, KiongweKidogo and Tovuni

"Increased income, or avoided decrease in income": aquaculture, beekeeping, horticulture, poultry and tree nurseries	- The average annual income from horticulture (tomatoes, watermelon and sweet pepper) is estimated at US $12,500 from 3rd year of the project - The reforestation of 15hectares of mangrove is envisaged to reduce seawater inundation and thus increasing yield in rice production - The average annual income from sale of honey is estimated at US $ 9,600 by end of the project
"Natural Assets Protected or Rehabilitated": reduction of deforestation, improvement of biodiversity,	- 15 ha of mangrove - 5 ha of terrestrial tree species

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 15: Budget summary

Components	Output	Year 1	Year 2	Year 3	Total
Component 1: Construction of water harvesting infrastructures for supplying water throughout the year in selected sites					
	1.1	82,334	8,000	2000	92,334
	1.2	7000	96,800	6200	110,000
Total for Component 1		**89,334**	**104,800**	**8,200**	**202,334**
Component 2: Promoting soil and water conservation techniques for improved water protection and crop productivity					
	2.1	249,435	68,131	15,400	330,966
	2.2	2,000	7,500	2,500	12,000
Total for Component 2		**251,435**	**75,631**	**17,900**	**342,966**
Component 3: Developing integrated climate resilient livelihoods diversification systems in selected sites					

	3.1	6,000	11,000		17,000
	3.2	4,500	31,500	3,000	39,000
	3.3	14,000	20,800	9,500	44,300
	3.4	4,500	20,000	13,500	38,000
	3.5	5,000	37,000	34,000	76,000
Total for Component 3		**34,000**	**120,300**	**60,000**	**214,300**
Component 4: Institutional capacity building of local government authorities and communities in planning ,implementation of climate change adaption actions and dissemination of project results and lessons learnt					
	4.1	24,000	16,000	10,000	50,000
	4.2		16,000	20,000	36,000
Total for Component 4		**24,000**	**32,000**	**30,000**	**86,000**
Project execution cost		**30,320**	**21,920**	**28,160**	**80,400**
Total project cost		**398,769**	**332,731**	**116,100**	**847,600**
Management fee		**31,900**	**20,000**	**20,100**	**72,000**
GRAND TOTAL		**460,989**	**374,651**	**164,360**	**1,000,000**

(b) Output Budget

Table 16: Component 1 Budget

Component	Output	Activities	Year 1	Year 2	Year 3	Total	Notes
Component 1	1.1	Land survey and technical design	5,000			**5,000**	Consultant
	Water reservoirs	Construction of reservoirs	75,334			**75,334**	2 reservors (1 in Makoba and 1 in Mafufuni) to be constructed under supervision of water engineer @ $ 37,667
		Implementation of environmental and social measures	2,000	3,000	2,000	**7,000**	
		Training of communities on O&M procedures		5,000		**5,000**	Facilitation fees, meals and transport allowance
Total for Output 1.1			**82,334**	**8000**	**2000**	**92,334**	
Component 1							
Component 1	1.2	Site selection and community mobilization to agree on the selected site for drip irrigation	7,000			**7,000**	Land survey, suitability analysis and community meetings

	Irrigation systems	Installation of drip irrigation systems and supporting structures		92,000		**92,000**	Pipes, valves,connectors, solar -powered water pumps, water towers and storage tanks, channels and labour charges (done by irrigation contractor) for 2 drip irrigation system 1 in Unguja and 1 in Pemba
		Establishment of irrigators organization (IO)		4,800		**4,800**	Costs for irrigators mobilization and awareness raising
		Training of leaders of IO on various topics including operation and maintenance of the irrigation system			6,200	**6,200**	Facilitation fees, meals and transport allowance
Total for Output 1.2			**7,000**	**96,800**	**6,200**	**110,000**	
Total for Component 1						**202,334**	

Table 17: Component 2 Budget

Component	Output	Activities	Year 1	Year 2	Year 3	Total	Notes
Component 2	2.1	Training of smallholder farmers on soil and water conservation techniques	2,400			**2,400**	
	soil and water conservation	Support smallholder farmers to implement selected techniques	1,500	2,800	2,200	**6,500**	Allowance for extension officers
		Establishment of demo farms		3,831	3,200	**7,031**	Allowance for extension officers and costs for agricultural inputs
		Tree planting for restoration of degraded ecosystems including mangroves	5,000	4,000	4,000	**13,000**	Costs for tree nurseries and labour charges for nursery care takers . Planting of trees will be done by community members (in-kind contribution)
		Supporting saline agriculture trials for selected crops	3,000	3,000	3,000	**9,000**	Agricultural inputs, research materials ,transport costs and allowance for researchers
		Dike construction to prevent salt water inundation in Unguja (Mafufuni and Kiongwe Kidogo)	110,442	42,500		**152,942**	500 m dike in Kiongwe Kidogo and 400 m dike in Mafufuni .Labour will be provided by the community members
		Dike construction in Pemba (Tovuni)	118,125			**118,125**	

		Implementation of environmental and social measures	3,200	2,000	3,000	**8,200**	
		Baseline study	2,000				Contribution to the baseline survey to be done by a consultant
		Drainage canal construction in Tovuni	3,768			**3,768**	Site clearance, canal excavation, embankment formation
		Plot bunds formation in Tovuni		10,000		**10,000**	site clearance and bund formation
Total for Output 2.1			**249,435**	**68,131**	**15,400**	**330,966**	
Component 2	2.2	Community awareness raising on integrated water resources management		2,000		**2,000**	Allowance for government officers and transport costs
	River catchment management	Baseline study	2,000			**2,000**	Consultant
		Establishment of Water Users Associations (WUA)		5,500		**5,500**	Allowance for government officers , transport costs and seed fund for the WUA
		Training of WUA leaders on good governance, financial management, water use conflict management and water resources management			2,500	**2,500**	Facilitation fees, meals and transport allowance
Total for Output 2.2			**2000**	**7,500**	**2,500**	**12,000**	
Total for Component 2						**342,966**	

Table 18: Component 3 Budget

Component	Output	Activities	Year 1	Year 2	Year 3	Total	Notes
Component 3	3.1	Awareness raising on the need for restoration of coastal vegetation	2,000			**2,000**	
	Tree nurseries	Training of communities on tree nursery establishment		3,000		**3,000**	Facilitation fees, meals and transport allowance
		Support the establishment of tree nurseries by communities		8,000		**8,000**	
		Baseline study	4,000				
Total for Output 3.1			**6,000**	**11,000**		**17,000**	
Component 3	3.2	Training on Poultry production	2,500	2,500		**5,000**	Facilitation fees, meals and transport allowance
	Poultry production	Provision of startup capital in form of chicks and equipment		26,000		**26,000**	
		Establishment and building capacity poultry producers cooperative		3,000	3,000	**6,000**	Facilitation fees, meals and transport allowance. Facilitating the cooperative leaders to

							organize meetings
		Baseline study	2000				
Total for Output 3.2			**4,500**	**31,500**	**3,000**	**39,000**	
Component 3	3.3	Training of farmers on Tilapia and milkfish production	2,000	3,200		**5,200**	Facilitation fees, meals and transport allowance
	Aquaculture	Designing and construction of fish ponds/enclosures	8,000	8,200		**16,200**	Materials (bricks , gravel , pipes, valves, connectors and cement) and labour charges
		Purchase and distribution of fingerlings to farmers	2,000	3,000	4,000	**9,000**	
		Provide startup capital for feeds		3,100	2,500	**5,600**	
		Establishment and building capacity for fish farmers cooperative		3,300	3,000	**6,300**	Facilitation fees, meals and transport allowance. Facilitating the cooperative leaders to organize meetings
		Baseline study	2,000				
Total for Output 3.3			**14,000**	**20,800**	**9,500**	**44,300**	

Component 3	3.4	Training on sustainable beekeeping	2,500	2,500		**5,000**	
	Beekeeping	Provision of modern beehives and other related items		8,000	8,000	**16,000**	Locally made 100 beehive boxes for Unguja and 100 beehive boxes for Pemba including honey harvesting equipment and protective gears
		Training on honey processing and packaging		4,000		**4,000**	
		Provision of honey processing equipment such as honey centrifuge machine and filters		2,000	2,000	**4,000**	
		Establishment and building capacity honey producers cooperative		3,500	3,500	**7,000**	
		Baseline study	2,000				
Total for Output 3.4			**4,500**	**20,000**	**13,500**	**38,000**	
Component 3	3.5	Training on horticulture production for selected crops (tomatoes and sweet chill)	3,000	3,000		**6,000**	

	Horticulture	Provide a start up capital to farmers groups and support extension services		29,000	29,000	**58,000**	construction of 4 greenhouses with drip irrigation system @8500, Seeds, fertilizers, agrochemicals and allowance for extension officers
		Support business development activities and enabling farmers to access local and international markets		2,000	2,000	**4,000**	Communication and transport costs by district officers and leaders of horticulture farmers cooperative
		Establishment and building capacity horticulture producers cooperative		3,000	3,000	**6,000**	Facilitation fees, meals and transport allowance. Facilitating the cooperative leaders to organize meetings
		Baseline study	2,000				
Total for Output 3.5			**5,000**	**37,000**	**34,000**	**76,000**	
Total for Component 3						**214,300**	

Table 19: Component 4 Budget

Component	Output	Activities	Year 1	Year 2	Year 3	Total	Notes
Component 4	4.1	Conducting Training Needs Assessment, Development of Training Modules and Conducting training of local government officials in two targeted districts on climate smart agriculture including mainstreaming of climate change into development plans and budgeting process.	17,000				Consultant
		Facilitating district officers to provide technical assistance (training) to farmers on climate smart technologies and practices	4,000	8,000		**12,000**	Transport cost, meals and allowance for district officers and community participants
		Disseminating project results and share lessons learnt through various communication methods and channels including monthly reflection meetings	3000	8,000	10,000	**21,000**	Costs for TV documentaries, Articles on Local Newspapers, monthly reflection meetings and brochures
Total for Output 4.1			**24,000**	**16,000**	**10,000**	**50,000**	
Component 4	4.2	Build capacity of farmers cooperatives on planning for climate related actions			4000	**4,000**	
		Training various livelihood based groups (cooperatives) on climate change adaptation and preparedness		8,000	8,000	**16,000**	Facilitation fees, meals and transport allowance
		Supporting Community Based Trainers (CBT) on various livelihood activities		2,500	2,500	**5,000**	

		Facilitate farmers exchange visits/study tours		5,500	5,500	**11,000**	Farmers (15 in Unguja and 15 in Pemba) travel costs to other coastal communities outside Zanzibar to learn how their counterparts are conducting climate resilent livelihood activities
Total for Output 4.2				**16,000**	**20,000**	**36,000**	
Total for Component 4						**86,000**	

(C) Project Execution Cost

Table 20: Project execution budget

Component	Output	Activities	Year 1	Year 2	Year 3	Total	Notes
Project Execution costs							
		Staff salary top ups					
		Project Coordinator	3,600	3,600	3,600	10,800	
		Irrigation Engineer	2,400	2,400	2,400	7,200	
		M& E officer	2,400	2,400	2,400	7,200	

		Accountant	2,400	2,400	2,400	7,200	
		Driver	600	600	600	1,800	
		Steering committee meetings	1,300	1,500	1,500	4,300	(Travel cost + per diems)
		Monitoring visits by steering committee	1,350	1,350	1,600	4,300	
		Computers	1,800			1,800	
		Office consumables	800	1,000	1,000	2,800	
		Communication	600	600	600	1,800	
		Transport costs	6,000	6,000	6,000	18,000	Fuel
		Inception workshop	5,000			5,000	
		Final project Evaluation			5,000	5,000	Consultant
		Bank charges	1,000	1,000	1,200	3,200	
Total Project Execution Cost			**29,250**	**22,850**	**28,300**	**80,400**	

(d) Management Fee

Table 21: Project Management Budget for NIE

Component	Output	Activities	Year 1	Year 2	Year 3	Total	Notes
Management Fees		NEMC staff allowances	8,400	8,400	8,400	25,200	
		Monitoring and Evaluation visits	12,000	12,000	12,000	36,000	(Travel cost + per diems)
		Bank charges	3,500	3,600	3,700	10,800	
Total Project Management Fees			**31,900**	**20,000**	**20,100**	**72,000**	

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

Table 22: Disbursement schedule

	Upon signature of Agreement	One Year after Project Start	Year 2	Year 3	Total
Scheduled date	August 2020	August 2021	August 2022	August 2023	
Project Funds	400,000	375,740	85,000	67,260	928,000
Implementing Entity Fees	20,000	20,000	20,100	11,900	72,000
Total	**420,000**	**395,740**	**105,100**	**79,160**	**1,000,000**

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

A. Record of endorsement on behalf of the government[30] *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.*

Ambassador Joseph E. Sokoine, Deputy Permanent Secretary, Vice President's Office	Date*: January 14, 2020*

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

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.

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 2012, 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.	
 ***Fredrick F. Mulinda*** Implementing Entity Coordinator	
Date: *January 17, 2020*	Tel. and email: Tel. and email: **+255 753 240 517**, nieaf@nemc.or.tz / kasigazi.koku@gmail.com
Project Contact Person: Aziza Juma	
Tel. And Email: +255 777 498723 E-mail: aziza_juma@hotmail.com	

Annex 1: Endorsement Letter

UNITED REPUBLIC OF TANZANIA

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

In reply please quote:

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

Our Ref: BA. 90/201/01

14th January, 2020

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

Re: Endorsement for Enhancing Climate Change Resilience of Coastal Communities of Zanzibar

In my capacity as designated authority for the Adaptation Fund in the 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 and executed by the Department of Environment, Second Vice President's Office, Zanzibar.

Sincerely,

Ambassador Joseph E. Sokoine
For Permanent Secretary

All correspondences should be Addressed to ***Permanent Secretary,***

Annex 2 : Vulnerability Assessment Study

1.Introduction and background

As global warming causes polar ice caps to melt, the IPCC predicts sea-level rise of 8 to 96 cm by 2100, sea-level rise is likely to have a considerable impact on Tanzania's coastal communities and the ecosystems they depend on for their livelihoods (Ehrhart and Twena, 2006). The situation is evident to Zanzibar, one of the two countries that form the United Republic of Tanzania. Climate variability in the country has caused prolonged dry periods and unpredictable rainfall patterns making crop cultivation unproductive. Freshwater resources are also in limited supply mainly dependent on seasonal rains that store water in inefficient groundwater aquifers consisting of freshwater lenses floating on the underlying seawater(Gössling, 2001). Furthermore, increasing temperatures have occasionally caused seal level rise leading to saltwater intrusion in low-lying farm fields, notably rice farms.

Past global efforts on dealing with the problem of global warming concentrated on mitigation, with the aim of reducing and possibly stabilizing greenhouse gas concentrations in the atmosphere (Nyong*et al.,* 2006). Given that climate change is unavoidable, even if effective mitigation starts now, adaptation is viewed as a viable option to reduce the vulnerability to the anticipated negative impacts of climate change (Wekesa, 2008).

In order to develop effective adaptation strategy. With this regard, the Revolutionary Government of Zanzibar in consultation with stakeholders and guided by Zanzibar's development Vision 2020 and the MKUZA-III development plans, has developed a Zanzibar Climate Change Strategy (ZCCS) in 2014. The Strategy has been developed to spearhead the development of climate change interventions in Zanzibar. The ZCCS provides strategic priorities and prioritized sectors for implementation. Among the strategic priorities include the building adaptive capacity and intervention for Resilient Coastal and Marine Areas and Ecosystems. A broad set of potential adaptation options has been identified in the Zanzibar Climate Change Action Plan (2016). These have been prioritized in a short and long-term priority plan, built around an adaptation pathway that maximizes economic opportunities whilst building information to help decisions in the future, especially in the face of uncertainty. However, the island is vulnerable to the current climate stress, and there is an urgent need to curb the existing adaptation shortfall.

Currently, the Revolutionary Government of Zanzibar through the Department of Environment, Second First Vice President‖s Office is soliciting funds from Adaptation Fund for the purpose of implementing a project entitled 'Enhancing Climate Change Resilience of Coastal Communities of Zanzibar', focusing on the most affected areas of Unguja and Pemba.

The purpose of the situation analysis was to better understand the extent of vulnerability of communities and coastal ecosystems to climate change impacts and existing adaptation measures. More specifically, the analysis attempted to address the following questions: What are the constraints of communities living in the coastal zone of Zanzibar and how such constraints are exacerbated by climate change, what are the effects of the climate change impacts to livelihoods? Which groups in the communities are most vulnerable to climate change impacts? Which adaptation measures should be implemented in light of sea water intrusion and inundation?

2.Methodology

2.1Description of Proposed project sites

The project is planned to be conducted twos sites of North B in Unguja and Wete districts. In the North B, the sites visited were shehias of Makoba and Mafufuni located in Bubwini. In Wete District there are at least 12 shehias already affected by sea water inundation. These include Ukunjwi, Gando, Kiuyuminungwini, Kiungoni, Chwale, Shengejuu, Piki, Kisiwani, Junguni, Kangagani, Mjio ole and MtambweKusini. However, Tovuni is the most affected area. In Tovuni there are 77.5 ha of which 12 ha are already affected by seawater inundation. About 270 farmers mostly women are engaged in

agriculture in this area. In recent years the production of rice has decreased significantly due to environmental changes

2.2 Data collection methods

Key informant interviews (1b), focus group discussions (FGDs) and observation methods were used for the socio-ecological assessments. The FGDs comprised of groups of at least 6 people that included women, elders and village government leaders living in the proposed project sites (1a). The direct field observation method was also important as helped the project design team to understand the extent of the problem and propose relevant adaptation measures, in addition, secondary data were collected from desktop literature review.

1A 1B

Plate 1 (A and B).The project designing team visiting sites affected by the climate change impacts in Mafufuni village

3. Results and discussion

The major factors affecting peoples and livelihood in the coastal community in the propose project sites include see table 1:

S/n	Constrains (Vulnerability context)	Project site	
		Unguja	Pemba
1	Deforestation of mangroves	x	x
2	Limited land	x	x
3	Decrease of land productivity	x	x
4	Salta water intrusion and inundation	x	x
5	Deficit of fresh water	x	x
6	Inadequate knowledge on the role and mangrove restoration	x	x

3.1 Vulnerable groups

Qualitative Gender analysis in the project sites show that women whose number is relatively higher than men, are more vulnerable to climate change impacts than men. Women have the primary responsibility of household duties such as fetching water, collecting firewood for cooking and sometimes working for food to feed the household. Furthermore, women are required to participate in productive activities such as farming. Yet, access and control of resources are controlled by men. While the communities in Zanzibar are vulnerable to climate change, it is important to recognize that there are groups which are most vulnerable to climate impacts. Groups such as children, widows, female headed households, elderly and the people of with disability.

Women fetching water from communal water well which is partly affected by sea water intrusion

3.1 Vulnerability of mangrove ecosystem

Removal of mangrove cover was mentioned as a source of salt water inundation and intrusion into farmers' farms and scarcity of freshwater in the proposed project sites. Mangrove act as barrier for salt water inundation. However, the communities in the project sites have been removing this natural barrier. The drivers for the mangrove loss include: Salt making, rice farming, charcoal making and firewood collection and cutting for building materials. Salt making activity was mentioned in Makoba, they use firewood illegally harvested from mangrove forest as source of energy during the salt making process and hence resulting in degradation of mangroves. To curb this situation, it is important to support communities on alternative source of energy and other technologies for salt making

.

Rice farming is practiced in all proposed project sites of Zanzibar, clearing of mangrove forest for rice farming was among of the contributing factors for the mangrove loss. A mangrove tree species mostly affected is *Heritieralittoralis* which prefers a low salt concentration area, other species found affected in the area are *Avecennia marina* and *Ceripstagal.* While the other mangrove tree species were reported to be regenerating, no *H. littoralis* was found According to the communities in Tovuni who have been using *H. littoralis* as a source of traditional medicine, the disappearance of the species, is a big loss to their community, so they want it to be restored.

Fuelwood (charcoal making and firewood collection) and tree cutting for building were also mentioned to contribute to mangrove loss. According to Dresen*et al*, (2014) in many Sub-Saharan African countries, fuelwood collection is among the most important drivers of deforestation and particularly forest degradation. This is true for the proposed project sites of Unguja and Pemba, Zanzibar. It has been revealed that the communities in the proposed study sites, solely depends on mangroves as the source of fuelwood (charcoal and firewood). Due to this a project component which supports tree planting for fuelwood (woodlots) is important. Since, the land in the areas is limited, encouraging agroforestry practices is very important.

2a 2b

Plate 2. (A) Official of ZEMA Pemba showing the project designing team a part of rice farming area affected by salt inundation in Tovuni, Pemba, (B) A temporarily dyke build to prevent inundation salt water in the rice farms

3.2 Vulnerability due to Limited land

In in all proposed project sites it was revealed that majority of households have small land size. To cope with such situation, in the compounds of individual houses they integrate annual and with perennial agricultural crops. Few cattle was observed, keeping through tethering and free range methods. In Tovuni, only arable land of 85 acres available for rice farming. About 271, farmers area farmed in the area. However, saltwater, has been inundated in the farms. The salt water condition is not favorable for rice farming, making some areas to be not suitable for rice farming. To adapt with the situation farmers contracted a temporally dyke (Plate 1b). However, the dyke is not big enough to prevent salt water to enter into the rice farms. In the project sites, since there is nowhere to expand their farm size, therefore the issue that needs critical thinking is how the farmers would be empowered to improve productivity within the same piece of land and to adapt with salt water entering into their farms.

3.3 Vulnerability due to decrease of land productivity

The decrease of land productivity was attributed by: salt water inundation and intrusion into farmers' farms, Soil fertility problem as well as rainfall variability. Rice farms of Mafufuni and Makoba in Unguja as well as Tovuni in Pemba was found affected by the salt water. Also, in dry season, the fresh in these areas changes into salt water, hence affecting availability of fresh water in the area.

Soil fertility problem in these areas might be caused by lack of livestock and a desired agroforestry their farms. Cattle normally produces manure that improves soil fertility, which makes heathy crops in the farm. Therefore, many households are required to keep cattle. However, in all visited project sites, the number of cattle was limited. Therefore, the project to support cattle production including important infrastructure for storing water and tree planting are essential.

3.4 Vulnerability due to Inland salt water inundation and intrusion

Sea level rise has detrimental impacts on mangroves and other coastal ecosystems. Sea-level rise causes salt inundation and intrusion to inland areas thus affecting the habitats and organisms intolerant to salinity. For example, in the Mafufuni village in Unguja, several small patches of dwarf mangroves and bare land were observed (Plate 3 A&B) due to increased salinity levels

3A 3B

Plate 3 (A) Parches of dwarf mangroves (B) Bare land (salt pan) in the mangrove reserve cause by salt water intrusion

4.5 Inadequate knowledge by communities

The current situation of salt inundation in farmer's farms have been direct linked to the clearing mangrove. The village elders in the proposed projects sites, admitted that, before removal of mangrove cover, salt water was not spreading into their farms. They started restoring mangroves through planting, after realizing that, salt water in their farms is associated with mangrove loss.

While restoration of mangroves in MakobaUnguja started in 1995, at Tovuni in Pemba the programme started in 2001, however, the major constrains to the villagers for success is to understand the right approach for restoration (Plate 4). Since mangroves are not only important for preventing salt water inundation, but also provision other ecosystem, good and services, knowledge enhancement to farmers, government officials and politician on the mangrove restoration and management is vital.

Plate 4. Some of the areas mangroves that needs to be restored, (A) indicate community's initiative in mangrove restoration, mangroves have been planted in weeds making them to be stunted. (B, C and D) Aras of deforested mangroves in Makoba villages that needs different approaches for mangrove restoration

4. Conclusion

Women are more vulnerable to climate change impacts than men. The current vulnerability of coastal communities to sea water inundation into their farming lands due to climate induced sea level rise is largely exacerbated by mangrove degradation in the past. The adaptation interventions should give priority to the most vulnerable groups such as widows, female headed households, children, orphans, people with disability and the elderly.

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Annex 3: Mangroves Restoration in Zanzibar

1.0 Introduction

Mangroves are woody plants that grow at the interface between land and sea in tropical and sub - tropical latitudes where they exist in conditions of high salinity, extreme tides, strong winds, high temperatures, muddy and anaerobic soils (Kathiresan and Bingham, 2001). Zanzibar has a total land surface area of 264,180 ha, (Shunula, 2002), about 20000 ha is under mangrove vegetation, out of it 14,000 ha are found in Pemba and 6,000ha are in Unguja (Mchenga and Ali, 2015). Seven species of mangroves are common in the country including, *Avicenia marina*, *Rhizophoramucronata,Bruguieragymnorrhiza*, *Ceriopstagal*, *Pemphisacidula*, *Xylocarpuss*p and *Sonneratiaalba*.

In Zanzibar, mangroves existence is jeopardized by the increase in population pressure, agricultural, industrial and urban development, weak forest management capacity and climate change (Mchenga and Ali, 2015). For instance, sea level rise is the biggest climate threat, especially if it occurs rapidly. It increases inundation, salt stress and erosion (Hamad *et al.*, 2019) as well as rise farming. As a results of this, a thousand hectares of mangrove have been diapers in the country, which call our immediate attention to recover the degraded areas.

It is important to reverse the loss of mangrove ecosystem by using various approaches of restoration However, the restoration work is costly, ranges from USD$225/ha to USD$216,000/ha, and even much higher to up to USD$500,000/ha (Lewis III, 2001). Though, millions of dollars have been spent in the restoration work in the recent years, majority of projects failure, the success rate range between 15 - 20% (Primavera and Esteban, 2008). implies that a lot of conservation funding has gone to waste. This call for the best practices to adopted to ensure successfulness of the restoration projects.

The proposed initiative aims not ensuring cost effective but also successful in restoration of the deforested areas of mangroves in Zanzibar. Ecological Mangrove Rehabilitation (EMR) is among the best practice in the mangrove restoration. EMR requires both lower-cost biophysical approaches and greater attention to socio-cultural-political approaches common in sustainable development and coastal resource management programs (Brown *et al.*, 2014). The biophysical approach focused are mainly enabling environmental conditions for natural recovery in sites, like restoring hydrology, sediment dynamics and soil conditions is vital for the natural recovery of mangroves. Planting is only applied when really needed, in the areas where natural recovery cannot take place. Socio-political adaptations included land tenure settlement, increased use of training of trainers programs, gender assessments and sensitisation, enhanced community organising, coordination with numerous government agencies and participatory monitoring (Brown *et al.*, 2014). The approach is important as it encourage community-based or collaborative management and hence reducing conflicts of interests in the mangrove conservation.

Strategic Objectives and Performance Measures

The proposed initiative aims at rehabilitate at least 10 ha of mangroves within 3 years for the purpose of achieving variety of goals including protecting salt water inundation, shore line erosion, restoring fisheries habitat, and contributing to biodiversity conservation/climate mitigation and people's livelihood.

The specific objectives are to:

1. **To build capacity communities on the importance of mangroves and the use of Ecological Mangrove Restoration principles in the Restoration of mangroves**
   Why mangrove restoration essential?Mangrove Restoration is important for reviving social, economic and ecological functions of the mangroves. Mangroves are to the livelihoods of

the local communities as well as to the ecological functioning. It provides wood and non-wood products such as lumber, poles, fuelwood (charcoal and firewood) tannins and honey from beekeeping. In Zanzibar for example, it has been established that, the mangrove vegetation occupies a key position in the livelihood of the people. About 45% of the total population live along the coast and the majority are involved in the extraction of mangrove wood products and fishing. Between 80% and 90% of the local fishing is concentrated in waters close to mangrove-vegetated areas, creeks and bays (Shunula, 2002).

In term of ecological functions, it has been established that, what intact mangroves provides is more valuable than alternative short term gain from coastal development, aquaculture, tourism or agriculture. For example, per hectare, mangrove habitats can lock in three or four times carbon than terrestrial forest. Can also absorb up to 60% of the energy from waves, providing coastal protection from storms and preventing coastal erosion. The tangled roots of the mangroves provide rich feeding and breeding ground for marine species, generating source of protein and income for millions. Are also, important nursery grounds and breeding sites for birds, fish, crustaceans, shellfish, reptiles and mammals (Alongi, 2002). It is because of this, there is no surprise mangrove restoration to become hugely popular, with Governments, NGOs, private sector, students, and religious leaders across the world. However, the situation is difference to Zanzibar, whereas mangrove is under threats, which needs our immediate attention to serve the ecosystem. Communities have been clearing mangrove fore rice farming, salt, lime and charcoal making, extraction of fuel wood and building materials. The removal of the mangrove which is a natural barrier for salt water inundation, salt water has been spreading in rice farms and wells with salt fresh water, which results to food insecurity and scarcity of fresh water.
This object, therefore, aims at enhancing knowledge on the importance of mangroves and effective approach for restoration of mangroves is the deforested areas of Zanzibar this will be achieved by the end of the project duration. This will come out through the report and whereas possible publication.

2. **To apply the Best approaches on mangroves restoration approach for the restoring of least 10 ha of degraded mangroves areas in Zanzibar**
   Across the world hundreds of thousands of mangroves have been actively planted. Unfortunately, the majority of projects have failed and sometimes obtained very low success rate resulting to low success rates of 15 - 20 percent only. Main reasons for these meagre results include:
   i. Failure to understand the ecology of individual species, i.e. pattern of propagules production, distribution and seedlings establishment.
   ii. Failure to well understand the normal hydrological patterns that the distribution and successful establishment and successful establishment of targeted mangrove species.
   iii. Failure to understand the modification of previous environment that occurred that currently prevents natural secondary succession
   iv. Failure to design the restoration program to initially restore the appropriate hydrology and utilize natural volunteer mangrove propagules recruitment for plant establishment
   v. Failure to assess the success of the 1 to 4 aforementioned steps and apply planting a right mangrove species to the right place
   vi. Failure to address socio-economic root-causes for mangrove loss, e.g. conversion for settlement, aquaculture, infrastructure development, infrastructure development and overharvesting of timber or fuelwood and

   This objective therefore aims is to demonstrate on the ground on the best approach for mangrove restoration, addressing social issues (reduce conflicts on the restoration of mangroves with communities) and application various techniques in the restoration for the successful restoration of mangrove of Zanzibar.

IMPLEMENTATION METHODOLOGIES

Description of project area

The project will be implemented in the selected sites of North B and Wete districts:

Proposed areas in North B

Bumbwini which is one of the four constituencies is the proposed project site for North B district. This includes the three shehias of Makoba, Mafufuni and Kiongwe located in Mafufuni ward. In total there are about 16,000 inhabitants in the three shehias most of them are engaged in agricultural activities. However, to a large extent the paddy fields in these areas are affected by sea water inundation .

Wete District

In Wete District there are at least 12 shehias already affected by sea water intrusion. These include Ukunjwi, Gando, Kiuyuminungwini, Kiungoni, Chwale, Shengejuu, Piki, Kisiwani, Junguni, Kangagani, Mjio ole and MtambweKusini. However, the proposed project intends to address the needs of Tovuni which is the most affected area. In Tovuni there are 77.5 hectors of which 12 hectors are already affected by seawater intrusion. About 270 farmers mostly women are engaged in agriculture in this area. In recent years the production of rice has decreased significantly due to environmental changes.

Implementation methods /approaches

To make ecological mangrove restoration (EMR) successful in Zanzibar, a combination approaches i.e. The System-wide Collaborative Action for Livelihoods and the Environment (SCALE) and Ecological Mangrove Restoration (EMR) approach will be used. The SCALE concept is based on a communication- driven management approach that brings together all players and actors to generate options and negotiate solutions to identified problems and result in enhanced livelihoods, improved governance, increased private sector participation, and the adoption of best practices (USAID, 2004). The SCALE approach will follow five steps, namely: map the context, catalyze coalitions and partnerships, create collaborative, sustainable solutions, act and monitoring and evaluation.

- Mapping the context: will be used for identifying the stakeholders who are linked to the mangrove conservation, analysing their positions and beliefs regarding the mangrove restoration; identifying leverage points where small interventions will trigger large-scale adoption of the restoration approaches; identifying gaps in knowledge through conducting research to understand the barriers and constraints for adoption of the restoration. Key questions for understanding the barriers and constraints for adoption will be: What are the positions and beliefs regarding the mangrove restoration? What assistance (intervention) for successful adoption of the restoration? What should be done to strengthen local government and private sector to engage in the restoration activities?
- Catalyze Coalitions and Partnerships: aims at creating collaboration by bringing together all players and actors to generate options and negotiate solutions to identified problems. The Whole-System-in-the Room Planning Workshops will be conducted for stakeholders to define site-specific barriers for restoration and suggest strategies (options and actions) for scaling up the use of existing proven good practices for mangrove restoration
- Create Collaborative, Sustainable Solutions: this should be through negotiating and prioritizing collaborative solutions by identifying specific opportunities to work together as partners, Define the coalition’s or partnership’s objectives and indicators of success. What does this group want to accomplish and how will members know they have achieved, how will it contribute to the overall goal? Define the stakeholder actions that will contribute to solving the problem including success full restoration of mangroves, choose a combination of social change methodologies and tools to help them reach their objectives and measure success along the way.

- Act: SCALE provides the needed spur to action by working with stakeholders and develops collaborative strategies to achieve our restoration ambition. To make this possible, CBEMR also approach will be used. EMR approach will approach will enable to understand the in detail on the situation on the ground as described in objective 2 section. Social-political issues will also be addressed in implementation of the project for the successful restoration of mangroves in Zanzibar (Appendix 1). According to Brown *et al*, (2014) for large-scale restoration, attention is l needed to be paid to both biophysical and socio-political approaches. However, despite the proposed restoration work to be in small scale, attention will both to biophysical and socio-political. The aims here to check the applicability of the approach in small scale for thereafter to be up called to large scale restoration in the country.
- Monitoring and Evaluation: SCALE monitoring and evaluation may measure impact through a variety of indicators including: change of attitude towards mangrove restoration, reduced conflicts between mangrove conservation stakeholders and tourism activities as well as Number of hectares covered with mangroves

Key Success Factors

The approach CBEMR and SCALE that will be used are important factor for the success of the project. The two approach are potential for the success of the restoration project as it addresses issues that might hinder the success of the project prior the field work. Good cooperation between project implementers, villagers, District authority's leaders and availability of fund to meet the proposed budget will ensure the success of the project.

Monitoring and Evaluation Plan

Project monitoring and evaluation plan are shown below:

Table 2. Objective, activities and deliverables

OBJECTIVES	INDICATORS OF ACHIEVEMENT	BASELINE VALUE	TARGET VALUE	MEANS OF VERIFICATION
Overall objective:				
To rehabilitate at least 10 ha of mangroves within 3 years by use of best practices of mangrove restoration	1.0 Inception meeting with core partners to discuss the programme and plan for collaborative work	0	2	Meetings report
	1.1 Number of ha restored into functional mangrove forest	0	10	- monitoring report - satellite data - time series photos
Specific objectives:				
To build capacity communities of Zanzibar from village to national level (villagers, Government, private sector and Non-Government Organizations (NGO), policy makers on the importance of mangroves and the use of Ecological Mangrove Restoration principles the Restoration of mangroves	- Number of training workshop conducted at district level	0	4	- Training reports - Training manual - Training Posters
	- Number of awareness meetings conducted at village level	0	6	- Meetings report - Communities testimonials
	- Number of peoples trained, including women groups	0	50	Training report
To apply the Best approaches on mangroves restoration approach Ecological mangrove restoration (EMR) for the restoring of least 15ha of degraded mangroves areas in Zanzibar				
- Mapping the context: will be used for identifying the stakeholders who are linked to the mangrove conservation	Stakeholders assessment report	0	1	Stakeholders mapping report

- Map biophysical site conditions and identify restoration measures following EMR approach; - Map socio-economic and institutional context - Develop site-specific incentive mechanisms for upscaling - Identify demonstration measures with a high likelihood of success, selects site for implementation of demonstration measures	Baseline assessment reports	0	2	Baseline reports
In-the Room Planning Workshops will be conducted for stakeholders to define site-specific barriers for restoration and suggest strategies (options and actions) for scaling up the use of existing proven good practices for mangrove restoration, creating collaborative and sustainable Solutions	Number of workshop conducted	0	4	Workshop report
Action on the ground (filed work) for the restoration of mangroves				
- Prepare restoration methodologies, matching to site status - (reforestation, nursery establishment, site preparation etc.) - Adapt monitoring protocol for the restoration of deforested sites in Zanzibar				
Share best practice through outreach campaign, supporting adoption of best practice Continuous	Continuous outreach to target groups, based on campaign strategy	0	6	Social media, website and posters

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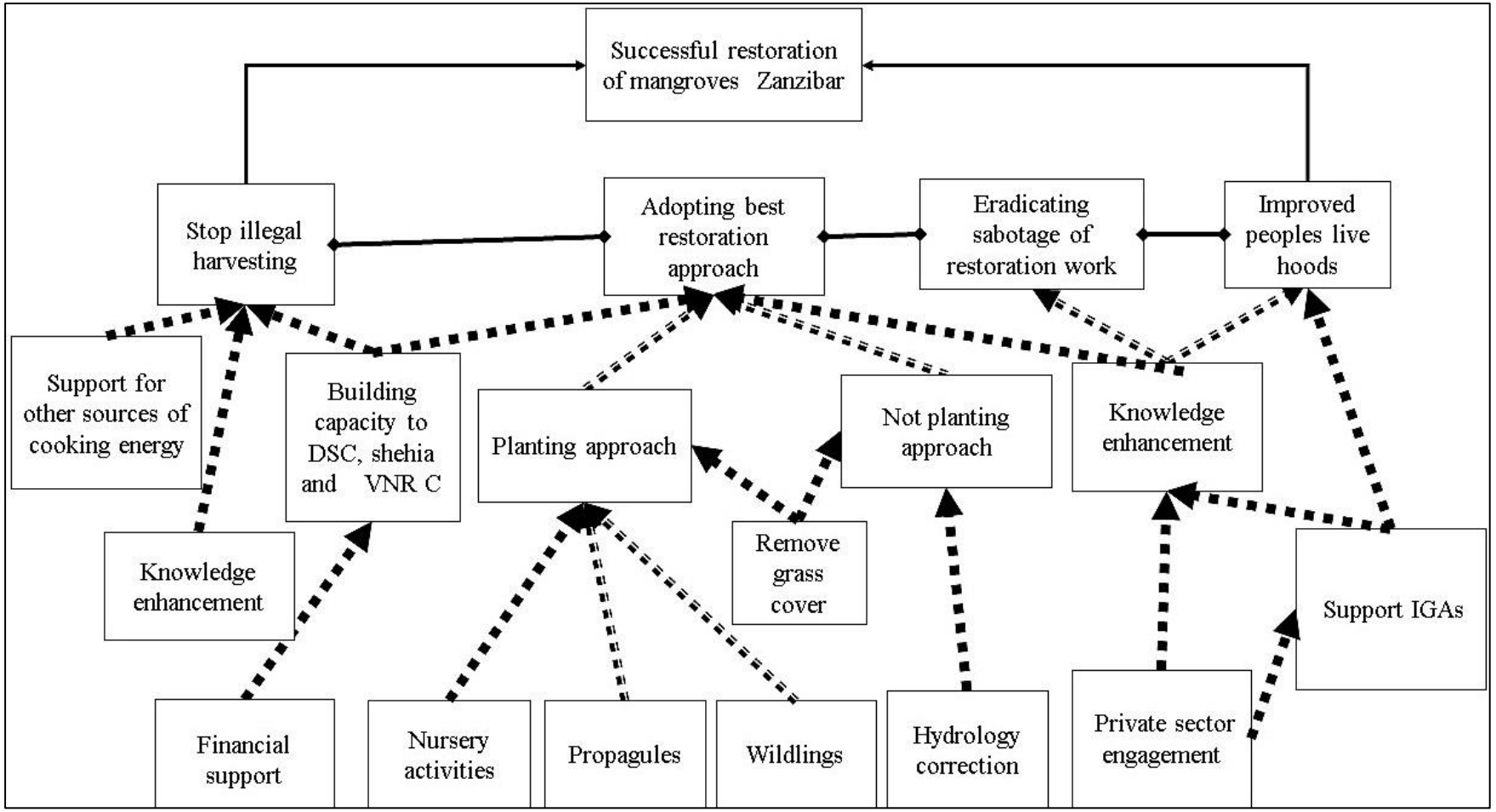
Propose modal for successful restoration of mangroves in Zanzibar



Annex 4: List of individuals and institutions consulted

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Annex 5: List of Acronyms

DOE	Department of Environment
MANRLF	Ministry of Agriculture, Natural Resources , Livestock and Fisheries
JECA	Jozani Environmental Conservation Association
PASCO	Pemba Association of Civil Organisations
SVPO	Second Vice President Office
ZACCA	Zanzibar Climate Change Alliance
ZEMA	Zanzibar Environmental Authority
ZAWA	Zanzibar Water Authority