AFB/PPRC.3/17
December 10, 2010

Adaptation Fund Board
Project and Programme Review Committee
Third Meeting
Cancun, December 13, 2010

PROPOSAL FOR TANZANIA

I. Background

1. The Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, adopted by the Adaptation Fund Board, state in paragraph 41 that regular adaptation project and programme proposals, i.e. those that request funding exceeding US$ 1 million, would undergo either a one-step, or a two-step approval process. In case of the one-step process, the proponent would directly submit a fully-developed project proposal. In the two-step process, the proponent would first submit a brief project concept, which would be reviewed by the Project and Programme Review Committee (PPRC) and would have to receive the approval by the Board. In the second step, the fully-developed project/programme document would be reviewed by the PPRC, and would finally require Board's approval.

2. The Templates Approved by the Adaptation Fund Board (Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, Annex 3) do not include a separate template for project and programme concepts but provide that these are to be submitted using the project and programme proposal template. The section on Adaptation Fund Project Review Criteria states:

> *For regular projects using the two-step approval process, only the first four criteria will be applied when reviewing the 1st step for regular project concept. In addition, the information provided in the 1st step approval process with respect to the review criteria for the regular project concept could be less detailed than the information in the request for approval template submitted at the 2nd step approval process. Furthermore, a final project document is required for regular projects for the 2nd step approval, in addition to the approval template.*

3. The first four criteria mentioned above are:
   1. Country Eligibility,
   2. Project Eligibility,
   3. Resource Availability, and
   4. Eligibility of NIE/MIE.

4. Based on the Adaptation Fund Board Decision B.9/2, the first call for project and programme proposals was issued and an invitation letter to eligible Parties to submit project and programme proposals to the Adaptation Fund was sent out on April 8, 2010.

5. According to the paragraph 41 of the operational policies and guidelines, a project or programme proposal needs to be received by the secretariat not less than seven weeks before a Board meeting, in order to be considered by the Board in that meeting.

6. The following project document titled "Implementation of Concrete Adaptation Measures to Reduce vulnerability of Livelihood and Economy of Coastal and Lakeshore Communities in Tanzania" was submitted by the United Nations Environmental Programme (UNEP), which is a Multilateral Implementing Entity of the Adaptation Fund. This is the first submission of this proposal. It was received by the secretariat in time to be considered in the 12th Adaptation Fund Board meeting. The secretariat carried out a technical review of the project concept, assigned to it the diary number AFB/MIE/Coastal/2010/3, and filled in a review sheet.

7. In accordance with a request to the secretariat made by the Adaptation Fund Board in its 10th meeting, the secretariat shared this review sheet with the UNEP, and offered it the

opportunity of providing responses before the review sheet was sent to the Project and Programme Committee of the Adaptation Fund.

8. The secretariat is submitting to the Project and Programme Review Committee the summary of the project, prepared by the secretariat, in Annex 1. The secretariat is also submitting to the Committee the technical review sheet and the responses provided by the UNEP, as confidential documents.

Project Summary

Tanzania – Implementation of Concrete Adaptation Measures to Reduce vulnerability of Livelihood and Economy of Coastal and Lakeshore Communities in Tanzania
Implementing Entity: *UNEP*

Project/Programme Execution Cost: USD 408,750
Project/Programme Total Cost: USD 9,045,638
Implementing Fee: USD 768,879
Finance Requested: USD 9,814,517

PROJECT/PROGRAMME BACKGROUND AND CONTEXT:

As a large LDC where most of the population depends on natural resources and the environment for their livelihoods, Tanzania is already vulnerable to the impacts of climate hazards such as floods, droughts and tropical storms which are becoming more frequent and intense. Natural ecosystems, infrastructure and agriculture, mainly those within the coastal zone are presently threatened by those climate hazards. Agriculture and human livelihoods are also under severe constraints in rural areas, particularly in the Lake region. Droughts and floods have already resulted in a significant number of considerable economic losses. This project seeks to respond to the impacts of climate-change on the coastal zone and lakeshore areas of Tanzania. Coastal zone management and agriculture have been prioritized by the national policy documents of Tanzania as well as Tanzania's NAPA and National Communication to the UNFCCC. The main objective of the project is to reduce vulnerability of livelihoods and economy of coastal and lakeshore communities in Tanzania through the implementation of concrete and urgent adaptation measures. In order to achieve this objective, the project will be delineated into the following six specific outcomes which will be implemented in 5 sites, of which three districts in the coastal regions (Mtwara, Dar Es Salaam, Muheza), and two in the Lake Victoria regions (Magu, Muleba):

1. Adverse impacts of floods averted
2. Adverse impacts of climate change on water supply and quality averted
3. Livelihoods are sustainable, diversified and resilient
4. Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented
5. Knowledge of climate impacts and adaptation measures is increased
6. Adverse impacts of sea level rise on coastal infrastructures and settlements.

Component 1: Responding to Sea-Level rise impacts on key infrastructure in coastal zones (USD 4,041,113)
Activities under this component are designed along to achieve three outcomes. The first set of activities (Outcome 1) are targeted towards addressing the direct impacts of Sea Level Rise and coastal erosion on the key social, cultural and economic infrastructures of the 3 project sites located in coastal areas. Coastal protection measures will be put in place through a mixture of protective works and softer coastal protection measures, and existing protective infrastructures will be rehabilitated for increased resilience. Engineering assessments of the climate change impacts and adaptation measures for

specific port infrastructures will also be included in this component, which will enable the government and the Tanzania Port Authority to initiate the implementation of long-term rehabilitation and contingency plans and which will provide the coastal engineering needs assessment for this project.

Component 2: Resilient livelihoods (USD 2,429,950)

Activities under this component have a dual objective. First, to provide the vulnerable communities with resilient livelihoods that take into account the constraints and opportunities of climate change in the future; second, to remove the anthropogenic pressures on the environment that hinder its own resilience to climate change. This component will focus on agriculture, fisheries and tourism as the key productive sectors among non-urban communities in the coast as well as in the lakeshore areas. Activities will aim at providing communities with the means to achieve higher productivity based on better technology, while ensuring that challenges of climate change are taken into account and reducing environmental damage due to unsustainable natural resource use.

Component 3: Ecosystem-based Integrated Coastal Area Management (USD 1,743,225)

This component comprises a set of concrete environmental rehabilitation measures designed to enhance ecological resilience as well as a set of enabling measures that form part of an integrated ecosystem-based integrated coastal area management system for the targeted regions.

Environmental rehabilitation activities will be undertaken as complementary activities to the rehabilitation of infrastructures undertaken under Component 1 and the livelihoods-based measures undertaken in Component 2. They will focus on fragile buffer ecosystems, including dunes, beaches, mangroves, marshes, and coastal forests in each of the sites. Rehabilitation measures will be implemented with the direct support of district authorities, local authorities as well as local populations, through the implementation of a GreenJobs program targeted towards unemployed youth (that will include vocational training).

REQUEST FOR PROJECT/PROGRAMME FUNDING FROM ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN G6-602
Washington, DC. 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: secretariat@adaptation-fund.org

ADAPTATION FUND

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	REGULAR PROJECT
COUNTRY/IES:	REPUBLIC OF TANZANIA
TITLE OF PROJECT/PROGRAMME:	**IMPLEMENTATION OF CONCRETE ADAPATION MEASURES TO REDUCE VULNERABILITY OF LIVELHOOD AND ECONOMY OF COASTAL AND LAKESHORE COMUNITIES IN TANZANIA**
TYPE OF IMPLEMENTING ENTITY:	**MIE**
IMPLEMENTING ENTITY:	**UNEP**
EXECUTING ENTITY/IES:	**VICE PRESIDENT'S OFFICE (DEPARTMENT OF ENVIRONMENT)**
AMOUNT OF FINANCING REQUESTED:	**9,994,600** (IN U.S DOLLARS EQUIVALENT)

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

Project summary

As a large LDC where most of the population depends on natural resources and the environment for their livelihoods, Tanzania is already vulnerable to the impacts of climate hazards such as floods, droughts and tropical storms which are becoming more frequent and intense. Natural ecosystems, infrastructure and agriculture, mainly those within the coastal zone are presently threatened by those climate hazards. Agriculture and human livelihoods are also under severe constraints in rural areas, particularly in the Lake region. Droughts and floods have already resulted in a significant number of considerable economic losses. For example, Tanzania has experienced six major droughts over the past 30 years with the most recent one in 2006 having ravaged agricultural production which is estimated to have cut the GDP growth by one percent. Exacerbating these climate change impacts are poverty, population density, dependence on rain-fed agriculture and climate and environmental degradation and inefficient implementation of existing plans and policies.

Under a changing climate, existing climate hazards such as droughts, floods and tropical storms are likely to become more frequent and intense. They are likely to adversely affect the natural ecosystems, infrastructure, and agriculture and community livelihoods within the coastal zone and rural areas in the lake region. Sea level rise which, according to some projections could

reach 1m by 2100[1] in some areas, will have implications on socio- economic development and will increase the physical vulnerability of Tanzania's 800km coastline.[2] Expected climate changes are likely to undermine any progress in poverty alleviation by affecting agricultural productivity and to lead to continued degradation of the environment. This situation will become even worse unless timely adaptation interventions are implemented.

This project seeks to respond to the impacts of climate-change on the coastal zone and lakeshore areas of Tanzania. Coastal zone management and agriculture have been prioritized by the national policy documents of Tanzania as well as Tanzania's NAPA and National Communication to the UNFCCC. The main objective of the project is **to reduce vulnerability of livelihoods and economy of coastal and lakeshore communities in Tanzania through the implementation of concrete and urgent adaptation measures.** In order to achieve this objective, the project will be delineated into the following six specific outcomes which will be implemented in 5 sites, of which three districts in the coastal regions (Mtwara, Dar Es Salaam, Muheza), and two in the Lake Victoria regions (Magu, Muleba):

7. Adverse impacts of sea level rise on coastal infrastructures and settlements.
8. Adverse impacts of floods averted
9. Adverse impacts of climate change on water supply and quality averted
10. Livelihoods are sustainable, diversified and resilient
11. Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented
12. Knowledge of climate impacts and adaptation measures is increased

The project will be implemented by the United Nations Environment Programme and executed by the Vice President's office (Department of Environment) of Tanzania.

[1] 3AR IPCC, 2003
[2] 4AR IPCC, 2007

1. Background and context

1.1 Geography

The country's total area is 945,000 square kilometres with the mainland covering 939,702 square kilometers. The land area of the mainland is 881,289 square kilometers while 58,413 square kilometers are inland lakes. The available land for cultivation is 40 million hectares and cultivated land is about 5.2 square kilometers. Forests and woodland occupy 50 percent of the total area and 25 percent is wildlife reserves and national parks. The coastline extends 800 kilometers from 4^0S to 10^0S. Except for the coastal belt most of the country is part of the Central African plateau lying between 1,000 to 3,000 meters above sea level.

1.2 General climate

Tanzania's climate ranges from tropical to temperate in the highlands. Country wide, the mean annual rainfall varies from 500 millimeters to 2,500 millimeters. The average duration of the dry season is 5 to 6 months. Average annual precipitation over the entire nation is 1,042 mm. Average temperatures range between 24°C and 34°C, depending on location. Within the plateau, mean daily temperatures range between 21^oC - 24^oC. Natural hazards include both flooding and drought.

Within the country, altitude plays a large role in determining rainfall pattern, with higher elevations receiving more precipitation. Generally speaking, the total amount of rainfall is not very great. Only about half the country receives more than 762 mm annually (Mwandosya et al., 1998). Tanzania's precipitation is governed by two rainfall regimes. Bimodal rainfall, comprised of the long rains of Masika between March-May and short rains of Vuli between October-December, is the pattern for much of the northeastern, northwestern (Lake Victoria basin) and the northern parts of the coastal belt. A unimodal rainfall pattern, with most of the rainfall during December-April, is more typical of most of the southern, central, western, and southeastern parts of the country. (see Fig 1 below)

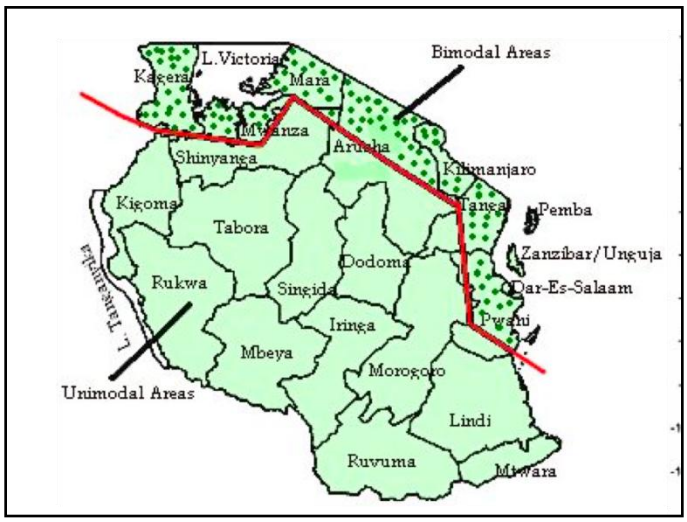


Figure 1: Rainfall patterns (source: Food Security Information Team, 2005)

The country can be roughly divided into four main climatic/topological zones:

(a) ***The Lowland Coastal Zone*** This zone can further be divided into three sub-zones: the wet sub-zone, between 0 to 500 meters of elevation, with 1,800 millimetres of annual rainfall on average; humid sub-zone, elevation ranging from 500 metres to 1000 metres with an annual rainfall of between 1000 and 1,800 millimetres; and the drier zone, about 1,000 metres in altitude, with less than 1,000 millimetres of rainfall per annum.

(b) ***The Highlands Zone*** **-** This comprises of the Northeastern Highlands, which include the Usambara Mountains, Mt. Kilimanjaro and Mt. Meru; the Southern Highlands, which include Mt. Rungwe, Livingstone ranges, and Mt. Mbeya. As catchment areas, these are generally areas of high precipitation

(c*) The Plateau Zone* **-** Found around Lake Victoria and much of western Tanzania, this zone is occupied by what are generally referred to as *miombo* woodlands. These are, in the main, dry areas with an average rainfall of up to 1,000 millimetres.

(d*) The Semi-desert Zone* Mainly found in central and North Eastern Tanzania around Dodoma, Shinyanga, Arusha, Mwanza and Mara. The zone has a rainfall of less than 600 millimeters per annum.

The Tanzania NAPA and National Communication further categorized the country into 7 agro-ecological zones, as represented in the table below.

Table 1

Zone	Sub-Zone and areas	Soils and Topography	Altitude	Rainfall (mm/yr)	Growing season
1. COAST	North: Tanga (except Lushoto), Coast and Dares Salaam South: Eastern Lindi and Mtwara (except Makonde Plateau	Infertile sands on gently rolling uplands Alluvial soils in Rufuji Sand and infertile soils Fertile clays on uplands and river flood plains	Under 3000m	North: Bimodal, 750-1200mm South: Unimodal, 800-1200mm	North: October-December and March-June South: December- April
2.ARID LANDS	North: Serengeti, Ngorogoro Parks, Part of Masailand Masai Steppe, Tarangire Park, Mkomazi Reserve, Pangani and Eastern Dodoma	North: Volcanic ash and sediments. Soils variable in texture and very susceptible to water erosion South: Rolling plains of low fertility. Susceptible to water erosion. Pangani river flood plain with saline, alkaline soil	North: 1300-1800m South 500-1500m	North: Unimodal, unreliable , 500-600mm South: Unimodal and Unreliable, 400-600mm	March- May
3. SEMI-ARID LANDS	Central Dodoma, Singida, Northern Iringa, some of Arusha, Shinyanga Southern: Morogoro (except Kiliombero and Wami Basins and Uluguru Mts). Also Lindi and Southwest Mtwara	Central: Undulating plains with rocky hills and low scarps. Well drained soils with low fertility. Alluvial hardpan and saline soils in Eastern Rift Valley and lake Eyasi. Black cracking soils in Shinyanga. Southern: Flat or undulating plains with rocky hills, moderate fertile loams and clays in South (Morogoro), infertile sand soils in center	Central: 1000-1500m Southeastern 200-600m	Central: unimodal and unreliable: 500-800mm Southeastern: Unimodal 600-800mm	December - March
4. PLATEAUX	Western: Tabora, Rukwa (North and Center), Mbeya North: Kigoma, Part of Mara Southern: Ruvuma and Southern Morogoro	Western: Wide sandy plains and Rift Valley scarps Flooded swamps of Malagarasi and Ugalla rivers have clay soil with high fertility Southern: upland plains with rock hills. Clay soils of low to moderate fertility in south, infertile sands in North.	800-1500m	Western: unimodal, 800-1000mm Southern: unimodal, very reliable, 900-1300mm	November- April
5. SOUTHERN AND WESTERN HIGHLANDS	Southern: A broad ridge of from N. Morogoro to N. Lake Nyasa, covering part of Iringa, Mbeya Southwestern: Ufipa plateau in Sumbawanga Western: Along the shore of Lake Tanganyika in Kigoma and Kagera	Southern: Undulating plains to dissected hills and mountains. Moderately fertile clay soils with volcanic soils in Mbeya Southwestern: Undulating plateau above Rift Valleys and sand soils of low fertility Western: North-south ridges separated by swampy valleys, loam and clay soils of low fertility in hills, with alluvium and ponded clays in the valleys	Southern: 1200-1500m Southwestern: 1400-2300m Western: 100-1800m	Southern: unimodal, reliable, local rain shadows, 800-1400mm Southern: unimodal, reliable, 800-1000mm Western: bimodal, 1000-2000mm	Northern: December – April Southwestern: November- April Western: October-December and February-May
6.NOTHERN HIGHLANDS	Northern: foot of mt Kilimanjaro and Mt. Meru. Eastern Rift Valley to . Eyasi Granite Mts Uluguru in Morogoro, Pare Mts in Kilimanjaro and Usambara Mts in Tanga, Tarime highlands in Mara	Northern: Volcanic uplands, volcanic soils from lavas and ash. Deep fertile loams. Soils in dry areas prone to water erosion. Granite steep Mountain side to highland plateaux. Soils are deep, arable and moderately fertile on upper slopes, shallow and stony on steep slopes	Northern: 1000-2500m Granitic Mts: 1000-2000m	Northern: Bimodal, varies widely 1000-2000mm Granitic mts. Bimodal and very reliable 1000-2000m	Northern: November-January and March-June Granitic Mts. October-December and March-June
7. ALLUVIAL PLAINS	K-kilomberao (Morogoro) R- Rufuji (Coast) U- Usangu (Mbeya) W- Wami(Morogoro)	K-Cental clay plain with alluvial fans east and west R- Wide mangrove swamp delta, alluvial soils, sandy upstream, loamy down steam in floodplain U-Seasonally Flooded clay soils in North, alluvial fans in South W- Moderately alkaline black soils in East, alluvial fans with well drained black loam in West		K—Unimodal, very reliable, 900-1300mm R-Unimodal, often inadequate 800-1200mm U-Unimodal, 500-800mm W-Unimodal, 600-1800mm	K-November-April R- December-April U-December-March W-December-March

This project is therefore concerned with two distinct areas, from a climatic point of view: the Coast area, which is further divisible into Northern Coast (bimodal rains) and Southern Coast (unimodal rains) and the Lake region, which for the most part can be categorized as semi-arid or arid zones (unimodal rains), as per figure 1 above.

This project is concentrated in the North and Eastern boundaries of the country, and will focus on 5 sites located along the Coast and in the shores of Lake Victoria (see section on project objectives for more information on the project sites).

1.3 The Coast

The Coast of Tanzania is tropical as Tanzania lies just south of the equator, between longitude

29°21'E and 40°25'E, and latitude 1°S and 11°45'S. Tanzania has a long mainland coastline of about 800 km excluding near shore islands, bays, lagoons and estuaries. About 10 rivers drain into the Indian Ocean, of which Pangani in the north, Rufiji in the middle and Ruvuma in the south are the main rivers. The smaller rivers include Zigi, Wami, Ruvu, Matandu, Mavuji, Mbwemkuru and Lukuledi. These rivers influence the coastal environment through the creation of productive brackish water environments in estuaries, maintenance of deltas, tidal flats and shorelines, and nourishment of mangroves and seagrass beds.

The coastal and marine environments include major estuaries, mangrove forests, coral reefs, sandy beaches, cliffs, seagrass beds and muddy tidal flats. Sandy-muddy flats or rocky reef platforms are found in the intertidal zone, while the sublittoral zone consists of extensive seagrass beds and coral reefs.

These coastal ecosystems interact with each other and together sustain a tremendous diversity of marine life, which is an important source of sustenance for coastal communities. For instance, a wide range of important and valued species are found, including an estimated 150 species of coral in 13 families, 8,000 species of invertebrates, 1,000 species of fish, 5 species of marine turtles, and many seabirds.[3]

Coral reefs: Due to the narrowness of the continental shelf of most of Tanzania, coral reefs are typically situated close to land. Coral reefs are common along much of the Tanzanian coastline, and well-developed barrier reefs occur along most of the ocean-facing eastern coastline of the islands. There are also extensive coral reefs and coral outcrops on the leeward side of the islands, and these vary in species diversity. Coral reefs provide a range of ecosystem services, including food, shelter and breeding grounds for fish and crustaceans, sediment input for beach formation, shoreline protection against wave action and storms, and natural carbon sinks. Coral reefs are subject to anthropogenic pressures (unsustainable use, dynamite fishing) as well as to the effects of climate change (temperature rises and precipitation change that lead to coral bleaching). Coral reefs are particularly sensitive to changes in water clarity and temperature and even a slight increase in temperature and/or decline in clarity are likely to have significant impact on their health. Endangered species associated with these ecosystems, including manatees and marine turtles, could also be at risk, along with migratory birds. The 1997-1998 coral bleaching observed in the Indian Ocean and Red Sea was coupled to a strong ENSO (an indication of the potential impact of climate-change induced ocean warming on coral reefs). In the western Indian Ocean region, a 30% loss of corals reduced tourism in Mombasa and Zanzibar and resulted in financial losses of about US$ 12-18 million[4].

Mangroves: Mangrove ecosystems play a key ecological role in the coastal environment. Mangroves are trees that flourish in salty, anaerobic and acidic soils. Mangroves grow in sheltered areas of brackish water, where freshwater mixes with seawater. These areas include estuaries, lagoons, bays, tidal creeks, and inlets. Mangroves also provide a range of ecosystem services such as habitat for marine and bird species, breeding and roosting grounds, as well as stabilization of riverbanks and shorelines, and a protection against floods and storms.

[3] Tanzanian Coastal and Marine Resources: Some Examples Illustrating Questions of Sustainable Use, *Julius Francis and Ian Bryceson, in Lessons Learned in Sustainable Development.*

[4] 4AR IPCCC, 2007

Mangroves in mainland Tanzania cover 115,500ha. They are subject to man-made pressure such as deforestation (for fuelwood or construction) and clearing (for agriculture, particularly in Rufiji area, tourism or salt production). Climate change pressures on mangroves are the result of complex interactions between changes in precipitation, drainage, and sea level rise. The largest continuous mangrove stands are found in the districts of Rufiji, Kilwa, Tanga, Muheza, and Mtwara. While a 2003 study showed that between 1990 and 2000 the geographic coverage of mangroves had showed no dramatic change, mangrove productivity and health are reputed to be in danger from changed climate patterns, which could hinder any progress resulting from previous attempts at managing mangroves in Tanzania (such as the Mangrove Management Project, launched in 1988 under the aegis of the Tanzania's department of Forestry).

See grass beds: In Tanzania, seagrass beds are found in sheltered areas of the coast around Kilwa, Rufiji, Ruvu and Moa. They are common in the vicinity of coral reefs, and are linked to them physically and in terms of energy flows. Seagrass beds are highly productive and serve many ecological functions. These include providing breeding, nursery, and feeding areas for many invertebrate and vertebrate species including commercially important species of finfish and shellfish; and shelter and refuge for resident and transient adult animals. Seagrasses are an important food source for herbivorous invertebrates, fish, dugong, and green turtles. Additional ecological functions of seagrass include the trapping of sediments, which reduces sedimentation over coral reefs and therefore protects shorelines, and the dissipation of wave energy, which also provides protection to the beaches. Because seagrass beds are mainly found in shallow water close to shore and to human activities, they are very vulnerable to pressure from those activities.

Beaches: Beaches are an interface or meeting zone between land and sea. They are dynamic features and are often under the combined influence of many factors and processes which themselves are subject to change. These include geological, climatic and oceanographic processes. Beaches provide a number of key ecological services such as breeding or nesting grounds, feeding grounds for marine and bird species, and a buffer against wave action. Beaches are extensively used by coastal communities for recreational, touristic and aesthetic value, as well as as working areas for fisheries. They are subject to manmade pressures as well as climate change pressures due to sea level rise.

The map in Figure 2 below illustrates the key ecological features of the Tanzanian Coastline.

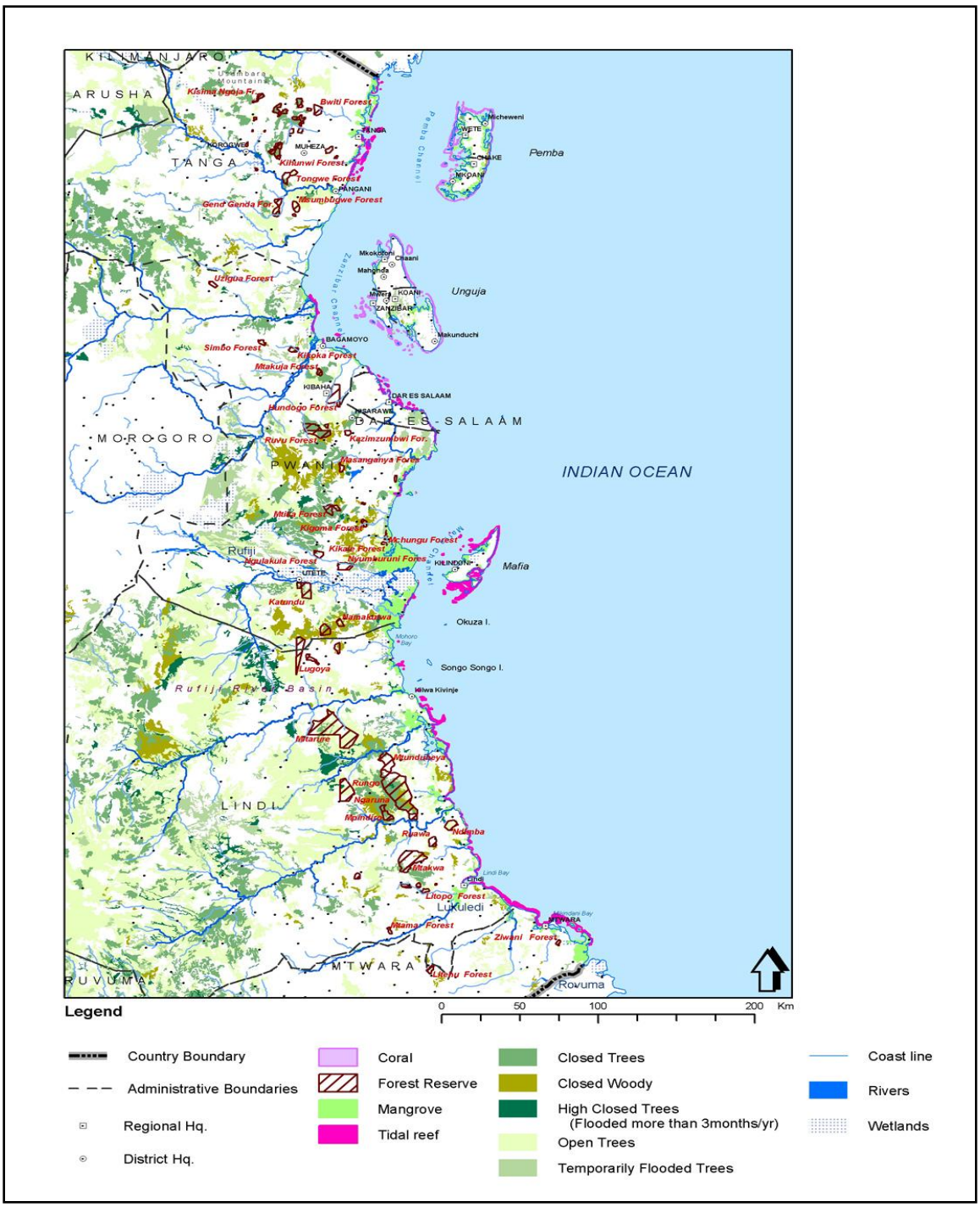


Figure 2: The Coast

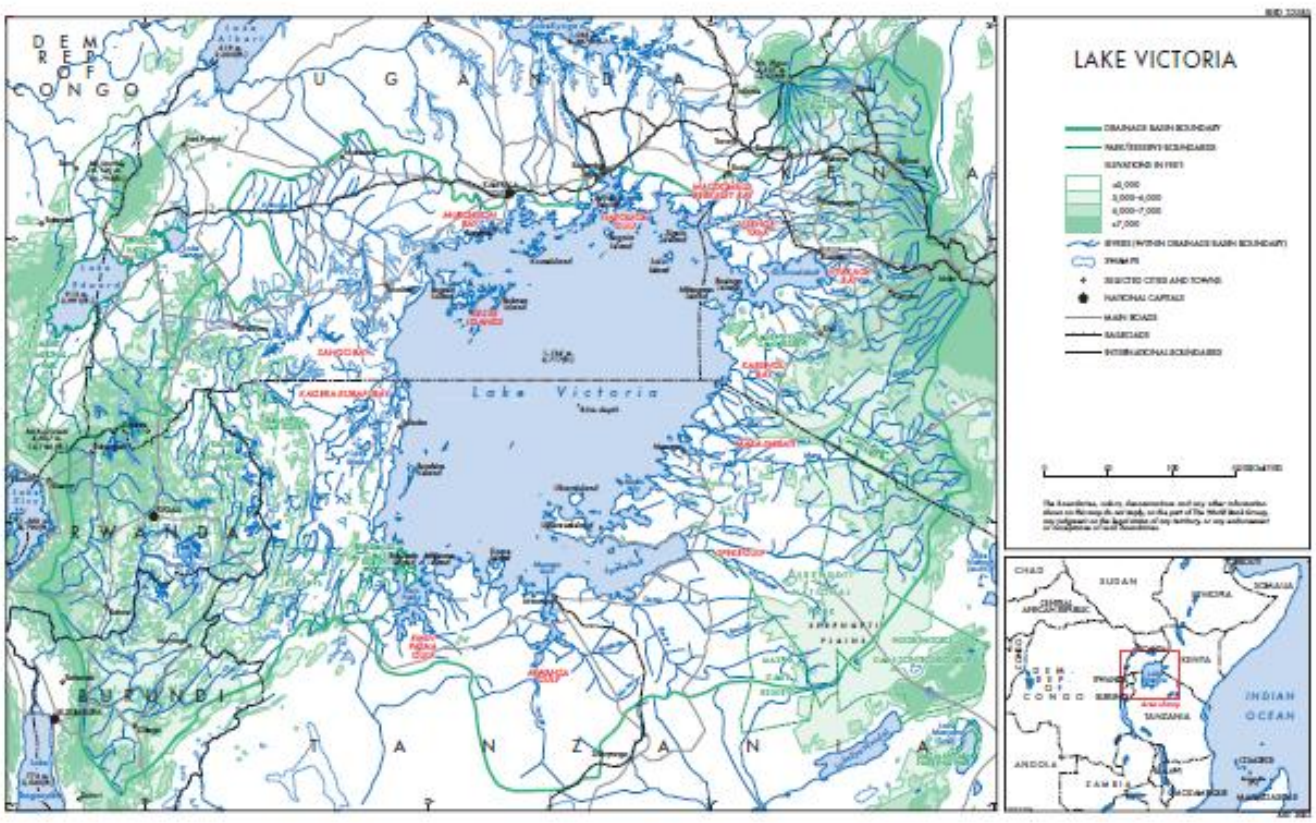
1.4 The Lake region

The Lake Victoria area of Tanzania covers the districts of Kagera, Mwanza and Mara in the Northwest area of the country. Lake Victoria, the largest of all African Lakes, is also the second widest freshwater body in the world. Its extensive surface belongs to the three countries; the northern half to Uganda, the southern half to Tanzania, and part of the northeastern sector to

Kenya. The lake occupies a wide depression near the equator, between the East and West Great Rift Valleys, but its drainage basin is relatively small, being slightly less than three times the lake's surface in area. Lake Victoria receives most of its water from direct precipitation or from thousands of small streams. The largest stream flowing into this lake is the Kagera River, the mouth of which lies on the lake's western shore. The lake water is drained into the Victoria Nile which flows northward via Lake Albert and the White Nile forming the uppermost reaches of the Nile River. Lake Victoria has numerous shallow bays and swamps, including extensive papyrus swamps. There are a number of small "satellite" lakes that connect to Lake Victoria, including lakes Kanyaboli, Sare, and Namboyo in Kenya; lakes Nabugabo, Gigati and Agu in Uganda; and, lakes Ikimba and Burigi in Tanzania.

The lake catchment provides for the livelihood of about one third of the combined populations of the three countries that share it. With the exception of Kampala, the capital of Uganda, the lake catchment economy is principally an agricultural one, with a number of cash crops (including exports of fish) and a high level of subsistence fishing and agriculture. It is estimated that Tanzania benefits from 40% of the total fish catches in the Lake. The lands surrounding Lake Victoria represent three ecoregions. The rolling hills and plateaus of the Victorian Basin Forest-Savanna Mosaic ecoregion extend from the lake north and west. It is most noted for its high species diversity and endemism resulting from the mixture of habitat types and species from both western and eastern Africa. Southern Acacia-Commiphora bushlands and thickets (mostly in Tanzania) cover the lands east and southeast of the lake with wide-sweeping grasslands and associated woodlands dominated by species of acacia and commiphora trees.

The lake basin is used as a source of food, energy, drinking and irrigation water, shelter, transport, and as a repository for human, agricultural and industrial waste. Over the past three decades or so, the lake and its surrounding basins have come under increasing and considerable pressure from a variety of interlinked factors such as overfishing, invasive species (water hyacinth, and the Nile perch to a certain extent), industrial pollution, eutrophication, and sedimentation, and has already been experiencing impacts of aridification. Its vulnerability could well increase due to the combined effects of climate change in the region, such as modification in precipitation regimes, temperature changes, and the resulting land and water use changes in the surrounding areas.



2. Population, development and economy

Tanzania is one of the poorest countries in the world with a GNI per capita of only US $ 300[5]. The total population of the country is estimated at over 43,7 million people, 35% of which are living below the poverty line[6]. About 85 per cent of the country's poor people live in rural areas and rely on agriculture as their main source of income and livelihood. The five coastal regions encompass about 15 percent of the country's land area and are home to approximately 25 percent of the country's population. Recent estimates indicate that the population of the five coastal regions has increased to about 8 million. The combined population of the three Lakeshore regions is estimated at approximately 4 million (10% of the total population).

Agriculture (including livestock) is the dominant sector in Tanzanian economy, providing livelihood, income and employment to over 80% of the overall population and accounting for roughly 56 percent of GDP and about 60 percent of export earnings[7]. Within the agriculture sector, food crop producers are generally poorer than cash crop farmers, but both operate under cyclical and structural constraints, are subject to frequent natural calamities (drought and flooding), and lack market linkages, inputs, credit and irrigation water[8]. Agricultural products include coffee, sisal, tea, cotton, pyrethrum, cashew nuts, tobacco, cloves, corn, wheat, cassava,

[5] WB, 2008
[6] World Bank Development Indicators, http://data.worldbank.org/country/tanzania
[7] Tanzania National Adaptation Programme of Action, 2006
[8] IFAD, rural poverty

bananas, and vegetables. Livestock production includes cattle, sheep, and goats. Agricultural output remains predominately based on small holder production, as opposed to estate cultivation, though the latter does account for some sisal, tea, coffee, tobacco, rice, wheat, and wattle (construction material made of tied-together poles or sticks) production. Cash crops, such as coffee, tea, cotton, cashews, sisal, cloves, and pyrethrum account for the vast majority of export earnings. Maize, paddy, wheat, and cassava are produced for domestic consumption. Most crops are under rainfed conditions.

It is now commonly recognized that the productivity of most food and cash crops could be increased from 50 per cent to 150 per cent by improved crop and animal husbandry practices, including through the dissemination of better irrigation technology in areas under drought, arid conditions or erratic rainfall patterns.

Fisheries contribute 27% of consumed protein in the country. The most important fish stocks and other aquatic resources include Snappers, Scombrides, Mackerels, Nile perch (Lates niloticus) from Lake Victoria, sardines from lake Tanganyika (Stolothrissa tanganicae and Limnothrissa miodon), Nile tilapia (Oreochromis sp.) and pelagic sardines (Rastrineobola argentea). All artisanal fisheries in marine waters takes place within the territorial waters (12 nautical miles stretch). The catch consists mostly of fin fish and to a small extent of shrimps. It is dominated by the artisanal fishers using poor crafts and fishing methods. The marine industrial sub sector fish both the territorial waters and beyond in the Exclusive Economic Zone (EEZ). The main target species in the territorial waters are shellfish (shrimps and lobsters), cephalopods and crabs. In the EEZ industrial fisheries generally target tuna, tuna-like species, marlin, sword fish and sharks. Inland fisheries are all artisanal.

In Tanzania, fish is mainly consumed fresh, processed (smoked, sun-dried, and salted-sun dried). Nile perch, mostly from Lake Victoria, is the only fresh water used for filleting. However, the Government has now allowed processing of specified marine fish species. Most fish fillets and other processed fishery products including crabs, lobsters, octopus, shrimps and squids are exported. Fish that is exported in fresh or frozen form is generally processed in industrial fish processing plants

Water and sanitation. In population centers, sprawl and uncontrolled land use is rampant. This is made worse by unplanned settlements, both in urban and rural areas, where there is no access to potable water and sanitary systems. In some regions, 15 to 23 percent of today's households do not have toilets, leading to health problems like cholera and diarrhea. The Government of Tanzania has embarked on a major sector reform process since 2002. An ambitious National Water Sector Development Strategy that promotes integrated water resources management and the development of urban and rural water supply was adopted in 2006. Decentralisation has meant that responsibility for water and sanitation service provision has shifted to local government authorities and is carried out by 20 urban utilities and about 100 district utilities, as well as by Community Owned Water Supply Organisations in rural areas.

Water quality varies significantly within the country. In the semi-arid regions (including Dodoma, Singida, Tabora, Shinyanga, and Arusha), colour and turbidity levels become problematic during the rainy season. Rivers in the fluoride belt (including Arusha, Kilimanjaro, Singida, and Shinyanga regions of the Rift Valley, and extending to the Pangani and Internal

Drainage basins) have naturally high fluoride concentrations. The waters of Lakes Tanganyika and Nyasa have overall good water quality except in the vicinity of urban areas where effluent and storm water cause local contamination, whereas the water quality of Lake Victoria is poor: high turbidity and nutrient levels lead to frequent blooms of algae and infestations of water weeds.

Infrastructure: Currently, 75 percent of the country's industries are in coastal regions. Newly initiated activities include coastal tourism, mariculture development and natural gas exploitation. These are seen as potential resources for national economic development. Important infrastructures are located in the coastal zones and in the lakeshore areas, including key roads to and from major cities, port and fish processing infrastructures, and much of the tourism industry. Tanzania counts 6 ports, including one in Mtwara (south coast), Dar es Salaam (central coast), Tanga (Northern coast), and around Lake Victoria (2 ports in Mwanza, Nansio, Bukoba, Muzoma and a series of cluster ports).

Tourism is a growing industry in Tanzania, and one that is also dependent on natural resources and wildlife. Both in mainland Tanzania and Zanzibar, tourism has been identified as one of the main engines of economic and social development. Already, it is making a significant economic contribution – accounting for an estimated 12 percent of GDP for Tanzania as a whole and probably in excess of that for Zanzibar. Tourism is a key source of foreign exchange earnings, contributing more than 50 percent to total export earnings. The sector is estimated to directly support some 30,000 jobs on the mainland and a further 6,000 in Zanzibar, and probably as many indirect jobs. The prime attractions are wildlife safaris (especially in the Northern Circuit) and beach tourism in Zanzibar. As well as the broad categories of wildlife viewing and resort tourism, Tanzania also offers tourism niches that appeal to more specialised market segments some of which show higher demand growth rates than in mainstream tourism. In 2004, it was estimated that some 583,000 tourists visited Tanzania and this number was expected to grow by 4.5% annually 2008 and 2017.

3. Observed climate hazards, trends and their impacts

The observed climate change, including varaibility in Tanznia and East Africa over the recent past includes the following:

- Warming of 0.7°C over the 20th century for Africa with 0.05°C warming per decade through the 20th century[9]
- Inter-annual rainfall variability. During the recent decades Eastern Africa has been experiencing an intensifying dipole rainfall patterns on the decadal time scale [10].
- An increase in the frequency and severity of floods, droughts and tropical storms in Tanzania. [11]Tanzania has experienced six major droughts over the past 30 years. The most recent, in 2006, ravaged agricultural production. The single event is estimated to have cut

[9] Hulme et al., 2001; IPCC, 2001
[10] 4AR IPCC, 2007
[11] WWF, 2006

GDP growth by 1 percent[12].

The El Niño associated events of 1997-98 led to drought and flooding, and triggered a national food emergency, with severe food shortages, increased food prices, increases in power rationing, and extensive food, cattle and cash crop losses. Flooding damaged human settlements, infrastructure, property and livelihoods, and was associated with the spread of malaria, cholera and diarrhea[13]. Paradoxically, droughts, which are expected to be felt increasingly in the central regions, are known to have similar effects on health.

Current climate variability has affected the availability of water resources in Tanzania. Two of three major rivers have reduced flow due to declining regional rainfall, which has had ecological and economic impacts such as water shortages, lowered agricultural production, increased fungal and insect infestations, decreased biodiversity and variable hydropower production[14]. High temperatures and less rainfall during already dry months in the Tanzanian river catchments could affect the annual flow to the River Pangani by reductions of 6-9% and to the River Ruvu by 10%[15]. The Pangani Basin is also fed by the glaciers of Kilimanjaro, which have been melting alarmingly fast[16]. The population living around the base of Kilimanjaro use this meltwater and the fog water from the rainforests that cover the mountain's flanks for drinking, irrigation, and hydropower. The Pangani Basin is one of Tanzania's most agriculturally productive areas and is an important hydropower production region. Because of this, climate change threatens the productivity and sustainability of this region's resources, which hosts an estimated 3.7 million people.

There is a strong link between climate and Tanzanian livelihoods because Tanzania depends heavily on rain-fed agriculture making rural livelihoods and food security highly vulnerable to climate variability such as shifts in growing season conditions. For example, from 1996 to 2003, there has been an observed decline in rainfall of 50-150 mm per season (March to May) and corresponding decline in long-cycle crops (e.g., slowly maturing varieties of sorghum and maize) across most of eastern Africa[17]. Long-cycle crops depend upon rain during this typically wet season and progressive moisture deficit results in low crop yields in the fall, thereby impacting the available food supply.

Increased variability (i.e., deviation from the mean) of crop production is also a major concern of farmers in eastern Africa. Inter-annual climate variability has huge impacts on the region's climate. El Niño events produce abnormally high amounts of precipitation in parts of equatorial East Africa and can result in flooding and decreased agricultural yields[18].

Climate change may also impact the fisheries. Recent changes in the limnology of Lake Victoria have also negatively affected its fisheries. In the 1980's decreased turnover in the lake led to low

[12] Economics of Climate Change Adaptation: "Shaping Climate Resilient Development – a framework for decision making" 2009
[13] Tanzania 's First National Communication, 2003.
[14] Orindi and Murray, 2005
[15] VPO-URT, 2003
[16] Thompson *et al*. 2002
[17] Funk *et al*., 2005
[18] WWF, 2006

levels and dissolved oxygen and, consequently, fish kills. Stratification in this lake now appears to be permanent[19].

4. Expected impacts of climate change

Climate change scenarios developed during the National Communications and NAPA processes indicate that the country is likely to undergo an increase in mean daily temperature as well as in the temperature of the warmest and coolest months. The results indicate that mean annual temperatures are projected to rise by 2.2 C by 2100, with somewhat higher increases (2.6 °C) over June, July and August, and lower values (1.9 °C) for December, January, February[20].

Annual precipitation over the whole country is projected to increase by 10% by 2100, although seasonal declines of 6% are projected for June, July and August, and increases of 16.7% for December, January, and February. These overall increases are nuanced regionally, with some parts of Tanzania projected to experience increases in annual rainfall, while others are expected to experience decreases. The National Vulnerability and Adaptation Assessment of Tanzania, under the National Communication, predicts increased and modified climate variability. For example, northern and southeastern sectors of the country would experience an increase in rainfall ranging from between 5% and 45%. The central, western, southwestern, southern, and eastern parts of the country might experience a decrease in rainfall of 10% to 15%. The southern highlands might similarly experience a decrease of 10%, which could alter the suitability of this area for maize cultivation. These overall average figures also mask potentially more complex seasonal variability patterns. For instance, the northeastern sector might experience an increase of 25%-60% in the short rains and an increase of 20- 45% in the long rains, and the north coastal region might get an increase of 0-20% in the short rains and a decrease of 0-10% in the long rains. Additionally, the timing of rains will become less predictable and their intensity is likely to become more volatile.

While there are no precise predictions of Sea Level rise for Tanzania, the IPCC has predicted a global average sea level rise of between 18 and 89 cm by 2100. Impacts on the Indian Ocean are expected to be highly variable, and impacts on Tanzanian Coastline and islands are also uncertain, due to variables such as currents and modifications of tidal patterns and overall regional climatic patters. Consequently, Tanzanian government estimates are based on a conservative and a worst-case scenario of 50cm and 1m sea-level rise respectively.

Warming temperatures are projected to cause more frequent and more intense extreme weather events, such as heavy rain storms, flooding, fires, hurricanes, tropical storms and El Niño events[21]. Tropical storms can ravage coastal areas and intensive the impacts of sea-level rise by accelerating erosion in coastal areas and by removing protective natural buffer areas that absorb storm energy, such as wetlands and mangroves[22]. . Extreme rainfall and subsequent heavy flooding damage will also have serious effects on agriculture including the erosion of topsoil, inundation of previously arid soils, and leaching nutrients from the soil. Regional fluctuations in

[19] Kaufman *et al*., 1996
[20] Climate Change and Development, OECD
[21] IPCC, 2001.
[22] Magadza, 2000

lake levels are another impact of regional climate variations and are expected to worsen with projected climate change. While land use change can have a dramatic effect on lake levels, climate variability is more unpredictable and difficult to manage for. For example, lake levels in Lake Victoria[23] have been attributed to climate variations and may become more variable in the future. In 1997, floods and high rainfall, triggered by an El Niño event in eastern Africa, resulted in a surface rise of 1.7 meters in Lake Victoria and disrupted agricultural production and pastoral systems[24]. While climate change is projected to cause more frequent and intense El Niño events , impacts are not uniform across East Africa[25]. In fact, the same year that the waters were rising in Lake Victoria, El Niño triggered a severe drought in another location in Kenya, significantly decreasing hydro-electric power output, limiting the availability of electricity to East Africans[26]. Further, a projected increase in precipitation may also have an effect on hurricanes and storms in the Atlantic[27].

As a result of these climate changes, all productive sectors of the Tanzanian economy and livelihoods will experience changes and, in most regions, increased vulnerability:

Agriculture: In areas where rainfall will increase, the leaching of nutrients, washing away of topsoil and water logging would affect plant development and thus affect plant growth and yield. Climate change is bound to promote the occurrence of diseases and insect pests due to both increased temperature and rainfall. For areas that will get less rainfall irrigation will be required to substitute for moisture losses due to increased evapo-transpiration and thus drought resistant varieties would be required more than at present. Crop models used for the main cash crops in preparation for the National Communication show that:

- Cotton yields are likely to increase (under improved pest management) due to the rainfall increase in certain regions (for example Mwanza);
- Increases in rainfall will also provide positive impacts on coffee production, whereas in areas under a decrease scenario, irrigation could compensate.
- Maize is likely to undergo a yield decrease of about 33 percent over the entire country, and cultivation is likely to become more difficult under more erratic conditions.

Beyond rainfall, temperature increases are also likely to have impacts on agriculture, and shifts in growing seasons are to be expected in some cases. In the case of smallholder agriculture, vulnerability is increased by improper means of production, unsustainable methods of cultivation, as well as lack of conservation and transformation technology. Opportunities for increased productivity through agriculture can only be realized under optimal and sustainable production methods. Similarly, more frequent extreme events, such as droughts or sever rainfall, could also jeopardize any potential increase realized through average rainfall increase.

Climate change is also expected to have significant impacts on land uses, specifically due to the effects of modified precipitation regimes on agriculture and on water availability, both in the

[23] Birkett et al., 1999; Latif et al., 1999
[24] Lovett *et al*., 2005
[25] Wara *et al*., 2005
[26] Lovett *et al*., 2005
[27] Landsea and Gray, 1992

coastal zone as well as in the lake area. Impacts of sea level rise on coastal waters are uncertain but evidence has already been seen of saltwater infiltration in coastal wells and boreholes, leading to unsafe water and irrigation conditions.

Fisheries are expected to be impacted directly and indirectly, through changes in habitat, potential destruction of breeding grounds and mangroves, and coral bleaching, as well as through changed patterns of consumption induced by decreased agricultural productivity during longer drought periods. An increase in mean temperature may also affect the dissolved oxygen concentrations in the layer of water below the thermocline in two ways: increased metabolism of fish and other organisms in a slightly warmer à will lead to the faster depletion of the limited oxygen supply, and lake overturn, the primary means of replenishing à dissolved oxygen, will occur less frequently[28].

Water resources: Climate change is projected to have both positive and negative consequences for Tanzania's water-resources, specifically for the three major river basins: Ruvu, Pangani, and Rufiji. The Ruvu basin, of particular importance because it is upstream of Tanzania's major population center, Dar es Salaam, could experience a 10% decrease in runoff according to the Initial National Communication. The Pangani basin which supplies water to the Tanga, Kilimanjaro, and Arusha regions, supporting a number of economically important activities there is some seasonal variation with runoff projected to increase in some months runoff and decrease in others, with annual basin runoff decreasing by an estimated 6%. However, the Kikuletwa River, also within the Pagani Basin, is projected to decrease in all months, with annual reductions of 9%. The Rufiji basin meanwhile is a large catchment in the south of the country, focused on the Great Ruaha River, which is economically important to the nation in part because of the hydropower it generates at Mtera Dam and Kidatu Dam. Its annual runoff is expected to increase with 5% and 11% at Mtera and Kidatu, respectively, most coming in the period from November to March. All these estimates however are based on scenarios from a single GCM, and should be interpreted with some caution. Real uncertainties exist concerning present and future withdrawals for irrigation, changed land use, and urbanization. Nevertheless, decreases in runoff could potentially have serious affects on socioeconomic activities in the regions of Dar es Salaam, Morogoro, Tanga, Coast, and Kilimanjaro. Dar es Salaam might be particularly vulnerable because it is the largest industrial, commercial, and administrative city in Tanzania.

Rural communities often depend on streams and rivers for drinking water, and some of these tend to dry up during droughts and dry seasons. Recurrent droughts have already had significant impacts throughout the country. Changes in runoff in rivers feeding the lake could adversely affect water levels, and hence fisheries. In the coastal area, some saltwater intrusion in coastal aquifers and deltas can also be expected due to sea level rise and intrusion into shallow coastal rivers, as in the case of the Rufiji delta.

Energy: A mentioned above, under the climate change scenarios, the runoff of three major rivers will be altered. Reduced runoff of Pangani and Ruvu rivers, which are economically important for supplying water and hydro-electricity to major towns, where industrial activities are highest

[28] Fick *et al.*, 2005.

in the country, would adversely affect socio-economic activities in the country. The five regions supplied are Dar es Salaam, Coastal, Tanga, Kilimanjaro and Arusha. These changes would adversely affect water supply and socio-economic activities, and most likely lead to an increase in deforestation for fuelwood supply.

Infrastructure: Studies undertaken prior to the National Communication and NAPA processes analysed vulnerability to a 50cm and 1m sea level rise, whereas IPCC estimates place global sea level rise predictions at between 9 and 88 cm by 2100. Estimates show that in Dar es Salaam and Coast region a total of 14,757 ha and 29,485 ha could be inundated for a sea level rise of 0.5m and 1.0m respectively; in Tanga the areas cover 2,022 ha and 4,045 ha and in Mtwara and Lindi the inundated areas are 7,922 ha and 15,855 ha for the sea level rise of 0.5m and 1.0m respectively. Total potential land loss is estimated to be 247 square km and 494 square km for the sea level rise of 0.5 m and 1.0m, respectively. In addition, stronger storm surges, stronger winds and cyclones may also have impacts on coastal infrastructre, and increase coastal erosion. Along the Dar es Salaam coastline the estimated loss of important structures is estimated to cost Tshs.49,83 billion and Tshs.85.97[29] billion for a sea level rise of 0.5 m and 1.0 m respectively.

This project seeks to respond to the impacts of climate-change on the coastal zone and lakeshore areas of Tanzania. These impacts include direct effects of sea level rise, such as erosion, saltwater intrusion in aquifers, and potential losses of infrastructure and economic assets, as well as effects of coral bleaching, decreased fisheries, and predicted changes in precipitation regimes with their impacts on agriculture, livelihoods and health.

In order to respond to these threats and anticipated impacts, this project will address the direct climate drivers of vulnerability as well as the non-climate drivers that are acting as barriers to adaptive capacity throughout the country and in the targeted sectors and regions. These non-climate drivers of vulnerability include:

- **Poverty**: Tanzania is one of the poorest countries in the world with 42% of the total population and 50% of the rural population live below the poverty line and with 20% of the entire population surviving on less than US$1 per day (World Bank, 2002). It is the poor that are the most vulnerable to climate change impacts because they are particularly sensitive to, and have the least capacity to adapt to such impacts. Within the coastal zone, there are limited livelihood sources in the urban areas. As a result, the majority of the coastal population rely on rain-fed agricultural activities and/or exploitation of natural resources to generate income streams and maintain livelihoods thus creating a vicious circle of increasing vulnerability to climate change.

- **Population density,** in some regions, is also a problem that contributes to environmental degradation, and to difficult living conditions. In urban centers, illegal settlements are increasing in size while living conditions create additional factors of vulnerability (lack of access to water, energy, health, education and overall economic poverty).

- **Unsustainable uses of natural resources**: poverty has led many communities to resort to unsustainable uses of natural resources, such as forests, mangroves, fisheries, and reefs.

[29] Tanzania's First National Communication, 2003

The lack of sanitation in many parts, combined with increasing industrial development have led to pollution of waterways and to the degradation of ecosystems that previously provided sanitation services (wetlands, marshes). Deforestation for fuelwood, along with sand and coral mining are among the unsustainable practices that are increasing vulnerability of ecosystems and indirectly, the vulnerability of communities that depend on them.

- **Low or inefficient implementation of existing plans and policies and low enforcement of laws**: As recognized in Tanzania's Coastal Management Strategy, there is a need for coordination and feedback mechanisms are needed among agencies, decision-makers and implementing authorities at all levels. Enhanced management structures and capacity of relevant agencies, particularly at district and village levels and improved enforcement of existing laws are essential for effective governance of coastal resources[30]. Although plans and policies governing the use of natural resources in vulnerable areas are in force, there is limited capacity at district level for their enforcement. In some cases, codes and regulations currently in force do not take into sufficient consideration the possible impacts of climate change, such as building codes (buffer zones) or fisheries regulations (no-take zones).

PROJECT / PROGRAMME OBJECTIVES:

The main objective of the project is **to reduce vulnerability of livelihoods and economy of coastal and lakeshore communities in Tanzania** through implementation of concrete and urgent adaptation measures.

In order to achieve this objective, the project will be delineated into six specific outcomes:

1. Adverse impacts of sea level rise on coastal infrastructures and settlements.
2. Adverse impacts of floods averted
3. Adverse impacts of climate change on water supply and quality averted
4. Livelihoods are sustainable, diversified and resilient
5. Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented
6. Knowledge of climate impacts and adaptation measures is increased

The project focuses on the implementation of concrete on the ground, practical solutions to climate impacts (current and anticipated), some foundational activities have been included where necessary in order to facilitate project output and objective achievement.

This project is expected to be implemented alongside, and in close collaboration with the LDCF NAPA implementation project, which also focuses on coastal zones but whose activities are targeted towards enabling, facilitating and community-level pilot actions.

[30] Government of Tanzania, National Integrated Coastal Environmental Management Strategy, 2003.

The project will implement concrete adaptation actions in 5 sites (three districts in the coastal regions and two in the Lake Victoria regions). These sites were se including: (i) geographic representativity; (ii) presence of key infrastructure; (iii) presence of fragile buffer ecosystems; (iv) complementarities to LDCF project interventions; and (v) presence of multiple factors of vulnerability.

1. Mtwara Urban and Rural Districts, Mtwara Region: According to the 2002 Tanzania National Census, the population of the Mtwara Region was 1,128,523 people. Mtwara Region is administratively divided into six districts: Masasi, Nanyumbu, Newala, Tandahimba, Mtwara Urban and Mtwara Rural. Mtwara district combines growing urban settlements and port infrastructures that can handle between 400,000 and 750,000 MT of annual shipment[31], with fragile ecosystems such as mangrove forests, coastal reefs and estuaries. The district is also home to a marine national park, the Mnazy Bay Marine Reserve. Main livelihoods in this region are agriculture, although coastal lands are lower in fertility than inland areas, and fisheries. Natural Gas deposits have recently been placed under exploitation in the region.

2. Dar Es Salaam District: Dar es Salaam is the major commercial, administrative and industrial centre of Tanzania. The total surface area of Dar es Salaam City is 1,800 square kilometers, comprising of 1,393 square kilometers of land mass with eight offshore islands, which is about 0.19% of the entire Tanzania Mainland's area. Based on the 2002 Population and Housing Census, Dar es Salaam had 2,487,288 inhabitants. The City is divided into three ecological zones, namely the upland zone comprising the hilly areas to the west and north of the City, the middle plateau, and the low lands including Msimbazi valley, Jangwani, Mtoni, Africana and Ununio areas. The main natural vegetation includes coastal shrubs, Miombo woodland, coastal swamps and mangrove trees.[32].

Dar es Salaam obtains its water from three major sources, namely, Lower Ruvu near Bagamoyo, Upper Ruvu near Mlandizi and Mtoni in Temeke District. The city and its surrounding areas benefits from a varied economy in which urban agriculture, fisheries, industry, and tourism blend. Dar es Salaam city is prone to floods and shortage of water, pollution due to urbanization influx, increasing squatter settlements and lack or resources to facilitate functioning (Kazinja.V, 2001). The Ruvu river which is the main source of Dar es Salaam water supply is not well managed and lands which could have been left unused are now misused due to overpopulation. Wetland degradation, upland droughts and pollution lead to environmental impacts in the coastal area, making the area even more vulnerable to the impacts of climate change, including sea level rise and flooding, and coastal erosion[33]. Major impacts of climate change are expected to occur on key infrastructures, water infrastructure as well as on human habitations.

3. Muheza District, Tanga Region: According to the 2002 Tanzania National Census, the region has a population of 1,642,015 people. Tanga is comprised of 8 districts: Handeni, Kilindi, Korogwe, Lushoto, Muheza, Mkinga, Pangani and Tanga. In Tanga region most areas get rainfall of at least 750 mm. per year. The amount of rainfall is about 1,100 to 1,400 mm. along the coast, decreasing inland. The coastal area of Tanga region is dominated by bushland, palm gardens,

[31] Tanzania Port Authority
[32] Government of Tanzania, Dar es Salaam City Council, Tanzania City Profile, 2004.
[33] Government of Tanzania, Dar Es Salaan Vulnerabiltiy to Climate Change, 2008.

village cultivations and estates (mainly sisal). Main species cultivated include: Citrus fruits, Sisal, Coconuts, Cashewnuts, Maize, Cassava, Rice and Sea Weeds[34]. Muheza district is home to mangroves and costal forests reserves also important for bird and marine species, as well as fragile estuaries.

This district is also expected to benefit from some smaller-scale pilot interventions in the district of Pangani through the LDCF Adaptation project which is currently under development for submission to the GEF in 2011.

4. Magu District, Mwanza Region: Mwanza region has a population of 2,942,148 (2002 census) in eight districts, and covers an area of 19,592km2. The districts are Ukerewe (to the north), Magu (to the east), Sengerema and Geita (to the west), Misungwi and Kwimba (to the south), and Nyamagana and Ilemela (the city). The economy in Mwanza Region is dominated by smallholder agriculture employing 85% of the region's population and complemented by an expanding fishing sector. Some large fishing companies, using modern fishing gear and vessels, carry out commercial fishing in the lake. The region has traditionally been one of Tanzania's main producing areas for cotton. For the past two decades cotton production has declined basically due to low profitability and inefficient marketing arrangements as well as climate variability and extreme events such as droughts. Magu district is one of the poorest districts in Tanzania. The annual district rainfall is about 600 to 800 mm that falls in unreliable patterns, with persistent droughts, whereas irrigation schemes are not very widespread, despite availability of surface freshwater[35]. Another production problem in the district is declining soil fertility due to factors such as overgrazing, deforestation for fuelwood (alternative energies are not yet widespread in the area), poor farming methods, and population growth. Magu district is home to wetlands under various states of degradation from unsustainable use (grazing)[36] and pollution (lack of sanitation). Other factors of vulnerability in the region, in addition to livelihoods insecurity, include malaria and the potential climate change induced appearance of cholera, and the appearance of invasive sea weeds and algae in the lake areas, due to pollution, with impacts on fisheries. The eastern part of Magu District borders Serengeti National Park, whose management can generate significant revenue.

5. Muleba District, Kagera Region: Kagera Region is located in the northwestern corner of Tanzania. Bukoba, Kagera Region's capital, is a fast growing town situated on the shore of Lake Victoria. Kagera comprises eight administrative districts: Bukoba Urban, Bukoba Rural, Misenyi, Muleba, Karagwe, Ngara Chato,and Biharamulo. The 2002 Census places the region's population at 2,033,888, and the Muleba district population at 386,328 distributed in 31 wards. The region's climate is influenced greatly by its proximity to Lake Victoria. Prevailing winds from the east tend to bring higher rainfall to the shore strip and highlands close to the shore. The shore highlands create a rainfall shadow over the central area. The main rains come twice a year (bimodal) in March to May and during the months of October to December. The average annual rainfall for the whole regions ranges between 800 mms and 2000mms. In the western highlands

[34] Government of Tanzania, Planning Commission, Tanga Regional Profile, 1997, http://www.tzonline.org/pdf/Tanga.pdf

[35] Government of Tanzania, Socio-economic profile of Mwanza region.

[36] Impact of immigrant pastoral herds to fringing wetlands of lake Victoria in Magu district Mwanza region, Tanzania, H. Hongo, and M. Masikini, Lake Victoria Environmental Management Project, 2003

of Ngara and Karagwe annual rainfall is over 1000 mms whereas in Biharamulo it ranges between 800 and 1000 mms. The dry period begins in June and ends in September. There is also a short and less dry spell during January and February.

A series of hilly ridges running north south and parallel to the lake shore are the main banana coffee growing areas in the region. Soils in these areas have high iron and clay content. However, the soils are low in phosphorus and are acidic. The nitrogen content of these soils is usually low but to some extent is boosted by intercropping with legumes, including and to a less extent by manuring. Because of damage by high rainfall regimes in areas along and near the lake shores coupled with bad soil management, soil erosion is a serious problem[37]. Most of Muleba district is located in the lake coastal region, that receives annual precipitation ranging from 1400mms to 2000mms, having soils rich in yellow –red sandy clay, with low available nutrients. The area has an altitude of 1300ms to 1400ms above sea level. Crops grown are mainly bananas, cassava, beans, coffee and tea. The region's dependence on agriculture, and more specifically coffee makes it vulnerable to both climate shocks and economic fluctuations, and recent efforts to diversify agricultural production have begun to show some moderate success in reducing poverty (through introduction of mushrooms and vanilla). Forests, woodlands and thickets in Kagera region are estimated to cover 10,148 sq kms or nearly 35% of the region's land area, and the lake shore area is dominated by grasses mainly in steep areas. The natural forests are threatened by bushfires and human development activities like opening of new farms, charcoal production and the influx of refugees. Forests reserves are under encroachment pressures due to a lack of enforcement capacity. The large majority of households in the region use fuelwood either in the form of firewood or charcoal to do their cooking and heating. Given unlimited access, the demand for fuelwood per capita is about 2 cubic metres of roundwood per year. Given the current population in the region this demand equals some 2000 ha. of deforestation. Beyond deforestation, water pollution and invasive species such as the water hyacinth are factors of environmental degradation in this region.

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US$)
1. **Component 1 - Responding to Sea-Level rise impacts on key infrastructure in coastal zones**	Sea walls raised or rehabilitated in areas showing particular damage Set-up low-cost coastal protection infrastructure (groynes, revetments) Boreholes and wells showing signs of salinization relocated report on climate change impacts on port infrastructure and adaptation recommendations (enabling)	*Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced*	3,037,438
	Effective storm and flood drainage systems in urban areas and near coastal communities	*Outcome 2 - Adverse impacts of floods averted*	845,200

[37] Government of Tanzania, http://www.tanzania.go.tz/regions/kagera/climate.html

	water extraction, conservation and harvesting infrastructure rehabilitated, along with adequate monitoring at local level	*Outcome 3 - Adverse impacts of climate change on water supply and quality averted*	528,250
			4,410,888
Component 2 - Resilient livelihoods	New or rehabilitated fishing docks and fish processing areas Increased numbers of sustainable tourism enterprises and resilient touristic infrastructures agricultural tools, materials, and sustainable technologies and approaches transferred irrigation technology and equipment transferred in areas subject to drought or erratic rains Introduction of alternative resilient crops and crop management methods appropriate alternative energy (efficient cookstoves, small solar, solar water heaters, small hydro) technology transferred	*Outcome 4 - Livelihoods are sustainable, diversified and resilient*	**2,429,950**
3. **Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)**	Mangrove rehabilitation through planting of resilient seedlings, dredging and the creation of no-take buffer zones; Coral reef rehabilitation and protection in coastal sites Beach nourishment, coastline reforestation (trees and grasses) Shoreline management and rehabilitation, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones Wetland rehabilitation One EBICAM plan for the coastal region and one EBICAM plan for the Lake region approved	*Outcome 5 - Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented*	**1,743,225**
4. **Component 4 - Knowledge, monitoring and evaluation**	available knowledge, science and data gathered for project implementation Operational climate change coastal observatory for Tanzania for ongoing monitoring of CZM and Coastal environmental status and scientific research	Outcome 6 - knowledge of climate impacts and adaptation measures is increased	**211,300**
5. Project/Programme Execution cost			416,250
6. Total Project/Programme Cost			**9,211,613**
7. Project Cycle Management Fee charged by the Implementing Entity			782,987
Amount of Financing Requested			**9,994,600**

PROJECTED CALENDAR:

Indicate the dates of the following milestones for the proposed project/programme

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	January 2011
Mid-term Review (if planned)	June 2014
Project/Programme Closing	December 2016
Terminal Evaluation	January 2017

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

This project is comprised of 4 components designed to achieve the project's overall objective to implement concrete and urgent measures to adapt to climate variability and change in Coastal zones and lakeshore areas of Tanzania in order to protect livelihoods and to promote economic resilience.

Component 1 – Responding to Sea-Level rise impacts on key infrastructure in coastal zones.

Activities under this component are designed along to achieve three outcomes. The first set of activities (Outcome 1) are targeted towards addressing the direct impacts of Sea Level Rise and coastal erosion on the key social, cultural and economic infrastructures of the 3 project sites located in coastal areas. Coastal protection measures will be put in place through a mixture of protective works and softer coastal protection measures, and existing protective infrastructures will be rehabilitated for increased resilience. Engineering assessments of the climate change impacts and adaptation measures for specific port infrastructures in Dar Es Salaam, Tanga and Mtwala will also be included in this component, which will enable the government and the Tanzania Port Authority to initiate the implementation of long-term rehabilitation and contingency plans.

Specifically, in each of the three coastal sites, existing sea walls showing signs of degradation will be raised and rehabilitated or, where necessary, transformed (for example into revetments) to take higher sea levels (up to 1 meter), increased tidal action and stronger storm surges into consideration. Where needed and where appropriate, other less costly technologies will be implemented as coastal protection, including timber groynes, natural and floating breakwaters, or rip rap. Special attention will be paid to key economic assets and cultural or historical sites that also play a role in the touristic industry.

This project will also pay particular attention to the resilience of coastal water infrastructure, since water availability is a key component of vulnerability among coastal communities. The project will support the relocation of wells and boreholes that are too close to coastlines and present danger of saltwater intrusion, along with the installation of local water quality monitoring for health purposes.

The second group of activities (Outcome 2) is targeted towards addressing the adverse impacts of floods and mitigating flood risks in areas due to receive increased precipitation. Activities will mainly consist in clearing and maintenance works on drainage channels, dredging of estuaries showing signs of siltation and the rehabilitation of storm drains in urban areas. In communities located near wetlands in coastal districts, small dikes will be implemented in order to avoid flooding and saltwater intrusion. This set of activities will be undertaken in collaboration with – and based on knowledge from – ongoing disaster prevention initiatives in and around project sites.

Under Outcome 3, the project will also address the adverse impacts of climate change on water supply and quality in both coastal and lakeside sites. The project will assist in the rehabilitation, or modification to existing water mobilization, extraction, conservation and transport infrastructures. This will be undertaken alongside activities in component 2 that will assist with the broader dissemination of water conservation and harvesting systems in rain-dependent areas, or crop-appropriate irrigation systems in areas where rainfall is likely to become unpredictable and where surface freshwater is available, mostly in the lake area (see component 2). In order to avoid SLR impacts on health through salinization of water sources, extraction rates will be reduced in endangered wells and careful monitoring will be put in place.

In conjunction with measures included under Component 3, softer protective measures will also be put in place in coastal sites, namely through reforestation, beach nourishment, mangrove and coral rehabilitation, in order to create a coordinated and complete package of protective mechanisms for coastal human settlements. (see Component 3)

Component 1 - Indicative activities

Activities		**Outputs**	**Sites**				
Component 1 - Addressing climate change impacts on key infrastructure and settlements			**1-coast Mtwara**	**2-coast Dar***	**3-coast Muheza**	**4-lake Magu**	**5-lake Muleba**
Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced							
	Rehabilitate coastal protection facilities to protect settlements economic and cultural infrastructure	Sea walls raised or rehabilitated in areas showing particular damage	x	x	x		
		Set-up low-cost coastal protection infrastructure (groynes, revetments)	x		x		

	Rehabilitate or relocate water extraction and conservation structures in coastal areas to avoid salinization	Boreholes and wells showing signs of salinization relocated	x		x		
	Perform engineering assessment of climate change impacts on port infrastructure (enabling)	Report on climate change impacts on port infrastructure (both coastal and lake) and adaptation recommendations (enabling)	x	x	x		x
Outcome 2 - Adverse impacts of floods averted							
	Cleaning up of the drainage channels, dredging of estuaries,rehabilitation of storm drains in selected urban centers	Effective storm and flood drainage systems in urban areas and near coastal communities	x	x	x	x	x
Outcome 3 - Adverse impacts of climate change on water supply and quality averted							
	Rehabilitation and construction of resilient water mobilization (extraction, adduction, conservation) structures along with sustainable water extraction and management practices	Water extraction, conservation and harvesting infrastructure rehabilitated, along with adequate monitoring at local level	x	x	x	x	x

Component 2 - Resilient livelihoods

Activities under this component have a dual objective. First, to provide the vulnerable communities with resilient livelihoods that take into account the constraints and opportunities of climate change in the future. Second, to remove the anthropogenic pressures on the environment that hinder its own resilience to climate change. This component will focus on agriculture, fisheries and tourism as the key productive sectors among non-urban communities in the coast as well as in the lakeshore areas. Activities will aim at providing communities with the means to achieve higher productivity based on better technology, while ensuring that challenges of climate change are taken into account and reducing environmental damage due to unsustainable natural resource use.

For agriculture, activities will focus on promoting efficient crops and cropping methods, including mechanization where it is lagging (particularly in the lakeshore areas) more particularly for maize, cassava and sorghum, in both coastal and lakeshore areas. In lakeshore areas that are already under dryland conditions, irrigation technology and systems will be further disseminated in anticipation of rainfall regime modifications. Alternative crops (vanilla, fruit trees, flowers) will be further introduced in pilot locations, taking into consideration future climate conditions, in order to promote livelihoods diversification and to take advantage of any climate change opportunities. In the case of key cash crops, such as cotton, coffee, bananas, or nuts, organic production technologies will be transferred, and conservation and transformation technologies that take into consideration the emerging climate conditions and pests will also be introduced, including organizing fertilization, soil fertility management and integrated pest management.

In order to promote better management of forests, and to reduce deforestation in all sites, alternative energies will be promoted through the transfer of renewable energy technologies such as small solar energy, efficient cookstoves, small hydro energy where possible, with the aim of reducing dependency on fuel wood. In appropriate areas, agro-forestry will also be implemented as part of a diversification strategy.

Regarding fisheries, activities will focus on managing fishing rights and permits among the existing fishing communities, establishment of quotas and other systems in order to avoid overfishing or illegal fisheries, particularly in and around fragile systems such as mangroves. In addition to these "soft" measures, fisheries productive assets will also be rehabilitated, such as fishing docks, nets and boats, whose degradation is leading to unsustainable harvesting of fish species; fish processing areas will also be rehabilitated for resilience. Where they do not exist fish conservation or transformation structures will be implemented in order to ensure that fisheries remain a sustainable yet profitable activity for coastal and lakeshore communities. In conjunction with activities undertaken in component 3, fish breeding grounds and habitats will be placed under special protection for the maintenance of biodiversity as well as for the continued livelihoods of communities.

Finally, in order to continue to benefit from the potential of tourism as a growing sector in Tanzania, activities in this sector will include the rehabilitation of cultural infrastructures that are at risk from sea level rise, storm surges or severe rainfall events. District-level revolving funds designed to provide assistance to tourism entreprises will be created to provide targeted funds for eco-tourism promotion, retrofitting infrastructures and designing of sustainability plans.

	Activities	Outputs	1. Coast - Mtwara	2-coast Dar*	3-coast Muheza	4-lake Magu	5-lake Muleba
Component 2 - Resilient livelihoods							
Outcome 4 - Livelihoods are sustainable, diversified and resilient							
	Development or rehabilitation of fishing docks and fish processing areas at community level in coastal areas	New or rehabilitated fishing docks and fish processing areas	x	x	x	x	x
	Promotion of sustainable and resilient nature-based tourism through district-level tourism assistance revolving fund	Increased numbers of sustainable tourism enterprises and resilient touristic infrastructures	x	x	x	x	x
	Promote resilient agricultural practices	Agricultural tools, materials, and sustainable technologies and approaches transferred	x	x	x	x	x
		Irrigation technology and equipment transferred in areas subject to drought or erratic rains	x	x	x	x	x
		Introduction of alternative resilient crops and crop management methods	x	x	x	x	x
	Promote alternative energy for avoided deforestation	Appropriate alternative energy (efficient cookstoves, small solar, solar water heaters, small hydro) technology transferred	x			x	x

Component 3 – Ecosystem-based Integrated Coastal Area Management

This component comprises a set of concrete environmental rehabilitation measures designed to enhance ecological resilience as well as a set of enabling measures that form part of an integrated ecosystem-based integrated coastal area management system for the targeted regions.

Environmental rehabilitation activities will be undertaken as complementary activities to the rehabilitation of infrastructures undertaken under Component 1 and the livelihoods-based measures undertaken in Component 2. They will focus on fragile buffer ecosystems, including dunes, beaches, mangroves, marshes, and coastal forests in each of the sites. Rehabilitation measures will be implemented with the direct support of district authorities, local authorities as well as local populations, through the implementation of a GreenJobs

program targeted towards unemployed youth (that will include vocational training). Measures will include:

- Mangrove rehabilitation through planting of resilient seedlings, dredging and the creation of no-take buffer zones;
- Coral reef rehabilitation and protection in coastal sites;
- Beach nourishment, coastline reforestation (trees and grasses)
- Dune stabilization through grass barriers;
- Shoreline management and rehabilitation, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones
- Wetland rehabilitation

The enabling pillar of this component will be comprised of a set of measures designed to institute changes to the management and use of natural resources in coastal zones. First and foremost, this will include the development of two Ecosystem-Based Integrated Coastal Area management (EBICAM) action plans, which will include the following elements and become supporting supplementary tools for the existing Tanzanian Coastal Zone Management Policy:

- Revised regulations on no-take zones, protected areas, fishing management and building codes that take climate change and sea level rise into consideration.
- Coastal land use plan based on the principles of marine spatial planning and using the key planning tools and technologies for coastal zones.

	Activities	**Outputs**	**Sites**				
Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)			**1-coast Mtwara**	**2-coast Dar***	**3-coast Muheza**	**4-lake Magu**	**5-lake Muleba**
Outcome 5 - Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented							
	Coastal and shoreline ecosystem rehabilitation for climate resilience through the implementation of a GreenJobs program	Mangrove rehabilitation through planting of resilient seedlings, dredging and the creation of no-take buffer zones;	x	x	x		
		Coral reef rehabilitation and protection in coastal sites	x	x			
		Beach nourishment, coastline reforestation (trees and grasses)	x	x	x		
		Shoreline management and rehabilitation, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones				x	x
		Wetland rehabilitation				x	x

	Development of a supplementary action plan to the Integrated Coastal Management Strategy on Ecosystem-Based Integrated Coastal Area Management	One EBICAM plan for the coastal region and one EBICAM plan for the Lake region approved	x			x	

Component 4 – Knowledge development and learning

This project is intended to serve as a strong example of 'stage 2' adaptation implementation in the country and in the region. In this regard, the project will first build on existing and available knowledge, scientific evidence and technical studies in order to ensure the implementation of state-of-the-art technologies and approaches to adaptation. Knowledge management will be mainstreamed throughout the activities of the project, and will include the following functions:

- Stocktaking: at all stages of implementation, stakeholders will be called upon to perform a series of data gathering functions, baseline assessments, state-of-the art studies and feasibility studies. These will be undertaken as a means of providing best quality advice before activity implementation, particularly in the case of infrastructure and technology transfer. This function will also allow for the development of a significant database of information relevant to adaptation in Tanzania, that will be put together under the auspices of a coordinating entity (see below).

- Monitoring: scientific and technical monitoring of key project indicators, as well as monitoring of the key indicators of vulnerability to climate change in the targeted areas, will also be performed under this project. This will include technical assessments of the viability and resilience of proposed actions under the project, as well as monitoring of the key determinants of vulnerability: water availability, precipitation patterns, sea level rise, etc… These functions are currently being undertaken in Tanzania, and the information gathered by the various participating stakeholders will also be brought together under the aegis of a coordinating entity.

The key coordinating mechanism for the knowledge management component of this project will be the creation of a Coastal Climate Change Observatory for Tanzania, which will be a network institution that will bring together all relevant stakeholders and information through a clearing house function.

Component 4 - Knowledge, monitoring and evaluation **Outcome 4 -** *knowledge of coastal impacts and adaptation measures is increased*		
	Stocktaking	Available knowledge, science and data gathered for project implementation
	Monitoring	Climate change coastal observatory for Tanzania for ongoing monitoring of CZM and Coastal environmental status and scientific research

B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

The project is expected to deliver a set of targeted and interlinked economic, social and environmental benefits in the 5 targeted sites, as well as serving as a model for future replication throughout the country.

Social and economic benefits: The socio-economic benefits of this project will include increased income and reduced poverty for targeted communities from increased agricultural productivity, alternative crops and crop diversification coupled with efficient conservation and transformation technologies that will provide added value. Sustainable fisheries and the conservation of fish-breeding sites are also expected to generate socio-economic benefits through the continued and increased availability of protein for fishing communities, allowing them to resist more readily to climate change and climate shocks and their impact on traditional cropping activities.

Additionally, the project will promote a set of innovations together with district administrations that will help create better living conditions. The GreenJobs program will recruit unemployed youth and provide them with technical and vocational training, as well as jobs in the rehabilitation and management of fragile ecosystems such as wetlands, shorelines, and coastal areas. The provision and rehabilitation of fisheries equipment and transformation facilities will also provide direct employment as well as indirect income generating opportunities.

Alternative energies provided in the targeted sites as means of reducing deforestation will also create productive assets for targeted communities, for cooking as well a for the maintenance of additional productive activities that may be hindered from the lack of electricity or power.

Ecosystem Based Adaptation approach which will be used in this project will provide multiple benefits. For example, restoration of degraded wetlands can maintain water flow and storage in the face of droughts, as well as provide protection against floods or storms. Management and restoration of ecosystems thereby offer a valuable, yet under-utilized approach for climate change adaptation, complementing other actions such as the development of infrastructure.

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

Interventions in this project are of two different categories. First, a significant component of this project's budget is dedicated to concrete investments in coastal protection infrastructure and in the rehabilitation of key coastal and shoreline productive assets. Heavy infrastructure-related measures selected for this project were limited to areas where immediate and urgent action was necessary, lest productive assets would be lost in the shorter term (for example, the rehabilitation or construction of sea walls). In other cases, smaller-scale and less costly coastal protection technologies have been selected, including the use of natural barriers to sea level rise and flooding, and ecosystem-based coastal rehabilitation of buffer ecosystems. Although in some cases, one-time rehabilitation costs may seem elevated, these are expected to generate long-term benefits in terms of resilience that far outweigh their short-term costs.

The second group of interventions is comprised of technology transfer and modifications to the current natural resource uses and management practices that are factors of vulnerability. These activities, including the acquisition of productive assets, have been selected based on available studies and technical feasibility analyses and on the basis of their potential for generating multiple social, economic and environmental benefits.

Experience from adaptation projects implemented by UNEP has shown that building adaptation measures based on ecosystem management principles will deliver better returns on natural, human and economic capital investments, while at the same time maintaining resilient ecosystems, using less natural resources and reducing social disparities. [38]From an environmental perspective, this project is expected to generate significant benefits through the protection and rehabilitation of degraded and fragile ecosystems, who will then be able to continue to provide key ecosystem services, including water filtration (mangroves, wetlands), flood protection (mangroves, sea grass beds, dunes), carbon sinks (reefs and forests), as well as biodiversity that is vital to the continued livelihoods of coastal and lakeside communities.

The approach taken for the development of this project has also sought to build on linkages and synergy with other projects under implementation or/and development, which is expected to generate multiple benefits nationally. By so doing the project presents the least costly means of achieving rapid benefits.

D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-

[38] For example, redesigning adaptation measures such as flood control infrastructures in Vietnam from dykes to restored mangrove forests has delivered better returns on natural and economic capital investments that engineered measures alone. An investment of USD 1.1 million on restoring nearly 12,000 hectares of mangroves in Vietnam is estimated to have saved USD 7.3 million per year in dyke maintenance, while providing ecosystem services such as physical protection to coastal communities as well as productive fisheries Other benefits included climate change mitigation, restorations of livelihoods and reduced risk of climate related disasters. Reid, H. and Huq, S. (2005)

national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

This project has been developed in line with Tanzania's key development priorities, plans and programs, as embodied in Tanzania's Development Vision for 2025, the National Strategy for Growth and Reduction of Poverty, and sectoral policies in the areas of water, agriculture, fisheries and tourism. The NSGRP recognizes that poverty is closely related to growth in the productive and services sectors and that sector-based constraints precipitate income-poverty to the extent that they limit growth in the sector(s) and hence adversely affect the provision of services that reduce non-income poverty. Agriculture, as the lead sector, is pointed as one of the key areas for intervention towards increased productivity and interventions proposed include the development of better productive technologies alongside with the reduction of environmental degradation and stresses, including reducing deforestation and coastal degradation.

This project can be seen as a direct tool for the implementation of Tanzania's National Integrated Environmental Coastal Management Strategy (ICM)[39] objectives, which include the improvement of the wellbeing and livelihoods of all coastal resources users, the need to undertake environmental planning and management of key economic opportunities and to manage geographic areas of concern and critical habitats, while supporting local initiatives for intersectoral development.

This project is also consistent with the objectives of the Tanzania Agricultural and Livestock Policy, whose primary objectives are to increase farmers' incomes, reduce poverty, achieve food security, increase export earnings, support and promote agro-industries and environmental conservation.

Tanzania's Initial National Communication and National Adaptation Programme of Action both emphasize the urgent need to promote adaptation and resilience in the coastal areas. Vulnerable sectors highlighted in the NAPA include agriculture, water and health, and energy.

The project is also consistent with the principles of aid harmonization and coordination, as embodied in the Joint Assistance Strategy and in the One UN strategy implemented by development partners in Tanzania.

E. Describe how the project / programme meets relevant national technical standards, where applicable.

Interventions targeting infrastructure rehabilitation, construction of new structures, or including construction works will be implemented in strict adherence with Tanzanian standards and legal provisions for environmental impact assessment (EIA), as well as procurement and tender rules. Best international standards will also be respected in the development and rehabilitation of coastal protection structures.

[39] ICM Strategy, 2003.

Interventions designed to provide technology transfer, training and extension services or that will include local community participation in works will also be conducted in adherence with Tanzania labor codes.

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

This project is designed on the basis of knowledge, studies, and analyses provided by other, ongoing related projects and programmes. As such, it benefits from a considerable body of knowledge, stakeholders and processes. A preliminary analysis of ongoing initiatives was undertaken at the start of project design, in order to determine best practices and possible areas of duplication. A list of ongoing projects can be found in the Annex. To date, no other project has tackled, to the level achieved by this proposal, coastal issues in an integrated manner. Few initiatives provide significant support for concrete investments in coastal adaptation, and fewer still promote ecosystem-based approaches to coastal resilience. Hence this project is both building on existing available knowledge and practices, and pioneering new approaches to adaptation.

This project is expected to be implemented in conjunction with the LDCF project (to be submitted) that also focuses on adaptation in coastal areas. This LDCF project is expected to pilot adaptation measures in different sites, only one of which is located in one of the targeted regions in this project (Pangani). Because they are being developed simultaneously, opportunities for synergies have been maximized, and duplications have been reduced to a minimum. Coordination among all partners in Tanzania, through exiting donor and thematic coordination fora will be actively pursued. For example, this project will be discussed through the climate change coordinating group, which includes all relevant line ministries, donors and NGOs. Coordination will be ensured through the Vice President's Office, who is acting as National Executing Agency for this project.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

Component 4 of this project describes both the cross-cutting and specific knowledge management functions that will be undertaken in this project. In order to focus on concrete activities, however, this project will rely on the LDCF project to assist in traditional knowledge management activities, such as websites, case studies and knowledge products. Knowledge management activities undertaken in this project are therefore focused on the necessary elements for successful activity implementation.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

This project builds on a long history of consultation and cooperation on adaptation in Tanzania. In designing this project, all stakeholders were consulted and their inputs introduced in the various projects through discussions led by the Vice President's Office, in cooperation with other ministries. Various other partners were consulted, including bilateral donors active in the regions targeted or in the country on themes relevant to this project.

The Vice President's office has undertaken consultations with key line ministries who will be called upon to play a role in this project, including:

- Ministry of Regional Administration and Local Government
- Ministry of Parliamentary Affairs
- Ministry of Foreign Affairs and International Co-operation
- Ministry of Finance and Economic Affairs
- Ministry of Industry, Trade and Marketing
- Ministry of Agriculture, Food Security and Co-operatives
- Ministry of Natural Resources and Tourism
- Ministry of Water and Irrigation
- Ministry of Energy and Minerals
- Ministry of Infrastructure Development
- Ministry of Communication, Science and Technology
- Ministry of Health and Social Welfare
- Ministry of Education and Vocational Training
- Ministry of Labour, Employment and Youth Development
- Ministry of Lands, Housing and Human Settlements Development
- Ministry of Community Development, Gender and Children
- Ministry of Livestock and Fisheries Development

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Funding from the Adaptation Fund is requested in order to begin immediately with the implementation of concrete adaptation activities in support of Tanzania's resilience to climate change. The project covers the full costs of adaptation in the coastal and lakeshore regions as follows:

- Through the construction or rehabilitation of protective structures along the coast, the project is covering the full costs of adapting to sea level rise, increased tidal pressures and storm surges in selected sites along the Tanzanian Coast. These costs include the costs of modifying existing infrastructure, including touristic infrastructure, as well as rehabilitating buffer ecosystems for increased resilience and natural protection.

- The project is also providing a full coverage of the costs of adaptation in the lakeshore regions, through the rehabilitation of fragile ecosystems that play a key role in resilience and that provide crucial environmental services to Lake communities, including food, fisheries, pollution control, flood control, shelter and energy. The

costs of adaptation include the costs of incentives for modifying natural resource use patterns, and for promoting more sustainable and more productive uses of land, water and biomass, lifting barriers to resilience in the region.

- The project is building on existing knowledge and best practices, scientific evidence and technology, and also promotes innovative practices in the management of fragile ecosystems. The AF funds are used to promote innovative ecosystem-based adaptation practices, that have proven more to increase the effectiveness in creating resilience than other measures taken alone.

Component 1 – Addressing climate change impacts on key infrastructure and settlements

Baseline

A number of key coastal and shoreline infrastructures are under increasing pressures from human activities and coastal erosion. In general, projects that target climate change in Tanzania have yet to address the infrastructural aspects of adaptation, due to a lack of means, and because most projects were focused on Stage 1 or pilot adaptation measures. The business as usual scenario in the coastal areas would see existing infrastructure become increasingly inadequate, whether or not climate change scenarios for Sea Level Rise are realized. Under a sea level rise scenario, these infrastructures would be ineffective in protecting economic investments and human settlements along the coast.

In addition, human settlements in both coastal and Lakeside sites would continue to suffer from the impacts of floods due to sudden heavy precipitation events. It can be expected that without intervention, lives will continuously be lost, key productive assets will degrade, including agricultural lands, and cities will be come increasingly dangerous, including from a health and sanitation perspective. Water related diseases are expected to increase under climate change if no interventions are in place to ensure proper evacuation of floodwaters, of sanitation and to ensure water quality is safe from the effects of sea level rise or drought.

Adaptation additionality

Although this project is not expected to address all of Tanzania's coastal infrastructure needs, it will help in covering the costs of making selected installations more resilient to climate change by funding their rehabilitation, retrofitting or modification in order to take into account modified coastal regimes. Similarly, this project will also provide the costs related to avoiding the adverse impacts of increased floods in areas due to receive increased precipitation, by providing the means of increasing drainage and storm water evacuation. Along with the measures in Component 2, which are targeted towards buffer ecosystems, this project is expected to generate increased resilience and protection benefits in the targeted sites.

This project is also designed to cover the additional costs of adapting water extraction, conservation and transport infrastructures against the multiple effects of sea level rise and salinitation, coastal erosion and modified rainfall patterns.

Component 2 – Resilient livelihoods

Baseline

With the exception of Dar Es Salaam city per se, livelihoods in the selected sites are considered highly vulnerable to climate variability, economic shocks and environmental degradation. The dependence of most rural communities on a single source of economic livelihoods – in most cases agriculture – means that communities have little means to cope when agriculture fails due to erratic rains, droughts or floods. At the same time, larger estates are also ill-equipped to deal with the impacts of climate change and may not be able to take advantage of opportunities provided by climate change unless additional technology is provided.

Smallholder agriculture in Tanzania, as well as fisheries, are currently undertaken with very little means, low technology and low inputs and often imply unsustainable land and water use practices. Low productivity maintains people in a cycle of poverty and environmental degradation, which then makes them more vulnerable to climate change.

Adaptation additionality

This project is therefore designed to provide targeted communities with additional, improved and when necessary, alternative means of livelihoods in order to provide a safety net of resilience in case of climate changes and increased variability. This will include the additional costs of creating sustainable enterprises, promoting sustainable and resilient agriculture practices (land, water, biomass and pest management) and the development of economic alternatives.

Alternative energies will also be provided by this project as an additional contribution to resilience at the commuity level, as a means of supporting household productivity as well as to reduce deforestation – which is also a cause of increased vulnerability.

Component 3 – Ecosystem-Based Integrated Coastal Area Management

Baseline

There is currently no ecosystem-based coastal area management framework in Tanzania, although it is increasingly recognized that the fragile ecosystems in the coast and in the Lake region play a crucial role in sustaining communities and their own resilience. Existing coastal management frameworks are not completely implemented, and enforcement is lacking for some key aspects of natural resources management (including no-build or no-take zones).

The degradation of mangroves, reefs, sea grass beds and wetlands are all factors of coastal vulnerability and are also all factors of community vulnerability. However these fragile ecosystems are under pressures from climate as well as human activities.

Adaptation additionality

This project will therefore support the additional costs of rehabilitating the fragile ecosystems and of removing the elements of human pressures that are causing their degradation. This will ensure that the coasts and the lakeshores are resilient and can respond to climate shocks, while continuing to provide valuable ecosystem services such as protection against floods, animal habitat, water filtration and supply. Without this project, these ecosystems would gradually disappear, and the coasts and shorelines – and the communities who live there - would be starkly vulnerable to climate change impacts.

Component 4 – Knowledge development and learning

Baseline

There is a wide range of climate-related knowledge, science and evidence in Tanzania, however there remains broad areas of duplication in research and in programming, while some areas are neglected. Gaps in science and technology, as well as best practices are difficult to identify because of the multiplicity of actors, methodologies and initiatives. Efforts at coordinating have thus far focused on projects and programmes.

Adaptation additionality

This project therefore will seek to bring together all available and relevant knowledge on coastal and lakeshore impacts into a single coordinating function or clearing house, which will serve as a central coordinating mechanism for Tanzania's future initiatives in climate change adaptation. This Coastal Zone Observatory will be enabled to monitor key indicators of climate change in coastal and lakeshore areas and to provide best available technical advice to future activities.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

UNEP will be the Multilateral Implementing Entity[40] (MIE) for the project and will oversee and provide technical backstopping to the project. The Vice president's Office (Division of

[40] The following implementation services under the MIE modality will be provided by UNEP for this project: (1) Overall coordination and management of UNEP's MIE functions and responsibilities, and facilitate interactions with the AFB and related stakeholders; (ii) Oversight of portfolio implementation and reporting back on budget performance; (iii) Quality assurance and accountability for outputs and deliverables at the project development phase, during implementation and on completion;(iv) Receipt, management and disbursement of AF funds in accordance with the financial standards of the Adaptation Fund. (v) Information and communication management, including maintaining Management Information Systems and specific project databases to track and monitor progress (financial and substantive) of project implementation; (vi) Oversight and quality assurance of evaluation processes for project performance and ensuring that lessons learned/best practice incorporated to improve future projects; (vi) General administration and support costs including legal services, procurement and supply management, IT, and human resource management.

Environment-National Climate Change Focal Point (NCCFP) will be the Executing Agency of the project. UNEP will work closely with the VPO and the National Climate Change Steering Committee (NCCSC) which will serve as the Project Steering Committee (PSC) during project implementation. Overall, the project will be implemented with the support of several national government, local government and non-government partners.

The project will be supervised by the National Climate Change Technical Committee (NCCTC), which is comprised of sector environmental coordinators, senior environmental and representatives of relevant stakeholders, and chaired by the National Climate Change Focal Point. The NCCTC is itself supervised by the NCCSC, a national-level policy committee comprised of Directors and senior environmental officers from VPO-DOE and various ministries that meets quarterly. This is chaired by the Permanent Secretary-VPO responsible for environment and climate change issues.

The VPO (DOE) will be the overall coordinator of the project. In support of the national administration, and where a need arises, a Senior Technical Advisor (STA) may be hired to provide technical guidance on the implementation of the project to the NPC.

The key functions of the VPO-DoE, and with the possible support of the STA will be the following: i) quality assurance and technical review of project outputs (e.g. studies and assessments); ii) assistance in drafting TORs for technical consultancies and supervision of consultants work; iii) assistance in monitoring the technical quality of project M&E systems, including annual work-plans, indicators and targets; iv) providing advice on best suitable approaches and methodologies for achieving project targets and objectives; v) provide a technical supervisory function to the work carried out by the other technical assistance consultants hired by the project; and vi) assisting in knowledge management, communications and awareness raising. The STA position will be filled following a transparent and competitive recruitment process. The STA will be employed full-time during the first year and thereafter involvement of the STA will be reduced41. In this way, the project will strengthen and establish in-country capacity and ensure that project activities are sustainable after the project lifetime.

Additional staff employed to provide technical and administrative support will include consultants (both national and international, as needed) and an administration/finance assistant.

The VPO-DOE as coordinating unit will undertake the following responsibilities for management of the project:

- Coordinating between key line ministries and relevant departments in implementing the various project components.
- Coordinating between regional and national institutions and donors.
- Preparing regular annual reports on its activities and outcomes of the project.
- Providing advice and guidance on coastal zone management policies.
- Mobilizing additional partnerships and support for the project as necessary

[41] The STA will be contracted full-time for Year 1, 40% for Year 2 and for 30% of the time in Years 3 and 4.

The PSC will steer the project implementation process and any problems encountered will be discussed during the regular meetings (every six months throughout the project implementation with additional meetings held as and when necessary) and/or *ad hoc* sessions. The NCCFP will serve as the secretary of the PSC. The PSC will approve annual work plans and procurement plans, and review project periodical reports as well as any deviations from the approved plans. All decisions of the PSC, such as respective responsibilities, timelines and budget will be clearly communicated to the parties concerned. PSC members will facilitate the implementation of the project activities in their respective agencies, ensure that activities are implemented in a timely manner and facilitate the integration of project-inspired activities into existing programmes and practices.

B. Describe the measures for financial and project / programme risk management.

The following risks have been determined during project design, that could influence the project's delivery of its objective.

Risk	Level	Mitigation
The multiple ongoing initiatives on climate adaptation in Tanzania could cause delays for this project	Low	Coordination among various partners at national and international levels is an integral part of this project. In addition, dedicated staff for project coordination will help ensure that the project maintains its objectives.
District-level stakeholders and administrations show low engagement for adaptation measures	Low	District level administrations will be engaged early on in project activity planning and delivery. Efforts will be made to increase awareness of district-level stakeholders on the potential impacts of climate change on local economy and prospects. Incentives for private sector and vulnerable groups have been included in project activities in order to encourage active participation at all levels.
Extreme weather events such as tropical storms, floods or droughts could hinder progress in ecosystem rehabilitation and infrastructure activities	Med	Measures designed to rehabilitate buffer ecosystems will be implemented so that no-regrets measures are implemented first, gradually building resilience of targeted ecosystems. Protective infrastructure rehabilitation will be designed according to the best available technical standards, using the best available technology.

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

The project will comply with formal guidelines, protocols and toolkits issued by the AF, UNEP, and Tanzanian government procedures.

UNEP will develop a **Supervision Plan** during the project's inception phase that will be distributed and presented to all stakeholders during the Inception Workshop. The emphasis of the Supervision Plan will be on outcome monitoring, learning and sustainability, but without neglecting financial management and implementation monitoring. Project risks and assumptions will be regularly monitored by UNEP. Risk assessment and rating is an integral part of the Project Implementation Review (PIR). The quality of the project's M&E will also be reviewed and rated as part of the PIR. Key financial parameters will be monitored annually to ensure the cost-effective use of financial resources.

The project will undergo an independent **Mid-Term Evaluation** at the mid-point of project implementation. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, ToR and timing of the Mid-Term Evaluation will be decided after consultation between the parties to the project document. The relevant GEF Focal Area Tracking Tools will also be completed during the Mid-Term Evaluation cycle.

An independent **Final Evaluation** will take place three months prior to the project end date in accordance with UNEP and GEF guidance. The Final Evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the Mid-Term Evaluation, if any such correction took place). The Final Evaluation will assess the impact and sustainability of results, including their contribution to capacity development and the achievement of adaptation benefits. The Final Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded onto PIMS.

A key **Annual Project Review/Project Implementation Review** (APR/PIR) will be prepared to monitor progress made since the project's start and in particular for the previous reporting period. The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward the project's objective and outcomes - each with indicators, baseline data and end-of-project targets (cumulative).
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports.
- Project risk and adaptive management.

Periodic monitoring will be conducted through visits to the demonstration sites undertaken by relevant staff from UNEP. Visits will be jointly conducted based on the agreed schedule to assess project progress first hand.

M&E costs

MONITORING AND EVALUATION COSTS			
Type of M&E Activity	**Responsible Parties**	**Budget $ (excludes project team time)**	**TIMEFRAME**
Measurement of means of verification of project results (baseline assessments)	STA and NPC will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. Technical support provided by UNEP.	52,000	within first 2 months of start-up
Direct project monitoring and quality assurance including progress and financial reporting, project revisions, technical assistance and risk management	UNEP TM and FMO	169,363	quarterly, half-yearly and annually
Evaluations (Mid-term Review and Independent Terminal Evaluation)	UNEP EO	166,500	At mid-point of project implementation and at end of project implementation
Inception meeting, field visits and steering committee (SC) meetings	UNEP, NCCC	82,500	Inception mtg within first 2 months of project start-up, annual SC mtgs
Total M&E cost		470,363	

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

Project objective:						
	Activities	**Outputs**	**Indicator**	**Target**	**Baseline**	**Means of Verification**
Component 1 - Addressing climate change impacts on key infrastructure and settlements						
Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced						
	Rehabilitate coastal protection facilities to protect settlements economic and cultural infrastructure	Sea walls raised or rehabilitated in areas showing particular damage	Length of sea walls raised and rehabilitated (m)	Functional seawalls where appropriate in each sites	tbd (baseline engineering study)	Visual observation, engineering reports
		Set-up low-cost coastal protection infrastructure (groynes, revetments)	Number of Km of coast subject to enhanced protection (km)	Effective protective infrastructure in coastal sites	tbd (baseline engineering study)	Visual observation, engineering reports

	Rehabilitate or relocate water extraction and conservation structures in coastal areas to avoid salinization	Boreholes and wells showing signs of salinization relocated	% reduction in salwater intrusion in coastal borehoes and wells	Water salt content is as per WHO standards	tbd (water quality study)	Visual observation, engineering reports
	Perform engineering assessment of climate change impacts on port infrastructure (enabling)	Report on climate change impacts on port infrastructure and adaptation recommendations (enabling)	Assessment of climate impacts on port infrastructure available	1 study available and disseminated by 2nd year of project	No such study available	Study, project reports
Outcome 2 - Adverse impacts of floods averted						
	Cleaning up of the drainage channels, dredging of estuaries,rehabilitation of storm drains in selected urban centers	Effective storm and flood drainage systems in urban areas and near coastal communities	% change drainage debit capacity (M/s) in all locations; reduction in sea water intrusion; number of floods averted	tbd	tbd (baseline engineering study)	Visual observation, engineering reports
Outcome 3 - Adverse impacts of climate change on water supply and quality averted						
	Rehabilitation and construction of resilient water mobilization (extraction, adduction, conservation) structures along with sustainable water extraction and management practices	water extraction, conservation and harvesting infrastructure rehabilitated, along with adequate monitoring at local level	% change in water availability in all seasons; % reduction in waterborne diseases (cholera, malaria, diarrhea)	15% increase in safe water availability in all seasons in all locations; 10% decrease in waterborne disease	tbd (baseline engineering study)	project reports, questionnaires, household surveys
Component 2 - Resilient livelihoods						
Outcome 4 - Livelihoods are sustainable, diversified and resilient						
	Development or rehabilitation of fishing docks and fish	New or rehabilitated fishing docks and fish processing areas	Change in sustainable fisheries; % change in fish transformation activities	15% increase in fishery productivity	tbd (baseline study)	Reports, household surveys

	processing areas at community level in coastal areas					
	Promotion of sustainable and resilient nature-based tourism through district-level tourism assistance revolving fund	Increased numbers of sustainable tourism enterprises and resilient touristic infrastructures	# of private companies promoting resilient and sustainable tourism or # of private companies retrofitting infrastructure for resilience	At least 2 in each district by end of project	Tbd (baseline study)	Reports, questionnaires
	Promote resilient agricultural practices	Agricultural tools, materials, and sustainable technologies and approaches transferred irrigation technology and equipment transferred in areas subject to drought or erratic rains	% change in agricultural productivity;	15% increase in agricultural productivity	Tbd (baseline study)	Reports, household surveys
		Introduction of alternative resilient crops and crop management methods	% change in mangrove and forest health	15% average for all mangrove sites	Tbd (baseline study)	reports, visual observation, mangrove and forest studies
	Promote alternative energy for avoided deforestation	appropriate alternative energy (efficient cookstoves, small solar, solar water heaters, small hydro) technology transferred	% change in deforestation	10% decrease in deforestation in all sites	Tbd (baseline study)	reports, visual observation, mangrove and forest studies
Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)						
Outcome 5 - Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented						
	Coastal and shoreline ecosystem rehabilitation for climate resilience through the implementation of a	Mangrove rehabilitation through planting of resilient seedlings, dredging and the creation of no-take buffer zones;	% change in mangrove coverage	10% increase in coverage by mid-term	tbd (mangrove study)	Reports, visual observation, mangrove and forest studies

	GreenJobs program					
		Coral reef rehabilitation and protection in coastal sites	% change in reef coverage and health	10% recovery annually	Tbd (baseline study)	Visual observation , project reports
		Beach nourishment, coastline reforestation (trees and grasses)	Km of beach restored	175km	none	Visual observation , project reports
		Shoreline management and rehabilitation, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones	Km of shoreline rehabilitated	175km	none	
		Wetland rehabilitation	Ha of wetlands rehabilitated and protected	200ha	no wetlands rehabilitated	
	Development of a supplementary action plan to the Integrated Coastal Management Strategy on Ecosystem-Based Integrated Coastal Area Management	One EBICAM plan for the coastal region and one EBICAM plan for the Lake region approved	Number of plans approved	2 plans	no plans	Project reports, plans and policies
Component 4 - Knowledge, monitoring and evaluation						
Knowledge of coastal impacts and adaptation measures is increased						
	stocktaking	available knowledge, science and data gathered for project implementation	A comprehensive baseline study for project indicators; available knowledge gathered (Yes/ No)	1 baseline study in year 1	No such study	Project reports

	monitoring	Operational climate change coastal observatory for Tanzania for ongoing monitoring of CZM and Coastal environmental status and scientific research	Effective implementation of clearing house function (Yes/ No)	The Observatory is operational by mid-term	No such observatory	Project reports, evaluation reports

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

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[42] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Eng. Ngosi C.X. Mwihava (see attached Annex 4: Letter of Endorsement)	Date*: 28 October 2010*

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (including Development Vision 2025, National Adaptation Programme of Action) and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.
Maryam Niamir-Fuller  Implementing Entity Coordinator

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.

Division Director, UNEP PO Box 30552 Nairobi, Kenya Gigiri Complex, Block R-ground floor email: maryam.niamir-fuller@unep.org tel: (254 20) 762-4166 fax: (254 20) 762-4041 www.unep.org	
Date: *28 October 2010*	Tel. and email: + 254 20 762 4166 maryam.niamir-fuller@unep.org;
Project Contact Person: Ermira Fida, Adaptation Task Manager, UNEP	
Tel. And Email: +254 20 762 3113 ermira.fida@unep.org	

List of Annexes:

- Costed Logical Framework
- List of Ongoing projects
- Summary of key aspects of project sites
- Letter of Endorsement

Annex 1. Costed Logical Framework

	Activities	Outputs	Indicator	Target	Baseline	Means of Verification	Sites						Notes	Amount
Component 1 - Addressing climate change impacts on key infrastructure and settlements							**1-coast Mtwara**	**3-coast Dar***	**4-coast Muheza**	**5-lake Magu**	**6-lake Muleba**			
Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced														
	Rehabilitate coastal protection facilities to protect settlements economic and cultural infrastructure	Sea walls raised or rehabilitated in areas showing particular damage	Length of sea walls raised and rehabilitated (m)	functional seawalls where appropriate in each sites	tbd (baseline engineering study)	visual observation, engineering reports	x	x	x				cost of sea walls raised or rehabilitated = 2500$/meter - maximum of 720 metres	1,901,700
		Set-up low-cost coastal protection infrastructure (groynes, revetments)	number of Km of coast subject to enhanced protection (km)	tbd		visual observation, engineering reports	x		x				estimated cost of new groynes and revetment 5000$/m - maximum of 160m (Dar not included because covered under other projects)	845,200
	Rehabilitate or relocate water extraction and conservation structures in coastal areas to avoid salinization	Boreholes and wells showing signs of salinization relocated	% reduction in salwater intrusion in coastal borehoes and wells	tbd	tbd water quality study	visual observation, engineering reports	x		x				rough cost estimate 100,000 per borehole for 2 per site (Dar not included because water comes from elsewhere)	211,300

	Perform engineering assessment of climate change impacts on port infrastructure (enabling)	report on climate change impacts on port infrastructure and adaptation recommendations (enabling)	assessment of climate impacts on port infrastructure available	1 study available and disseminated by 2nd year of project	no such study available	study, project reports							1 study on 4 ports in Dar es Salaam, Tanga and Mtwara + 1 in lake area -	79,238
Outcome 2 - Adverse impacts of floods averted														
	Cleaning up of the drainage channels, dredging of estuaries,rehabilitation of storm drains in selected urban centers	Effective storm and flood drainage systems in urban areas and near coastal communities	% change drainage debit capacity (M/s) in all locations; reduction in sea water intrusion; number of floods averted	tbd	tbd (baseline engineering study)	visual observation, engineering reports	x	x	x	x	x		rough estimated cost of 1-time works = 100k per site + 300k for Dar Es Salaam	845,200
Outcome 3 - Adverse impacts of climate change on water supply and quality averted														
	Rehabilitation and construction of resilient water mobilization (extraction, adduction, conservation) structures along with sustainable water extraction and management practices	water extraction, conservation and harvesting infrastructure rehabilitated, along with adequate monitoring at local level	% change in water availability in all seasons; % reduction in waterborne diseases (cholera, malaria, diarrhea)	15% increase in safe water availability in all seasons in all locations; 10% decrase in waterborne disase		project reports, questionnaires, household surveys	x	x	x	x	x		estimated costs of 1 time works: 100,000 per site	528,250
														4,410,888
Component 2 - Resilient livelihoods														
Outcome 4 - Livelihoods are sustainable, diversified and resilient														
	Development or rehabilitation of fishing docks and fish processing areas at community level in coastal areas	fNew or rehabilitated fishing docks and fish processing areas	change in sustainable fisheries; % change in fish transformation activities	15%		reports, household surveys	x	x	x	x	x		costs of 1 time equipment acquisition and rehabilitation works	422,600

	Promotion of sustainable and resilient nature-based tourism through district-level tourism assistance revolving fund	Increased numbers of sustainable tourism enterprises and resilient touristic infrastructures	# of private companies promoting resilient and sustainable tourism or # of private companies retrofitting infrastructure for resilience	At least 2 in each district by end of project		reports, questionnaires	x	x	x	x	x		approximately 100,000 initial funding for each district fund	528,250
	Promote resilient agricultural practices	agricultural tools, materials, and sustainable technologies and approaches transferred	% change in agricultural productivity;	15% increase in agricultural productivity		reports, household surveys	x	x	x	x	x		equipment, inputs and training	528,250
		irrigation technology and equipment transferred in areas subject to drought or erratic rains					x	x	x	x	x		cost of equipment, works, and training	316,950
		Introduction of alternative resilient crops and crop management methods	% change in mangove and forest health	15% average for all mangrove sites		reports, visual observation, mangrove and forest studies	x	x	x	x	x		crops, seeds, inputs and training and extension services for 2 seasons	316,950
	Promote alternative energy for avoided deforestation	appropriate alternative energy (efficient cookstoves, small solar, solar water heaters, small hydro) technology transferred	% change in deforestation	10% decrease in deforestation in all sites		reports, visual observation, mangrove and forest studies	x			x	x		dar es salaam not included because energy omes from other sources; 100,000 per district	316,950
														2,429,950
Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)														
Outcome 5 - Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented														

	Coastal and shoreline ecosystem rehabilitation for climate resilience through the implementation of a GreenJobs program	Mangrove rehabilitation through planting of resilient seedlings, dredging and the creation of no-take buffer zones;	% change in mangrove coverage	tbd		reports, visual observation, mangrove and forest studies	x	x	x				cost per mangrove for 3 mangrove sites 150000	475,425
		Coral reef rehabilitation and protection in coastal sites	% change in reef coverage and health	tbd		visual observation , project reports	x	x						211,300
		Beach nourishment, coastline reforestation (trees and grasses)	Km of beach restored	175km		visual observation , project reports	x	x	x				2000$/km	369,775
		Shoreline management and rehabilitation, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones	Km of shoreline rehabilitated	175km		visual observation , project reports				x	x		2000$/km	369,775
		Wetland rehabilitation	Ha of wetlands rehabilitated and protected	200ha		visual observation , project reports				x	x		1000$/ha	211,300
	Development of a supplementary action plan to the Integrated Coastal Management Strategy on Ecosystem-Based Integrated Coastal Area Management	One EBICAM plan for the coastal region and one EBICAM plan for the Lake region approved	Number of plans approved	2 plans		project reports, plans and policies	x			x			cost per plan including consultations = 50000	105,650
														1,743,225
Component 4 - Knowledge, monitoring and evaluation														
Knowledge of coastal impacts and adaptation measures is increased														

	stocktaking	avilable knowledge, science and data gathered for project implementation	a comprehensive baseline study for project indicators; available knowledge gathered	1 baseline study in year 1	no such study	project reports							cross-cutting function	52,825
	monitoring	Create climate change coastal observatory for Tanzania for ongoing monitoring of CZM and Coastal environmental status and scientific research	effective implementation of clearing house function										consultancies and database + website function for clearing house	158,475
														211,300
														8,795,363
Management costs														416,250
Total activities budget														**9,211,613**
MIE fee (8.5%)														782,987
Total cost of project to AF														**9,994,600**

Annex **2. List of Ongoing Projects**

See separate file.

Annex 3. Summary of site vulnerabilities

	coastal sites			Lake sites	
	1. Mtwara	**3. Dar Es Salaam**	**4. Muheza**	**5. Magu**	**6. Muleba**
rainfall	unimodal	bimodal	bimodal	bimodal - 600-800mm	bimodal - 1400-2000mm
mangrove	yes	yes	yes		
sea wall					
forest	yes	yes	yes		yes
port	yes	yes			
reef	yes				
estuary	yes		yes		
dunes		yes			
seagrass					
wetlands + swamps		yes		yes	
crops	yes	yes, urban and periurban ag (vegetables, cassava, legumes, sweet potatoes, cashewnut, coconuts); fisheries; industry etc.	palm trees, sisal (cash), citrus, sisal, coconuts, cashew, maize, cassava, rice and sea weeds	yes	banana, coffee,tea, cassava, beans, more recently mushrooms and vanilla
fish	yes	yes		lake	
livestock					
existing climate hazards		drought, floods		variability, droughts	

anthropogenic pressures		pollution, poor urbanization, deforestation		overgrazing, deforestation, population growth , poor farming methods, pollution, malaria, invasive species	soil erosion, deforestation, excessive dependency on single crop,
future climate impacts	SLR, decreased precipitation - (=salinization of groundwater supplies)	droughts, floods, SLR, decreased precipitation	SLR, increased precipitation (flooding)	increased precipitation (flooding)	increased precipitation (flooding)
reg. population (district)	1.13 million	2.5 million	1.6 million	2.9 million	2.0 million (386,000)

Annex 4. Letter of Endorsement

THE UNITED REPUBLIC OF TANZANIA

Telegrams: "MAKAMU"
Telephone: 213983/2118416
Fax: 2125297/2113856/2113082
E-mail: ps@vpo.go.tz
Ref No: BA 38/49/01

VICE PRESIDENT'S OFFICE
P. O. BOX 5380
DAR ES SALAAM
TANZANIA
28th October 2010

The Adaptation Fund Board Secretariat,

1818 H Street NW, MSN G6-602,

Washington, DC.20433

United States of America.

Fax: 1 (202) 522-3240/5

Email: secretariat@Adaptation-Fund.org

RE: Endorsement of the "Implementation of Concrete Adaptation Measures to Reduce Vulnerability of Livelihood and Economy of Coastal and Lake Shore Communities in Tanzania" Project

Kindly refer to the subject.

The Vice President's Office-Division of Environment, being the Designated Authority (DA) of the Adaptation Fund, confirms that the captioned project conforms with the National Climate Change Adaptation priorities, *inter alia*, the National Vision 2025, the National Adaptation Programme of Action (NAPA) and the National Adaptation Strategy and Action Plan.

I therefore wish to endorse this project proposal amounting to US$ 9,994,600 and submit it for funding through UNEP as a Multilateral Implementing Entity.

Your consideration and cooperation is highly appreciated.

Mwihava

Eng. Ngosi C. X. Mwihava

ACTING PERMANENT SECRETARY