



ADAPTATION FUND

AFB/PPRC.5/15
June 3, 2011

Adaptation Fund Board
Project and Programme Review Committee
Fifth Meeting
Bonn, June 20, 2011

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. The fifth criterion, applied when reviewing a fully-developed project document, is:

5. Implementation Arrangements.

5. 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.

6. According to the Adaptation Fund Board Decision B.12/10, a project or programme proposal needs to be received by the secretariat not less than nine weeks before a Board meeting, in order to be considered by the Board in that meeting.

7. The following project document titled "Implementation of Concrete Adaptation Measures to Reduce Vulnerability of Livelihoods and Economy of Coastal Communities of Tanzania" was submitted by the United Nations Environmental Programme (UNEP), which is a Multilateral Implementing Entity of the Adaptation Fund. This is the third submission of this proposal. It was first submitted as a fully-developed project document, using the one-step proposal process, for the 12th Adaptation Fund Board meeting, and not approved by the Board. It was submitted again for the 13th Adaptation Fund Board meeting, and not approved. It was received by the secretariat in time to be

considered in the 14th Adaptation Fund Board meeting. The secretariat carried out a technical review of the project document, using the assigned diary number TZA/MIE/Coastal/2010/3, and filled in a review sheet.

8. 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.

9. 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 UNDP, in an addendum to this document.

II. Project Summary

Tanzania – Implementation of Concrete Adaptation Measures to Reduce Vulnerability of Livelihoods and Economy of Coastal Communities of Tanzania

Implementing Entity: UNEP

Project/Programme Execution Cost: USD 870,638

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 Least Developed Country 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. 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 leading to an estimated cut in 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.

This project seeks to respond to the impacts of sea level rise and modified precipitation patterns induced by climate change, with a specific focus on agriculture, water, and infrastructure in coastal zones , which 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, infrastructure and economy 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 3 priority sites in the coastal zone (Mtwara district, Ilala district and Muheza district):

1. Adverse impacts of sea level rise on coastal infrastructures and settlements are reduced.
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

Component 1: Addressing climate change impacts on key infrastructure and settlements (USD 4,675,000)

Activities under this component are designed to achieve 3 outcomes focused on reducing climate threats on infrastructure, settlements, and key investments. They are focused on multiple climate change threats and combined impacts, including: increased flooding in coastal areas due to receive increased precipitation, coastal and infrastructure erosion due to increased tidal activity and storm surges, and salinization of groundwater due to sea water intrusion. Activities in Component 1 are grouped together due to their common focus on physical coastal protection and infrastructure, but

are to be undertaken and understood in conjunction with “softer” coastal protection and ecosystem rehabilitation works contained in Component 3.

Component 2: Resilient livelihoods (USD 850,000)

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 as the key productive sectors among non-urban communities in the coast. 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 2,075,000)

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. It is designed to be implemented as a complement to activities in Component 1, in order to form a comprehensive package of protection from climate change impacts in coastal regions. This component also comprises activities designed to achieve policy linkages and as such is closely linked to activities included in Component 4.

Component 4: Knowledge, monitoring and policy linkages (USD 575,000)

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. This component builds on what currently exists in the country, as well as on approaches and methods that will be implemented through this project, specifically in Components 1 and 3, so as to generate policy-relevant knowledge.



ADAPTATION FUND

**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



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 ADAPTATION MEASURES TO REDUCE VULNERABILITY OF LIVELIHOOD AND ECONOMY OF COASTAL COMMUNITIES IN TANZANIA
TYPE OF IMPLEMENTING ENTITY:	MIE
IMPLEMENTING ENTITY:	UNEP
EXECUTING ENTITY/IES:	VICE PRESIDENT’S OFFICE (DIVISION OF ENVIRONMENT)
AMOUNT OF FINANCING REQUESTED:	9,814,517 (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 Least Developed Country 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. 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 leading to an estimated cut in 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 climate change, 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 throughout the country, with differing impacts according to the region. Sea level rise, which according to some

projections could reach 1m by 2100¹ in some areas, will have implications on socio- economic development and will increase the physical vulnerability of Tanzania's 800km coastline.² In addition, changes in precipitation patterns across the country's eco-climatic zones are also expected to have major impacts on agricultural productivity, infrastructure and property and social conditions. Expected climate change is 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 sea level rise and modified precipitation patterns induced by climate change, with a specific focus on agriculture, water, and infrastructure in coastal zones , which 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, infrastructure and economy in Tanzania through the implementation of concrete and urgent adaptation measures. The Coastal regions have been selected for priority implementation of adaptation measures due to their high socio-economic vulnerability as well as to the presence of major development investments whose deterioration due to climate change could have deep-felt and rippling impacts on local populations as well as throughout the country's economy.

In order to achieve this objective, the project will be delineated into the following six specific outcomes which will be implemented in 3 priority sites in the coastal zone (Mtwara district, Ilala district and Muheza district:

1. Adverse impacts of sea level rise on coastal infrastructures and settlements are reduced.
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 will be implemented by the United Nations Environment Programme and executed by the Vice President's Office (Division 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 kms 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 coastline extends 800 kilometers from 4°S to 10°S. Forests and woodland occupy 50 percent of the total area and 25 percent is wildlife reserves and national parks. 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. The coast of Tanzania is hot and humid; it contains Tanzania's largest city, Dar es Salaam, and is home to areas of East African mangroves, and mangrove swamps that are an important habitat for wildlife.

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°C - 24°C. Natural hazards include both flooding and drought.

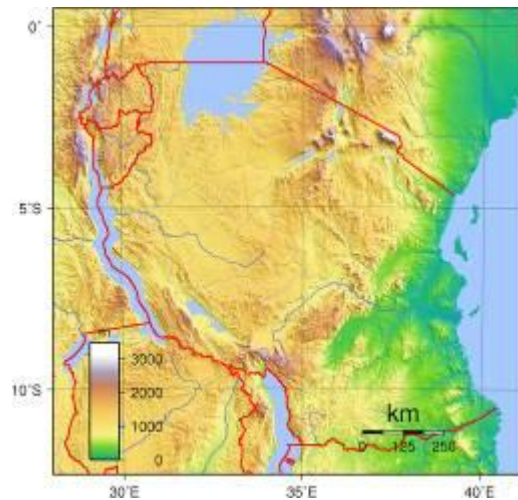


Figure 1: Topographical map of Tanzania

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



Figure 2: Rainfall patterns

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.

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: Agro-ecological zones

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 Rufiji 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. NORTHERN 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-kilombero (Morogoro) R- Rufiji (Coast) U- Usangu (Mbeya) W- Wami (Morogoro)	K-Central clay plain with alluvial fans east and west R- Wide mangrove swamp delta, alluvial soils, sandy upstream, loamy down stream 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 focused on the Coast area, which is further divisible into Northern Coast (bimodal rains) and Southern Coast (unimodal rains). Within this area, the project will focus on 3 priority districts located along the coast (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 million⁴.

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. 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

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 IPCC, 2007

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 3 below illustrates the key ecological features of the Tanzanian Coastline.

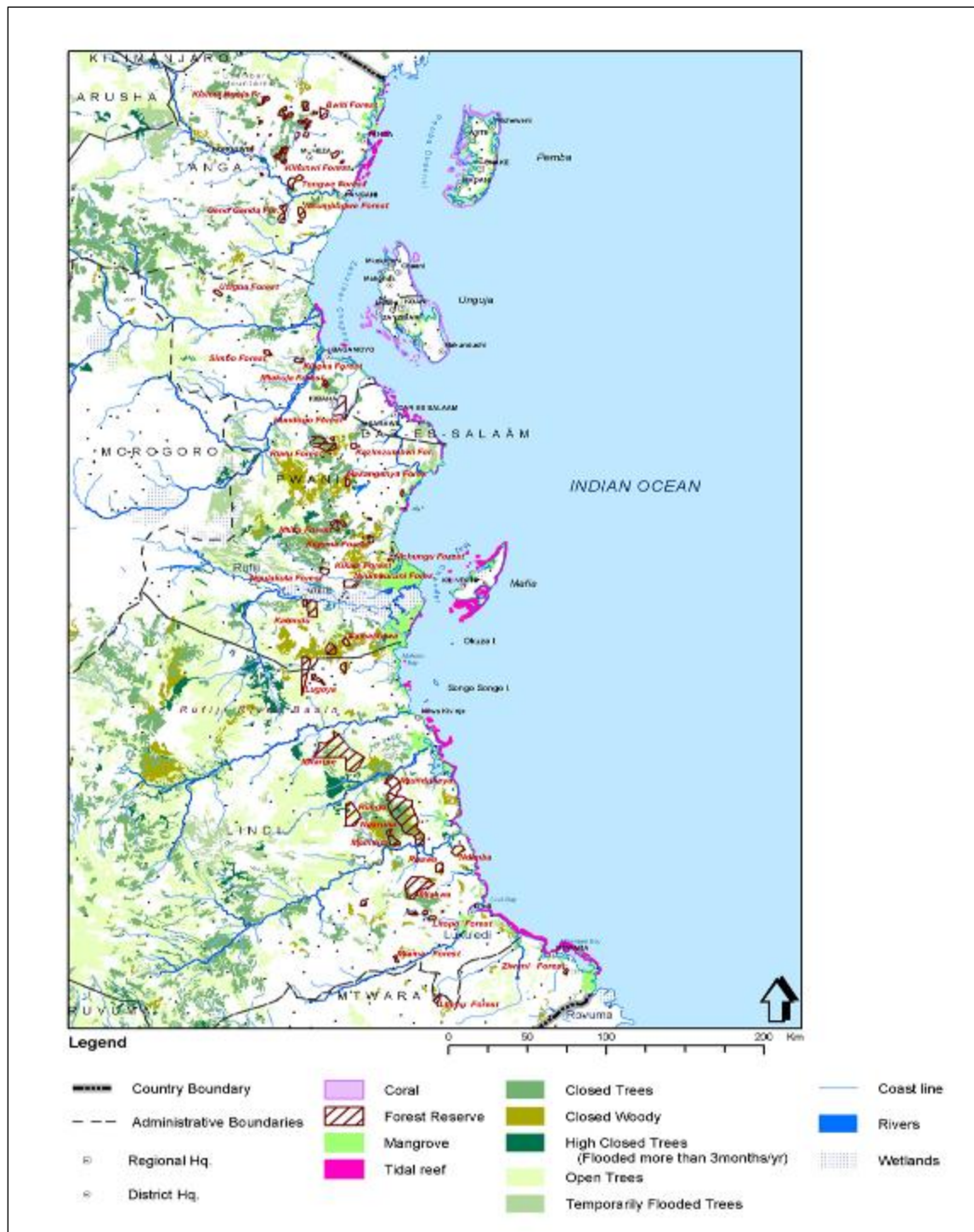


Figure 3: The Coast

2. Population, development and economy

Tanzania is one of the poorest countries in the world with a GNI per capita of only US \$ 300⁵. The total population of the country is estimated at over 43,7 million people, 35% of which are living below the poverty line⁶. 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 administrative 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.

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 earnings⁷. 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 water⁸. Agricultural products include coffee, sisal, tea, cotton, pyrethrum, cashew nuts, tobacco, cloves, corn, wheat, cassava, 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. As recognized in the 2005 National Strategy for Growth and Poverty Reduction, *“the constraints to rural growth are largely related to those in the agricultural sector (...) and include low productivity of land, labour and production inputs; underdeveloped irrigation potential; limited capital and access to financial services; inadequate agricultural technical support services; poor rural infrastructure hindering effective rural - urban linkages; infestations and outbreaks of crop or animal pests and diseases; erosion of natural resource base and environmental degradation.”*⁹

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

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

⁹ Government of Tanzania, National Strategy for Growth and Poverty Reduction, 2005.

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 Organizations 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. Groundwaters from the recent sediments in the coastal plain are vulnerable to marine intrusion, particularly where groundwater-pumping rates are high. Evidence of marine intrusion has been found in the coastal aquifer of the Kigamboni Peninsula (Dar Es Salaam) with elevated chloride, sulphate and sodium concentrations and with total-dissolved solids up to 1700 mg/l (Nkotagu, 1989).¹⁰

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).

3. Observed climate hazards, trends and their impacts

The observed climate change, including variability in Tanzania 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 century¹¹
- Inter-annual rainfall variability. During the recent decades Eastern Africa has been Component 1 in page 28experiencing an intensifying dipole rainfall patterns on the decadal time scale¹².
- An increase in the frequency and severity of floods, droughts and tropical storms in Tanzania. ¹³Tanzania 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

¹⁰ Groundwater: Tanzania, British Geological Services and WaterAid, 2001.

¹¹ Hulme et al., 2001; IPCC, 2001

¹² 4AR IPCC, 2007

¹³ WWF, 2006

GDP growth by 1 percent¹⁴.

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 diarrhea¹⁵. 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 production¹⁶. 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%¹⁷. The Pangani Basin is also fed by the glaciers of Kilimanjaro, which have been melting alarmingly fast¹⁸. 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 Africa¹⁹. 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 yields²⁰.

4. Expected impacts of climate change

¹⁴ Economics of Climate Change Adaptation: "Shaping Climate Resilient Development – a framework for decision making" 2009

¹⁵ Tanzania 's First National Communication, 2003.

¹⁶ Orindi and Murray, 2005

¹⁷ VPO-URT, 2003

¹⁸ Thompson *et al.* 2002

¹⁹ Funk *et al.*, 2005

²⁰ WWF, 2006

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, February²¹.

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 patterns. 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 events²². Tropical storms can ravage coastal areas and intensify 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 mangroves²³. 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.

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:

²¹ Climate Change and Development, OECD

²² IPCC, 2001.

²³ Magadza, 2000

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 severe 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 coastal zone. 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.

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 Pangani 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 effects 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. 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: As 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 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 could cover 2,022 ha and 4,045 ha and in Mtwara and Lindi the inundated areas could reach 7,922 ha and 15,855 ha for a 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 a 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 infrastructure, and increase coastal erosion. Along the Dar es Salaam coastline (approximately 100Km), the estimated loss of important structures is estimated to cost Tshs.49,83 billion and Tshs.85.97²⁴ 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 vulnerable coastal zone 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:

²⁴ Tanzania's First National Communication, 2003

- **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. 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 resources²⁵. 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:

This project responds to the impacts of sea level rise and changes in precipitation patterns caused by climate change and their direct or indirect effects, such as droughts, floods, infrastructure

²⁵ Government of Tanzania, National Integrated Coastal Environmental Management Strategy, 2003.

degradation and environmental degradation. **The objective of the project is to reduce vulnerability of livelihoods, ecosystems, infrastructure and economy in Tanzania** through implementation of concrete and urgent adaptation measures. The project is focused in the coastal zone of Tanzania.

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 reduced.
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 priority concrete on the ground, practical solutions to climate impacts (current and anticipated), but 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-funded NAPA implementation project (currently at final design stages), which also focuses on coastal zones but whose activities are targeted towards enabling, facilitating and community-level pilot action. The project will also coordinate with other ongoing relevant initiatives in targeted locations and at national level.

Activities in each of the components and outcomes are designed to be mutually reinforcing: Components 1 and 3 together provide a comprehensive set of solutions to coastal infrastructure and ecosystem degradation and are designed to be implemented jointly. For example, infrastructure works are also to be accompanied by ecosystem rehabilitation works in order to maximize efficiency of coastal protection systems. Component 2 is designed to remove the barriers to adaptation and resilience by promoting livelihoods that generate benefits and adaptive capacity while at the same time maintaining ecosystem services. As such, this component is a necessary element of any resilience strategy in the Coastal area. Finally, activities in Component 4 ensure that appropriate learning is taking place and that policy linkages are in place for upscaling, mainstreaming and replicating of lessons into national development processes as well as for ensuring the sustainability of project achievements.

The project will implement concrete adaptation actions in 3 sites of the coastal zone. These sites were selected according to key criteria such as: (i) geographic and socio-economic representativeness; (ii) presence of key infrastructure and economic assets; (iii) presence of fragile buffer ecosystems; (iv) complementarity to other ongoing interventions; and (v) presence of multiple factors of vulnerability. It is estimated that the total vulnerable population in the coastal zone represents 15% of the total population.

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 shipment²⁶, 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. Ilala District, Dar es Salaam region: 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. The total estimate coastline of Dar es Salaam is 100 Km. 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.²⁷

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 of 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 erosion²⁸. 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, village cultivations and estates (mainly sisal). Main species cultivated include: Citrus fruits, Sisal, Coconuts, Cashewnuts, Maize, Cassava, Rice and Sea Weeds²⁹. Muheza district is home to mangroves and costal forests reserves also important for bird and marine species, as well as fragile estuaries.

²⁶ Tanzania Port Authority

²⁷ Government of Tanzania, Dar es Salaam City Council, Tanzania City Profile, 2004.

²⁸ Government of Tanzania, Dar Es Salaam Vulnerability to Climate Change, 2008.

²⁹ Government of Tanzania, Planning Commission, Tanga Regional Profile, 1997, <http://www.tzonline.org/pdf/Tanga.pdf>

This region 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.

■ 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\$)
Component 1 - Addressing climate change impacts on key infrastructure and settlements	Sea wall raised or rehabilitated in areas showing particular damage	<i>Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced</i>	3,075,000
	Effective storm and flood drainage systems in urban areas and near coastal communities	<i>Outcome 2 - Adverse impacts of floods averted</i>	600,000
	Water extraction, conservation and harvesting infrastructure rehabilitated, along with adequate monitoring at local level Boreholes and wells showing signs of salinization relocated	<i>Outcome 3 - Adverse impacts of climate change on water supply and quality averted</i>	1,000,000
			4,675,000
Component 2 - Resilient livelihoods	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	<i>Outcome 4 - Livelihoods are sustainable, diversified and resilient</i>	850,000
3. Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)	Mangrove rehabilitated 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 One EBICAM plan for the coastal region	<i>Outcome 5 - Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented</i>	2,075,000

4. Component 4 - Knowledge, monitoring and policy linkages	Available knowledge, science and data gathered for project implementation Report on climate change impacts on port infrastructure and adaptation recommendations (enabling) Coastal engineering needs assessment and design study (enabling) Operational climate change coastal observatory for Tanzania for ongoing monitoring of CZM and Coastal environmental status and scientific research Assessment of the economic viability and practical feasibility of adaptation measures (i.e. through undertaking cost-benefit analyses) Policy briefs for policymakers and planners based on project outputs, lessons and challenges Awareness raising workshops based on project lessons for mainstreaming District level administration have the capacity to adequately manage rehabilitated infrastructure	Outcome 6 - knowledge of climate impacts and adaptation measures is increased	575,000
5. Monitoring and evaluation (see the M&E table under part III.C)			461,888
6. Project/Programme Execution cost (See Execution Cost under Part III.A)			408,750
7. Total Project/Programme Cost (Total of 1 to 6)			9,045,638
7. Project Cycle Management Fee charged by the Implementing Entity 8.5% of total project cost. See Annex 5)			768,879
Amount of Financing Requested			9,814,517

PROJECTED CALENDAR:

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

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

PART II: PROJECT / PROGRAMME JUSTIFICATION

1. 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 6 inter-related outcomes grouped into 4 components designed to achieve the project's overall objective to implement concrete and urgent measures to adapt to climate variability and change in order to protect livelihoods and to promote economic resilience. It seeks to respond to both direct effects of climate change such as sea level rise and the predicted changes in precipitation regime with their indirect impacts on agriculture and health. In order to respond to these threats and impacts the activities proposed are

designed to address the direct climate drivers of vulnerability as well as the non-climate drivers that are acting as barriers to adaptive capacity in the target sectors and spatial locations.

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

Activities under this component are designed to achieve 3 outcomes focused on reducing climate threats on infrastructure, settlements, and key investments. They are focused on multiple climate change threats and combined impacts, including: increased flooding in coastal areas due to receive increased precipitation, coastal and infrastructure erosion due to increased tidal activity and storm surges, and salinization of groundwater due to sea water intrusion. Activities in Component 1 are grouped together due to their common focus on physical coastal protection and infrastructure, but are to be undertaken and understood in conjunction with “softer” coastal protection and ecosystem rehabilitation works contained in Component 3.

Outcome 1: The adverse impacts of Sea Level Rise on Coastal Infrastructure and Settlements are reduced

The first set of activities (Outcome 1) are targeted towards addressing the direct impacts of Sea Level Rise (SLR) and coastal erosion on the key social, cultural and economic infrastructures of the 3 project sites located in coastal areas. Engineering assessments of the climate change impacts and adaptation measures for major coastal infrastructure will be conducted under Component 4 in support of this activity, 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 a technical coastal infrastructure adaptation needs assessment for the entire zone, as well as input into district level management plans.

In order to address emergency adaptation needs, special attention will be paid to the rehabilitation and maintenance of coastal protection infrastructure around key economic assets (e.g., roads, ports, markets) and cultural or historical sites that also play a role in the touristic industry. As a matter of urgent priority, this work will be undertaken in Dar es Salaam, where the existing sea wall is showing signs of severe degradation. For example, in Kunduchi area of Dar es Salaam, headwater waves are reported to have advanced for about 200m in the last 50 years; as a result, five residential houses were washed away as well as a historic fish market and hotel infrastructures³⁰. In order to protect major economic and social assets, this project will support the rehabilitation of a 1.2 km segment of the degraded sea-wall in Dar es Salaam-Ilala District, so that it can withstand higher sea levels (up to 1 meter), increased tidal action and stronger storm surges into consideration. Typical design and specifications for the rehabilitated portion of the seawall are shown in Annex 4.

Outcome 2: Adverse impacts of floods averted

³⁰ Makota V., Sallema, R. and Mahika, C. 2004. Monitoring shoreline change using remote sensing and GIS: a case study of Kunduchi Area, Tanzania. Western Indian Ocean Journal of Marine Science, Vol.3, No.1.

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 or stronger precipitation events. Activities will mainly consist in clearing and maintenance works on drainage channels and the rehabilitation of storm drains in selected urban areas (See specifications in Annex 4). Based on the assessments and engineering studies conducted under Outcome 6, levees, small dams may be constructed, repaired or upgraded to face increased flooding risks.

This set of activities will be undertaken in collaboration with – and based on knowledge from – ongoing disaster prevention initiatives in and around project sites. These activities will also benefit from the activity included above to strengthen district-level capacity to integrate infrastructure maintenance in their regular programmes.

Outcome 3: Adverse impacts of climate change on water supply and quality averted

The project will also address the adverse impacts of climate change on water supply and quality in coastal areas. In areas they have been inundated due to coastal erosion and sea level rise, the project will support the relocation of shallow wells and boreholes to safer areas, taking into consideration potential sea level rise and the risk of saltwater intrusion in groundwater aquifers. The relocation of boreholes and shallow wells will be undertaken based on a comprehensive environmental and social impact assessment³¹ as per national standards and regulations and appropriate hydro-geological studies that will determine recommendations for relocation based on climate scenarios, social impacts (particularly on women) and on potential environmental impacts. In order to avoid SLR impacts on health, extraction rates, that can exacerbate saltwater intrusion, will also be reduced and monitored in order to avoid groundwater depletion. This relocation and redesign of boreholes will be undertaken as per specifications in Annex 4.

In both zones, the project will also assist in the rehabilitation or upgrading of existing water extraction, transport and conservation infrastructures (e.g. underground cisterns, small retention dams, rooftop harvesting where feasible, pipes). This will be undertaken alongside activities in component 2 that aim to assist crop-appropriate irrigation systems in areas where rainfall is likely to become unpredictable.

This component therefore contains activities related to the physical works needed to protect and rehabilitate vital infrastructure from climate change impacts; it is to be undertaken in

³¹ The potential negative impacts of borehole relocation (e.g. from decommissioning to construction) include soil trampling if the water point is to be used by livestock, the immediate impacts of construction (for transport and surrounding structures, e.g. fountains, troughs, pumps, cisterns or pipes), increased time delays for fetching water for those located at a distance in the absence of adduction structures, and groundwater depletion in case extraction rates are not monitored. These potential impacts will be carefully weighed against the benefits of having access to potable water for targeted communities, and risk mitigating strategies will be proposed in the ESIA studies. In cases where the ESIA studies recommend against borehole or well relocation, the allocated budgets will be used to develop alternative water supply mechanisms, such as pipelines and adduction from main water systems.

conjunction with activities under Component 3, that provide softer protective measures based on ecosystem rehabilitation and services.

Component 1 - Indicative activities

Activities	Outputs	Indicator	Target	Baseline	Means of Verification	Sites		
Component 1 - Addressing climate change impacts on key infrastructure and settlements						1- Mtwara	2- Dar*	3- Muheza
<i>Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced</i>								
Rehabilitate coastal protection facilities to protect settlements economic and cultural infrastructure	Sea wall raised or rehabilitated in areas showing particular damage	Length of sea walls raised and rehabilitated (m)	functional seawalls where appropriate in each sites by end of project	Dar es salaam seawall at ocean road showing signs of severe degradation	visual observation, engineering reports		x	
<i>Outcome 2 - Adverse impacts of floods averted</i>								
Cleaning up of the drainage channels, dredging of estuaries, installation of floodgates, 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	at least a 15% increase in drainage capacity	drainage is insufficient as seen by flooding incidents in targeted sites during heavy rains	visual observation, engineering reports		x	x
<i>Outcome 3 - Adverse impacts of climate change on water supply and quality averted</i>								
Rehabilitation of resilient water mobilization 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	N-A	project reports, questionnaires, household surveys	x		x
Relocation of water extraction and conservation structures in coastal areas to avoid salinization	Boreholes and wells showing signs of salinization relocated, on the basis of ESIA studies	% reduction in saltwater intrusion in coastal boreholes and wells	% salinity below national and WHO standards in relocated boreholes	tbd water quality study	visual observation, engineering reports, environmental and social impact assessment studies	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 as the key productive sectors among non-urban communities in the coast. 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.

Outcome 4: Livelihoods are sustainable, diversified and resilient.

In Tanzania, agriculture accounts for about half of gross production, and employs about 80 percent of the labor force. Agriculture in Tanzania is primarily rain-fed, with only 2 percent of arable land having irrigation facilities – far below the potentially irrigable share (FAO, 2009). Tanzanian yields, especially of staple foods like maize, are particularly susceptible to adverse weather events. This threat has been recognized in Tanzania’s National Strategy for Growth and Reduction of Poverty which identifies droughts and floods as among the primary threats to agricultural productivity. Given that climate change is likely to increase these adverse effects and variability, adaptation activities in the agriculture sector should focus on providing added resilience to productive assets in rural areas. Models developed by the World Bank indicate that “scenarios with the greatest increase in precipitation volatility and the largest changes in temperature volatility the median climate outcome in the future may lead to 24.3 to 89.7 thousand additional poor. Individual GCM results show climate-induced interannual poverty increases as high as 700,000 in some cases”³². Reducing vulnerability to climate change impacts in the agricultural sector therefore entails providing communities with the means of increasing productivity while shielding them from climate shocks. This is generally achieved through a combination of better technology and management of natural resources, together with the development of suitable and resilient alternative sources of livelihoods.

For agriculture, activities will focus on promoting efficient crops and cropping methods, including mechanization where it is lagging more particularly for maize, cassava and sorghum. In areas that are already under dryland conditions, irrigation technology and systems will be further disseminated in anticipation of rainfall regime modifications³³. Alternative suitable 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 opportunities³⁴. In the case of key cash crops, such as cotton, coffee, bananas, or nuts, organic production technologies will

³² see for example *Climate Volatility and Poverty Vulnerability in Tanzania*, Syud Amer Ahmed et al., World Bank Policy Research Working Paper 5117, 2009

³³ Mtwara Socio-Economic Profile, 2000.

³⁴ MAKING AGRICULTURE IMPACT ON POVERTY IN TANZANIA: THE CASE ON NON-TRADITIONAL EXPORT CROPS, Prof. H.K.R. Amani, Economic and Social Research Foundation, Paper Presented at a Policy Dialogue for Accelerating Growth and Poverty Reduction in Tanzania, Held at ESRF, Dar es Salaam, 12th May 2005.

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. These activities combined are aimed at achieving at least a 15% increase in productivity in targeted areas, that would be maintained in the face of climate change. They have been selected based on an analysis of existing and functioning coping mechanisms already under implementation in some parts of the country³⁵.

In order to promote better management of forests, and to reduce deforestation in all sites, therefore maintaining soil fertility, protecting shorelines and creating buffer areas, 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 and charcoal. In appropriate areas, agro-forestry will also be implemented as part of a diversification strategy.

Component 2 – Indicative activities

Activities	Outputs	Indicator	Target	Baseline	Means of Verification	Sites		
Component 2 - Resilient livelihoods						1- Mtwara	2- Dar*	3- Muheza
<i>Outcome 4 - Livelihoods are sustainable, diversified and resilient</i>								
Promote resilient agricultural practices	agricultural tools, materials, and sustainable technologies and approaches transferred	% change in agricultural productivity;	15% increase in agricultural productivity	agricultural productivity is insufficient to ensure food security in targeted sites	reports, household surveys	x		x
	irrigation technology and equipment transferred in areas subject to drought or erratic rains			irrigation is only marginally available in targeted sites.		x		x
	Introduction of alternative resilient crops and crop management methods				reports, visual observation, mangrove and forest studies	x		x

³⁵ Government of Tanzania, Vice President's Office, Climate Change Assessment 2009.

	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	N-A	reports, visual observation, mangrove and forest studies	x	x	x
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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. It is designed to be implemented as a complement to activities in Component 1, in order to form a comprehensive package of protection from climate change impacts in coastal regions. This component also comprises activities designed to achieve policy linkages and as such is closely linked to activities included in Component 4.

Outcome 5: Coastal ecosystems are rehabilitated and ICAM is implemented.

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 (see Annex 5 for a visual representation of the coordination of the various activities in each project site). 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 proposed 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: Mangroves act as natural buffers against tidal pressure, storm surges and coastal erosion. Because they are populated with salt tolerant tree species, they also prevent saltwater intrusion into upshore ecosystems, such as wetlands, or aquifers. Mangroves provide breeding grounds for various species of fish, crustaceans and birds that provide a livelihoods when climate shocks cause crop losses. Promoting mangrove growth inland in response to sea level rise and related inundation provides a cost effective way of protecting coastlines. Other, non climate change related benefits of mangroves include: nutrient uptake, fixation, trapping and turnover; carbon sink and sequestration; secondary production via grazing and decomposition of mangrove plants; sediment trapping that helps reduce turbidity of coastal waters; food resources for animals; occasional forest products like timber and firewood. In addition to the above,

this measure is likely to add extra value by averting losses from natural hazards not directly related to climate change such as reducing tsunami damage risk. This blend of ecosystem services makes mangrove rehabilitation and conservation a cost effective no-regrets adaptation measure.

- **Coral reef rehabilitation and protection** in coastal sites: Coral reefs provide similar services to coastal ecosystems as mangroves above. By acting as a natural barrier against wave and tidal action, reefs provide protection against erosion and storm surges. Reefs also constitute habitats for fish and marine life, and are the basis of tourism in many countries, including Tanzania. As an example, a mass coral bleaching event near Zanzibar in 1998 caused a 20% decrease in tourism revenues.
- **Beach nourishment, coastline reforestation** (trees and grasses): Beach nourishment or replenishment involves transporting and depositing sand from elsewhere to the depleted area. As such, it creates a buffer space between infrastructures and the sea. Broader beaches can reduce storm damage to coastal infrastructures by dissipating energy across the surf zone and beach rather than impacting upland structures and infrastructure. Beach nourishment is most effective when implemented along with erosion-reducing measures, including hard structures that minimize sediment transport, or reforestation that helps stabilize shorelines and dunes. Beach nourishment is known to have economic benefits particularly for the touristic industry that depends on it. Reforestation and revegetation of shorelines helps stabilize sloping areas when trees and grass roots act as sediment retainers. Roots also absorb water from the soil, allowing the trees to act as natural storage tanks of freshwater, and slowing the loss of rainwater from the ecosystem through runoff.
- **Dune stabilization** through grass barriers: Sand dunes are common features of shoreline environments. Dunes provide habitat for highly specialized plants and animals, including rare and endangered species. They can protect beaches from erosion and recruit sand to eroded beaches, while acting as buffers between beaches and settled areas. Revegetation, using trees, shrubs and grasses and fencing are among the most frequent methods of dune protection.
- **Shoreline management and rehabilitation**, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones: Shoreline management refers to the combination of various physical approaches detailed above along with low-cost physical barriers such as stone dikes. It also includes policy-based approaches, such as retreat, and the institution of no-build or no-take zones. In Tanzania the mandatory no-build zone is 60m from the sea, a standards that would need to be revised in light of sea level rise. Enforcement of no-build zones is usually undertaken by city councils and district administrations, while the enforcement of no-take zones (or conservation areas) will be undertaken through a combination of community-based management systems, NGO participation and surveillance, and government-based enforcement systems.

The adaptation measures proposed by the project comprise a portfolio of measures taken out of a shortlist of 150 different adaptation measures found as cost – effective and most

promising ones out of a total of 600 measures evaluated by UNEP in the frame of the UNEP-GEF McKinsey study³⁶ on economics of adaptation.

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 and no-build 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.

Component 3 – Indicative activities

Activities	Outputs	Indicator	Target	Baseline	Means of Verification	Sites		
Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)						1.Mtwar	2.Dar	3.Muheza
<i>Outcome 5 - Coastal ecosystems are rehabilitated and ICAM is implemented</i>								
Coastal 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	15% increase in mangrove coverage and health	mangroves are showing signs of degradation and encroachment in targeted sites	reports, visual observation, mangrove and forest studies	x	x	x
	Coral reef rehabilitation and protection in coastal sites	% change in reef coverage and health	10% increase in reef coverages and health by end of project	reefs show signs of bleaching and death due to pollution and unsustainable fishing methods	visual observation , project reports	x	x	
	Beach nourishment, coastline reforestation (trees and grasses)	Km of beach restored	200km	no beaches under restoration in targeted sites	visual observation , project reports	x	x	x

³⁶ Shaping Climate-Resilient Development, The McKinsey Group, 2010.

http://www.mckinsey.com/App_Media/Images/Page_Images/Offices/SocialSector/PDF/ECA_Shaping_Climate%20Resilient_Development.pdf

		Shoreline management and rehabilitation, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones	Km of shoreline rehabilitated	200km	no shores under rehabilitation in targeted sites	visual observation , project reports			
							x	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 approved	Number of plans approved	1 plan	no plans yet available but ICZM capacity exists	project reports, plans and policies			

Component 4 – Knowledge, monitoring and policy linkages

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. This component builds on what currently exists in the country, as well as on approaches and methods that will be implemented through this project, specifically in Components 1 and 3, so as to generate policy-relevant knowledge.

Outcome 6: Knowledge of climate impacts and adaptation is increased

Knowledge generation, dissemination and management will be mainstreamed throughout the activities of the project, and will include the following functions:

- Stocktaking and assessment: 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). Key information gaps will also be filled under this umbrella, including through an assessment of coastal infrastructure vulnerability and adaptation needs that will provide technical and engineering assessments required for continued and upscaled adaptation in the region.
- Monitoring and assessment: 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. Assessment of the economic viability and practical feasibility of adaptation measures (i.e. through undertaking cost-benefit analyses) to identify successful adaptation measures and using this information to revise policy will be made under this component.

The key coordinating mechanism for the knowledge management component of this project will be a newly-created Climate Change Observatory for Tanzania (CCOT)³⁷, which will be a network institution that will bring together all relevant stakeholders and information through a clearing house function. The CCOT will be housed within the Vice President’s Office, which will serve as coordinating focal point and data share-point for a network of national and international partners. Its broad mandate will be to centralize and distribute scientific and technical information related to climate change impacts. Project financing will be used to set up the institution, gather data and create databases, and institute information sharing protocols among the various partners. The initial focus, as supported by this project, will be on gathering information relevant to coastal and lakeshore areas.

- Policy linkages: In addition to these activities, the project will support the creation of policy linkages, allowing lessons from on-the-ground activities to be elevated to the attention of policy makers and planners in various ministries, including for the reconstituted National Climate Change Steering Committee (NCCSC)³⁸. This will entail a regular gathering of project successes and challenges and their translation into policy briefing materials for policy makers in order to facilitate mainstreaming, as well as the organization of periodical awareness seminars for sectoral partners and government representatives. In addition, as part of this activity, and in direct support of activities under Outcome 3, district-level infrastructure maintenance programs will be reviewed or renewed and district level administrations will be assisted in setting aside budgetary allocations so that rehabilitated infrastructures are appropriately maintained in the long term.

Component 4 – Indicative Activities

Activities	Outputs	Indicator	Target	Baseline	Means of	Sites		
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³⁷ Although its name indicates a broad focus on all climate change issues, the project will support the initial set up of the institution focused on coastal and lakeshore regions. Future expansions of the CCOT mandate can be undertaken as part of a broader upscaling strategy for the project.

³⁸ NCCSC is a high-level officials body to coordinate climate change issues in Tanzania

							Verification				
Component 4 - Knowledge, monitoring and policy linkages											
								1. Mtwara	2. Dar	3. Muheza	
<i>Outcome 6 - Knowledge of climate impacts and adaptation measures is increased</i>											
stocktaking and assessment	available knowledge, science and data gathered for project implementation	availability of a comprehensive baseline study for project indicators; available knowledge gathered	1 baseline study in year 1	no such study	project reports						
	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						
	Coastal infrastructure adaptation needs assessment and design study (enabling)	availability of technical specifications on coastal infrastructure vulnerability and adaptation needs	by end of first year	no such study	project reports						
monitoring	A climate change coastal observatory for Tanzania for ongoing monitoring of CZM and Coastal environmental status and scientific research	effective implementation of clearing house function	clearing house function is operational by mid-term	no such function	project reports, institution reports						
	Assessment of the economic viability and practical feasibility of adaptation measures (i.e. through undertaking cost-benefit analyses)	cost-effective measures are identified for upscaling and policy uptake	measures are identified for upscaling and policy uptake on an ongoing basis	ad hoc assessments available but none specific to this project	reports from climate observatory, project reports						
policy linkages	lessons learned from the project outputs documented and integrated into policy making	number of policy briefs provided to key sectors and regulators; number of workshops	5 briefing notes per year; 4 workshops during the project	no notes; no workshop	project reports; briefing materials; workshop reports						
	district level administration have the capacity to adequately manage rehabilitated infrastructure	Amount dedicated to infrastructure maintenance from district budgets	each district earmarks appropriate annual allocations for infrastructure maintenance.	infrastructure budgets within district administrations are low	project reports, plans and policies, district-level budgets	x	x	x			

The activities portrayed above in Components 1, 2 and 3 are designed to be implemented in an integrated manner at local level in all three project sites. As a whole these components form a package of interventions designed to achieve the overall intended project objective, which is to

reduce coastal vulnerability in Tanzania. Annex 5 provides an illustration of the linkages, complementarity and articulation between activities in project sites.

The general model used for this project is one that has been tested in many UNEP and other Agencies projects on adaptation in previous years. It combines targeted protective investments (coastal protection works) with activities designed to rehabilitate ecosystems for resilience services (rehabilitation of buffer systems such as beaches, reefs, and mangroves), while activities targeted at improving livelihoods are aimed at removing the barriers to adaptation. All three pillars of this project are therefore closely linked to one another in achieving the objective of coastal resilience. For example, interventions focused only on protective infrastructures would not be efficient or sufficient to ensure coastal protection if the buffer ecosystems were continuously destroyed or degraded; and these systems would continue to be degraded if communities living around them do not benefit from alternative means of livelihoods and of incentives to ease their pressures on fragile natural resources (an existing adaptation barrier). This is the basis for an ecosystem-based approach to adaptation, and a model that has been implemented or adapted in countless adaptation projects to date.

2. 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 3 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.

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.

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

Vulnerable groups targeted by this project include:

- **Rural communities** who are among the poorest in Tanzania and whose livelihoods are highly dependent on climate. Vulnerable groups among the rural poor include women and women-headed households, unemployed youth.

- **Farmers** who depend on crop agriculture for their livelihoods. Crop cultivation is prevalent in coastal areas and employs the majority of population in Tanzania, while not ensuring food security, particularly in times of climate shocks such as droughts or floods.
- **Fisherfolk** who, due to the degradation of fragile ecosystems such as mangroves and reefs, have seen fish stocks dwindle and have resorted to illegal fisheries to ensure food security.
- **Small Businesses** such as tourism enterprises whose investments are at risk from sea level rise and increased variability, private sector and informal enterprises who lack adequate assets for productivity and profitability.
- **Urban dwellers** in both formal and informal settlements who are at risk of losses to life and property from sea level rise and increased flooding, lack of sanitation and decreases in access to safe water.

Annex 3 contains additional socio-economic data on the various sites.

The Ecosystem Based Adaptation approach used in this project will provide multiple environmental benefits, as explained under Component 3. 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. Other environmental benefits to be accrued by this project include nutrient cycling and water purification, groundwater recharge, coastal protection, habitat and nurseries, and carbon sinks. 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.

A recent study, supported by DFID, focusing on The Economics of Climate Change in the United Republic of Tanzania, came to the following findings regarding the costs and benefits of adaptation in Tanzania's coastal zone:

“ The results show that when adaptation is applied, in the form of coastal protection (to address floods) and beach nourishment (to counter erosion) the potential impacts and economic costs can be significantly reduced, with the number of people at risk of flooding reduced from 0.3 - 1.6 million per year in 2030 (no adaptation) to 0.04 to 0.1 million per year (with adaptation) with even larger reductions in later years. Similarly, the costs of climate change fall from up to \$55 million / year in 2030 (2005 values, undiscounted) to under \$20 million / year (with adaptation). The benefits are even larger in the later years.

The analysis also shows that adaptation is cost-effective, and has high benefits when compared to costs. Even so, the costs of adaptation are considerable, estimated at \$30 to 80 million / year by 2030 (2005 dollars undiscounted) depending on the sea-level rise scenario, rising potentially to \$35 to 120 million / year by 2050. Note that even with these measures, there will be residual damages (including to coastal wetlands). It is highlighted that even under a case of no sea-level rise, the costs of protection would need to rise to address rising population and assets.

The results also show that there is a significant need for a current strengthening of coastal

*adaptation (to cope with the current risks). Other key actions include the need for improved monitoring of both sea level and extreme coastal events (a key step in building adaptive capacity), further work to address spatial and development planning policy for current and future flood risks (especially in key hot spots), improved disaster risk reduction, and the need to move towards integrated coastal zone management (ICZM) to allow iterative and flexible decision pathways to address future climate change.*³⁹

³⁹ The Economics of Adaptation in the United Republic of Tanzania, 2011.

3. 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.⁴⁰ 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.

The effectiveness of the adaptation measures implemented by the project will be tested and measured during the course of the project. This will involve undertaking an economic analysis and performing cost-benefit analyses to ascertain whether each activity is an economically viable option given climate change (under Component 4). The most successful activities will be prioritized for upscaling to neighboring communes/districts and provinces and details regarding their implementation will be disseminated widely through the project's knowledge mechanisms (Component 4).

⁴⁰ 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 than engineered measures alone. Reid, H. and Huq, S. (2005)

Cost Benefit Analysis

For activities included in Component 1, which includes mostly works of a physical nature and targets infrastructures, costs have been distributed towards the most urgent required rehabilitation measures. It is postulated that priority infrastructure needs should be addressed as a matter of urgency, but that a comprehensive package of interventions that includes also activities in Component 3 (ecosystem-based adaptation) will be most effective in achieving adequate coastal protection.

As regards the coastal area, the Tanzania National Communication estimates potential damage from sea level rise to at least 50 billion Tanzanian shillings. It is estimated that a limited number of well-conceived and resilient sea walls can protect large stretches of shoreline, particularly when combined with ecosystem-based measures such as mangrove restoration, reef rehabilitation and shoreline revegetation. The average duration of a seawall can reach upwards of 30 years, with proper maintenance. Consequently, this project will support the rehabilitation or upgrade of existing degraded sea walls in areas at high risk of increased sea level and wave action; the area identified for priority action is centered around Dar es Salaam city, in the area of Ilala district, where many key economic, social and cultural assets are located, and are in danger of inundation in case of sea level rise (State House, Hospital, commercial buildings, foreign embassies, hotels, ferry terminal, fish market).

Activities designed to rehabilitate drainage systems are aimed at reducing damage from floods. Benefits from these activities generally include: reduced flood damage to public and private facilities, land value enhancement, Reductions in traffic delays, Reduced economic losses, clean-up and maintenance costs, Reduced emergency relief costs, increased possibilities for recreation opportunities (in or around nature-based systems), alleviation of health hazards and waterborne diseases, Reduced risk to life and improved water quality⁴¹. Depending on the type of drainage system (natural or engineered), costs will vary. 'engineered systems are typically used in highly urbanized areas (underground drainage and filtering systems), whereas natural systems such as ponds, biofilters or basins can be used in less urbanized areas.

As regards the proposed activities designed to rehabilitate and protect water infrastructure from climate change impacts (sea level rise as well as precipitation volatility), this project will ensure a resilient supply of safe potable water for vulnerable communities, their livestock and agriculture. The relocation of currently inundated or high-risk boreholes in the coastal area will help ensure continued health and productivity. In addition, the rehabilitation of water extraction and conservation structures, will lead to the expected added benefit of increased productivity in most cases (through provision of rainwater harvesting and irrigation structures). On the other hand, failure to address these issues in the short time could lead to accelerated migration towards urban centers, exacerbating existing pressures on land, and bringing the associated social costs of migration, including potential conflicts.

⁴¹Grigg, N. Benefits and costs of urban drainage and flood control projects, in *Effects of Urbanization and Industrialization on the Hydrological Regime and on Water Quality*, IAHS-UNESCO,1977.

Activities included in Component 2 bring costs that are related to the provision of strategic technical advice, capacity building, as well as the acquisition or upgrading of productive assets. The expected benefits of the activities that focus on livelihoods are numerous, and overall culminate in a reduction in poverty levels in all targeted locations. As mentioned above, the provision of irrigation infrastructure could bring about a 50% increase in productivity, and this combined with the dissemination of best land, water and crop management techniques, could lead to significant jumps in quality of life for targeted communities. This increase in productivity could lead to increased revenues, providing safety nets for communities in case of climate shocks, while alternative sources of economic livelihoods will also provide added resilience to targeted communities faced with erratic climate conditions. Cost-benefit analyses undertaken in the UNEP-GEF McKinsey Study⁴² on the Economics of Adaptation demonstrate clearly that a country can prevent much of its expected losses through measures with relatively low cost, and that for most of the measures identified, the economic benefits – primarily in the form of growth in the value of agriculture – exceed or closely approximate the costs, including in some cases (depending on climate scenarios), the use of infrastructural measures.

The expected benefits of ecosystem rehabilitation included in Component 3 are also proportionate to the costs of such activities. Ecosystem services provided by healthy ecosystems are difficult to value; however, there is growing evidence as to the cost-effectiveness of these measures. For example, 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. Another case study, in Jamaica, supported by UNEP⁴³, demonstrated that coral reefs explained or influenced 83% of the beach erosion, with the width of coral reefs playing the main role (59%) in reducing erosion. Furthermore, seagrasses explained 41% of the beach erosion, with the width of seagrasses playing the main role (47%) in reducing erosion. Ecosystem-based adaptation measures have multiple benefits for the environment and livelihoods that often exceed their costs and help prevent climate induced losses.

Adaptation options that were considered but not retained for this project for reasons of cost-effectiveness or feasibility include:

- The construction of new sea walls and the rehabilitation of all sea walls in major coastal settlements.
- The use of engineered structures alone as means of adaptation for the coastal zone
- The relocation of port infrastructure
- Construction of dams and dykes against flooding
- Construction or rehabilitation of groyne systems
- Resettlement of coastal populations

⁴² Shaping Climate-Resilient Development, The McKinsey Group, 2010.

http://www.mckinsey.com/App_Media/Images/Page_Images/Offices/SocialSector/PDF/ECA_Shaping_Climate%20Resilient_Development.pdf

⁴³ As illustrated in the UNEP Regional Seas programme report: Using ecosystems to address climate change –Ecosystem based adaptation, 2010.

- Potable water transports and transfers
- Desalination
- Ex situ coral reef nurseries.
- Provision of resilient species of livestock
- Aquaculture

Below is a more detailed analysis of expected social, environmental and economic benefits of this project:

Activities	Expected Project Benefits		
Component 1 - Addressing climate change impacts on key infrastructure and settlements	Economic	Social	Environmental
<i>Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced</i>			
Rehabilitate coastal protection facilities to protect settlements economic and cultural infrastructure	<p>Increased Lifespan of the Coastal infrastructure for sustained economic development (i.e. buildings, hotels, hospitals, roads and private residences,) and increase the value of land along a 1.23 km stretch of the Ocean Road in Dar es Salaam. While it is difficult to estimate the economic value of the assets to be protected, the investments located in the area can be said to be worth millions.</p> <p>Currently, about 8% of the land area of Dar es Salaam, 140,000 people, and economic assets worth more than \$170 million, are below the 10m contour line, i.e. in potentially vulnerable areas, with 31,000 people considered at risk from sea level rise. By 2030, without adaptation, this will increase to more than 100,000 people and over \$400 million assets⁷⁴.</p>	Maintain the socially and culturally respected areas i.e. Mosque, Churches, Museum, and communication systems, ensure transport and circulation of goods and people, protection of property. The area is home, among others to the State House, a Hospital, a Ferry terminal, a Museum, Botanical Garden, Golf Course, Hotels, Embassies and Residences.	Reduction of the rate of coastal erosion, conservation of ecosystems.
<i>Outcome 2 - Adverse impacts of floods averted</i>			

⁴⁴ The Economics of Climate Change in the United Republic of Tanzania, Global Climate Adaptation Partnership, 2011.

Activities		Expected Project Benefits		
	Cleaning up of the drainage channels, dredging of estuaries, rehabilitation of storm drains in selected urban centers	Reduce the risk of the infrastructure damage by floods through an increase of 15% in drainage capacity in targeted sites; maintenance of property values; reductions in insurance costs and premiums; reduce losses in productivity. A recent report estimates that Individual annual climate events have economic costs in excess of 1% of GDP ⁴⁵ .	Reduce the risk of other flood related hazards such as loss of household assets, loss of life; maintain communication and circulation channels. Reduction of waterborne diseases (i.e. malaria, cholera) and water pollution. With no adaptation, the expected number of people at risk of annual flooding is estimated at 0.3 to 1.6 million people per year by 2030, rising to 1.0 to 2.1 million people per year by 2050. ⁴⁶	Reduce damage to environment.
Outcome 3 - Adverse impacts of climate change on water supply and quality averted				
	Rehabilitation and construction of resilient water mobilization (extraction, storage) structures along with sustainable water extraction and management practices	Improve water provision for various uses including economic activities. Increased Food security. Reduces flood risks. It is expected that this project will help achieve a 15% increase in safe water availability in all seasons in rural or peri-urban areas where water demand is not fully satisfied (for example, in some areas of Bagamoyo district where only 50-60% of water demand is satisfied)	Improve public access to safe and clean water. The project is expected to facilitate a reduction in waterborne diseases of at least 10% in targeted sites.	Reduction of Waterborne Diseases and Increase of Clean water
	Rehabilitate or relocate water extraction and conservation structures in coastal areas to avoid salinization.	Improve the lifespan of the waterworks facilities; saving time for other economic activities. The project expects to decommission 6 inundated wells, and to rebuild them further from the coast where salinity and inundation present less risks.	Improved availability of water for domestic, agriculture and industrial uses. Improved health and reduced morbidity. This activity is expected to benefit approximately 300-500 households (in areas outside of Dar es Salaam). Relocated wells are expected to demonstrate levels of salinity below WHO for drinking water.	Availability of Safe and Clean water. Newer wells will use cleaner extraction technologies, with reduced pumping rates, contributing to groundwater maintenance.
Component 2 - Resilient livelihoods				
Outcome 4 - Livelihoods are sustainable, diversified and resilient				
	Promote resilient agricultural practices	Enhance agriculture productivity; increased income; increased production. Without adaptation, it is expected that where rainfall decreases by up to 15% average maize yields could decrease by up to 16% by 2030 ⁴⁷ . The project therefore seeks to leverage at least a 15% increase in	Improve community food security and well being.	maintain soil fertility; maintain water quality and quantity; maintain biodiversity.

⁴⁵ The Economics of Climate Change in the United Republic of Tanzania, 2011.

⁴⁶ Id.

⁴⁷ Sokoine University of Agriculture, Morogoro, Tanzania

Activities		Expected Project Benefits		
		current productivity levels, to a level that can be maintained in the face of climate change.		
	Promote alternative energy for avoided deforestation	Promote low carbon growth economy through the use of renewable sources of energy; increased economic productivity and income. This is also expected to reduce the energy burden to poor rural families by promoting cheap, reliable and sustainable energy sources.	Reduced smoke related health hazards due to firewood and charcoal (i.e. Health Centres and Dispensaries) and therefore health costs.	Reduces Greenhouse Gases emissions and decreased deforestation; maintained soil fertility; carbon sinks; maintained biodiversity. The project seeks to achieve a 10% decrease in deforestation rates in targeted sites (non-urban).
Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)				
<i>Outcome 5 - Coastal and shoreline ecosystems are rehabilitated and ICAM is implemented</i>				
	Coastal and shoreline ecosystem rehabilitation for climate resilience through the implementation of a GreenJobs program	Enhance livelihood of coastal communities; job creation; increased income; reduced coastal losses. An estimated 100 jobs will be created through the GreenJobs Program. Economic assets in the coastal zone will be protected (see above).	Improved Social security and services; protection of infrastructure and property; avoided losses due to erosion. An estimated 100 young people are expected to participate in the GreenJobs program.	Protection of coastal environmental systems and increased climate change resilience; creation of buffer ecosystems; increased ecological services (water, soil, fisheries; biodiversity). The project is due to restore 200Km of beach and shoreline (spread across three sites – beach nourishment to take place in Muheza and Mtwara along 10km of eroded beach), and expects to create a 15% mangrove regeneration rate, as well as a 10% reef coverage increase by the end of the project. It is difficult to estimate the economic value of these interventions as they could be far reaching.

4. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

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)⁴⁸ 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. It is also in line with the Government with the newly adopted *Kilimo kwanza* government directive aiming at improving agriculture as the major sources of national income and livelihood.

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 Joint programme implemented by development partners in Tanzania.

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

⁴⁸ ICM Strategy, 2003.

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 enshrined in the Environment Management Act of 2004), as well as procurement and tender rules. Best international standards will also be respected in the development and rehabilitation of coastal protection structures.

The EIA regulations provide a clear and transparent process for evaluating impacts of projects from screening to ministerial decision and including access to information provisions. The associated regulations provide a list of projects requiring mandatory EIA, including (as relevant to this project):

- Water resources development projects (dams, water supply, flood control, irrigation, drainage)
- Biological Pest Control
- Introduction of new breeds of crops.
- Introduction of new tree species and development of forest plantation
- Dredging of bars, groynes, dykes and estuaries

A number of other smaller-scale activities included in this project are subject to registration under the EIA regulations but may not require an Assessment. The Act further provides the timing and responsibilities of the various stakeholders throughout an EIA process. Activities that are likely to be subject to EIA regulations include budgetary provisions for the process. Preliminary assessments conducted within the Ministry of Public Works and the Vice President's Office indicate that the proposed activities, although subject to EIA procedures, will not present undue environmental negative impacts. In the case where un-anticipated negative impacts lead the detailed EIA to recommend against a proposed activity, a more suitable intervention will be designed to achieve similar objectives, subject to approval from project Committees. For a preliminary environmental and social impact screening, see Annex 8.

Interventions focused on water quality will adhere to the Tanzania Water Quality Standards (TZS 789:2008) that set threshold limits for salinity, turbidity and organic or inorganic content, along with microbiological requirement. These standards, along with the WHO standards for salinity, will be followed in assessing groundwater quality.

Building codes and other construction will also be undertaken in adherence with the Land Use Planning Act of 2007 which, among others, indicates matters to be included in land use plans.

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.

Interventions targeting ecosystem rehabilitation will be planned and undertaken in accordance with the above, as well as the relevant sectoral laws and regulations including the

Land Use Planning Act, the Integrated Environmental Coastal Management Strategy, the Forestry Act (2002), Environmental Management Act (2004).

6. 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 related projects can be found in the Annex. To date, no other project has tackled, to the level sought 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. Joint implementation management mechanisms between the two projects will be pursued, and the LDCF project will be expected to make contributions to the knowledge components of this initiative, through participation in the Climate Change Observatory. In addition, the LDCF project will seek to pilot innovative technologies and approaches that could provide insight to this project, but will not be implemented here (for example innovative adaptation financing mechanisms). At the same time, the LDCF project is expected to help fill the gaps that this AF initiative cannot fill (from a geographic perspective, for example by rehabilitating protective infrastructure and water extraction points in other areas), and so the two projects are to be considered complementary. In cases where it is administratively feasible, joint procurement and execution arrangements will be sought for similar works in order to reduce costs and delays.

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. During the inception period, a thorough assessment of ongoing relevant initiatives and programs will be made, and stakeholders and partners will be invited to participate in project Committees, as well as in the Climate Change Observatory, which will act as a chief knowledge coordinating mechanism. The Project Steering Committee may create technical task forces or sub-committees to allow for coordination on specific adaptation-related themes, if required by partners, in order to allow broadest participation. This could include a sub-committee comprised of Project

Managers from relevant initiatives who will meet on a regular basis to coordinate and seek opportunities for synergistic implementation.

7. 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. These include stocktaking and monitoring of various project indicators, as well as the creation of a Climate Change Observatory that will function as a clearing house for information related to project themes. The promotion of policy linkages is also included in the Knowledge Management Component. In order to focus on concrete activities, however, this project focuses on the necessary elements for successful activity implementation and policy linkages, and will work with other projects and initiatives to disseminate information as cost-effectively as possible.

8. 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. This project has been discussed at highest levels, including through reports to Parliament as well as through the Climate Change Steering Committee. Various other partners were consulted, including bilateral donors active in the regions targeted or in the country on themes relevant to this project. Further discussions on the formalization of roles and contributions are expected to take place during inception.

The Vice President’s Office has undertaken consultations with key line ministries and other stakeholders who will be called upon to play a role in this project. Each ministry listed below will participate to the project through national-level contributions as well as through their decentralized offices at district and local levels.

Stakeholder	Expected participation in the project
Prime Minister’s Office- (1) Regional Administration and Local Governments (PMORALG) and (2) Investment and Empowerment (PMO IE)	PMORALG will serve as key liaison between the project and local administrations. It will provide oversight and an overall policy supervision function so that activities to be delivered at district level are undertaken in accordance with policies regarding decentralization, and delivery of district budgets. PMO IE will provide policy level guidance on empowering local communities to sustain adaptation measures that will be instituted in the project areas.

Ministry of Foreign Affairs and International Co-operation	The Ministry will play an advisory role in this project, provide advice on best practices for adaptation and on linkages between national institutions and the MIE; the Ministry will also serve as relay between the project and the Adaptation Fund Board.
Ministry of Finance	The Ministry will participate in providing assistance to local authorities in mainstreaming climate change into their local development plans. The Ministry will also coordinate and oversee financial flows between national and local-level partners. The ministry will participate in activities related to assessment of cost-effectiveness, be informed of analyses related to the costs of adaptation, and will also participate in awareness raising efforts towards policy uptake.
Ministry of Industry, Trade and Marketing	The Ministry will provide advice on linkages with the private sector, particularly as regards tourism, labeling and codes of conduct for ecotourism, and trade development for livelihoods components of the project, specifically fisheries.
Ministry of Agriculture, Food Security and Co-operatives	The ministry will be responsible for coordinating and delivering the project components related to agriculture, particularly as regards the provision of technical inputs, enhanced crops and other technologies for agricultural productivity. The Ministry also provides support to the extension of irrigation infrastructures to the project zones.
Ministry of Natural Resources and Tourism	The Ministry will be responsible for coordinating and delivering the project components related to ecosystem rehabilitation and monitoring.
Ministry of Water	The Ministry will be responsible for implementing activities related to the relocation of boreholes, water quality monitoring.
Ministry of Energy and Minerals	The ministry will provide services in order to deliver the alternative energy technologies to targeted communities.
Ministry of Works	The ministry will be responsible for developing terms of reference, procurement and monitoring the delivery of all infrastructure components of this project.

Ministry of Communication, Science and Technology	The Ministry will participate in developing the Climate Change Observatory and will work with the VPO to support its operations. The ministry will also provide linkages between the project and national research facilities.
Ministry of Health and Social Welfare	The Ministry will provide services regarding monitoring of health and vectors in project areas, through district-level health officers.
Ministry of Education and Vocational Training	The Ministry of education will provide linkages to universities and will participate in the creation of the GreenJobs program.
Ministry of Labour, Employment and Youth Development	The Ministry will operate the GreenJobs program and will provide advice on climate related education in project sites.
Ministry of Lands, Housing and Human Settlements Development	The Ministry will provide advice at national level on the integration of climate risks into land use planning, urban planning and the revision of relevant codes. The Ministry will also provide advice on enforcement of regulations.
Ministry of Community Development, Gender and Children	The Ministry will participate in the project by providing advice and guidance on the integration of gender equity and gender sensitive activities, as well as on the monitoring of community-level resilience and well-being. The Ministry will participate in activities related to livelihoods development.
Tanzania Meteorological Agency	The agency will provide climate related information, including early warnings in project zones, designed to feed into feasibility studies, impact assessments as well as resilience modeling.
The National Environment management Council (NEMC)	This agency is under the VPO and will provide support in areas related to information collation and dissemination within the project sites

The following district and regional-level administrations were consulted during the development of the project and are intended to be at the forefront of project implementation.

Temeke Municipal Council
 Ilala Municipal Council
 Kinondoni Municipal Council
 Dar es Salaam city Council
 Mwanza city Council
 Mtwara rural district administration
 Mtwara urban district administration

The following para-governmental and non-governmental (NGOs, private sector) stakeholders have been invited to participate in the project development and implementation. This list is subject to expansion once contributions and roles are formalized, during project inception, and broader consultations can take place at all levels.

National Environment Management Council	Environmental Protection and Management Services
University of Dar es Salaam including the Institute of Resources Assessment and water Resources Engineering Department	Tanzania Traditional Energy Development and Environment Organization
Tanzania Association of Tourism Operators	Tanzania Natural Resource Forum (TNRF)
Tanzania Port Authority	
Tanzania Agency for National Parks (TANAPA)	
Dar es Salaam Water and Sewerage Authority (DAWASA)	

Consultations on climate vulnerability and adaptation have been occurring at community level since the development of the National Adaptation Programme of Action in 2007. During this process, consultation with stakeholders was undertaken in 13 districts and 52 villages at local communities including Bagamoyo, Pangani, Rufiji, Mtera, Mbeya, Shinyanga and Dar es Salaam. These consultations yielded the priorities and needs that are expressed in the NAPA and that are addressed in this project.

In 2009, The Vice President's Office, with support from DANIDA, undertook a comprehensive participatory Climate Impacts Assessment, that involved local level consultations, using methods ranging from village-level focus groups and surveys (100 sampled respondents), to one-on-one interviews with local leaders, technical representatives and representatives of interest groups. The final output of this exercise⁴⁹ contains the most recent expressions of local level perceptions of vulnerability as well as an analysis of vulnerable sectors for Tanzania, including in coastal areas. Finally, more recently in 2010 and 2011, for the purposes of this project, semi-formal consultations at the local level for project development occurred in the districts of Pangani, Bagamoyo, and Ilala (around Dar es Salaam). Consultations in Mwanza and Mtwara occurred mainly informally, through communications with village dwellers, village elders and local authorities. Consultations in Dar es Salaam have continued through the office of the City Mayor (see Annex 9).

Interministerial consultations have been continuing throughout the process of project development, including a technical workshop held on January 10-12 2011, in Dar es Salaam, involving the following institutions, designed to provide technical details towards final project design:

- i). Vice President's Office-Division of Environment;
- ii). Ministry of Agriculture, Food Security and Cooperatives-Agriculture;
- iii). Ministry of Natural Resources and Tourism-Tourism;
- iv). Ministry of Transport (Tanzania Port Authority);

⁴⁹ Vice President's Office, Climate Change Impacts Assessment Report.

- v). Ministry of Works;
- vi). Ministry of Transport;
- vii). Ministry of Land, Housing and Human Settlement Development;
- viii). Ministry of Livestock Development and Fisheries-Fisheries;
- ix). Ministry of Water-Department of Water Resources;
- x). Ministry of Energy and Minerals-Energy;
- xi). Ministry of Finance-External Finance;
- xii). Ministry of Natural Resources and Tourism-Forestry and Bee-keeping;
- xiii). Dar es Salaam city;
- xiv). University of Dar es Salaam-Water Resources Engineering Department; and
- xv). University of Dar es Salaam-Institute of Resource Assessment

9. 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 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 as well as rehabilitating buffer ecosystems for increased resilience and natural protection.
- In its interventions related to livelihoods, the project supports the costs of adaptation such as 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, particularly in Dar es Salaam, 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 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 become 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. Under Outcome 1, costs are related to the rehabilitation or construction of coastal protection infrastructures:

- Raising and refilling existing sea walls in Dar Es Salaam: Existing sea walls and revetments form the baseline of coastal protection in Tanzania and constitute a significant investment in and of themselves; this project seeks to ensure that this infrastructure - which is already showing signs of degradation - remains adequate to deal with sea level rise, increased storm activity and tidal pressures. Additional costs of adaptation are therefore the costs to repair, elevate and/or strengthen the existing structures where they are showing signs of degradation and around key economic assets in Dar es Salaam, as a priority.

Elements covered under outcome 1 should be seen in conjunction with activities foreseen in Component 3, as together these activities form a comprehensive and effective coastal protection system.

Under Outcome 2, this project will fund 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. In areas where significant investments in infrastructures are ongoing (e.g. Mtwara, certain parts of Dar es Salaam), the project will support the additional cost of ensuring these investments are resilient (for example by providing models, studies and additional works where necessary). The additional costs are related to the costs of civil and environmental engineering works, such as installing biofilters, infiltration basins, or wet ponds in less urbanized areas, or the costs of enlarging underground drain systems in urban areas

(piping, connections, reservoirs). 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.

Under Outcome 3, and related to activities under Outcome 1 (relocation of boreholes) 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 salinization, coastal erosion and modified rainfall patterns. This includes the costs of providing rainwater harvesting structures where aridity or erratic rainfall are likely to increase (and as a supplement to irrigation technologies covered under Component 2) and the costs of providing additional pipelines for the transport of safe water from non salinized sources (where relocation of wells is not possible). Relocating salinized boreholes and wells is to be undertaken in cases where boreholes and wells inundated, or showing high risk of salinization due to salt water intrusion. The additional costs of adaptation will be the costs of decommissioning existing wells and construction of new ones.

Baseline Situation	Value/Cost	Adaptation Activity	Cost
There exists a sea wall around Dar es Salaam which currently protects only part of the city's low lying areas. Along Ocean Road the wall is showing signs of degradation and in some places, complete subsidence or disappearance. The average rate of erosion for the city area has been estimated about 3 – 5 m/year. ⁵⁰	The value of property potentially lost to a 0.5m sea level rise in Dar es Salaam city is 49.83 billion TShs and 85.97 billion in case of a 1.0 m rise.	Repairing and upgrading the sea wall to allow it to withstand stronger tidal pressure, currents and storm surges, along with higher mean sea levels.	3,075,000 for 1.23 km rehabilitation and upgrade along Ocean Road.
There are currently annual flooding events in each of the three project sites, during heavy rain episodes, due to the insufficiencies in the actual drainage systems ⁵¹ . This results in significantly disrupted circulation. Silted rivers also prevent rainwater from reaching sea channels, leading to coastal flooding.	Road rehabilitation, including storm drainage and roadside drainage is ongoing in Mtwara, for a 28Km portion of road. This work does not, however, take climate change or increased severe precipitation events into consideration. ⁵²	For ongoing infrastructure works, the project will provide climate-related models and analyses to better inform engineering plans. In areas where this is not being done, such as Muheza district, the project will support the costs of enlarging the drainage structures in flood-prone areas.	600,000\$ to cover the costs of 1-time works in Dar es Salaam and Muheza and the additional costs of factoring in climate change into ongoing urban structure design.
Rural Water Infrastructures in the coastal areas are inadequate to cover even baseline water demand. A number of wells are already inundated, with no ready replacement available	The value of safe water supply is not known in monetary terms.	The project will support the relocation of 10 inundated wells in Muheza and Mtwara and the acquisition of water conservation structures (cisterns) and harvesting	400,000 US\$ to cover the cost of borehole decommissioning and relocation and equipment.

⁵⁰ Kebede and Nicholls (2010) Population and Assets Exposure to Coastal Flooding in Dar es Salaam (Tanzania): Vulnerability to Climate Extremes

⁵¹ Sustainable Cities Project for Tanzania – Environmental and Social Impact Assessment for Mtwara, April 2010.

⁵² Id.

(e.g, Muheza, Mtwara rural). Each village normally has 2 or 3 water wells.		equipment for both sites.	
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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 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 community level, as a means of supporting household productivity as well as to reduce deforestation – which is also a cause of increased vulnerability.

Under outcome 4, the costs of adaptation covered by this project include:

- The costs of training, equipment, inputs and capacity building for the achievement of resilient agricultural productivity in targeted regions. This includes the costs of works to extend irrigation infrastructure and practices, resilient genetic material as well as extension services. This adaptation cost is directly related to the need for farmers to change their land use practices proactively in anticipation of changing temperatures, rainfall patterns, as well as to remove environmental degradation barriers to resilience.

Baseline Situation	Value/Cost	Adaptation Activity	Cost
Agricultural productivity in	There are ongoing	The project will support activities	650,000 to

<p>rural coastal zones is low due to lack of technical input and knowledge, as well as current climate variability. Around Dar Es Salaam, A total of 110,850 ha of land has potential for agriculture, of which over 52% is already in use (Dar es Salaam City Council, 2004). In Mtwara the area under cultivation is 270,300 ha, about 55% of the arable land in the area.⁵³</p>	<p>governmental and international efforts designed to boost agricultural productivity in many regions of Tanzania. However these do not take into account the potentially changing climate conditions.</p>	<p>related to achieving a 15% increase in productivity that would be adapted under anticipated climate change conditions; this will involve the provision and testing of adapted species and varieties, technical practices. The project will not support expansion of areas under cultivation, but rather seek an increased per hectare productivity, along with resilience.</p>	<p>support the provision of training, equipment and technical inputs for resilient agriculture.</p>
<p>90% of energy needs in rural areas are provided through the use of charcoal produced locally by felling and burning trees. Other energy supplies include fuel. In rural areas, energy needs are not entirely satisfied.</p>	<p>The cost of a 20 kg bag of charcoal is approximately 8\$ US⁵⁴.</p>	<p>The project will provide alternative energy sources such as (efficient cookstoves, small solar, solar water heaters, small hydro) to reduce deforestation by at least 10% in the targeted areas. This will increase energy supply while easing pressures on forests that provide coastal buffering and soil fertility services.</p>	<p>200,000 US\$ to support the cost of acquisition of equipment and appropriate training.</p>

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

⁵³ Options for a National Integrated Coastal Management Policy, TCMP, 1999.

⁵⁴ Site consultations

gradually disappear, and the coasts and shorelines – and the communities who live there - would be starkly vulnerable to climate change impacts.

Under Outcome 5, this project will provide funding to local institutions, working with vulnerable communities and NGOs, to support the rehabilitation and sustainable management of fragile ecosystems, such as:

- Rehabilitation of mangroves, including the costs of dredging where necessary to improve water flows, replanting of resilient and appropriate species, fencing, and capacity building for local organizations to enforce no-take zones and buffer zones.
- Rehabilitation and protection of reefs, including collection of specimens, construction and operation of coral nurseries (in situ), transport, monitoring and maintenance.
- Beach nourishment: as an element of coastal zone management, and to supplement infrastructural measures in coastal areas, beach nourishment costs cover mostly the costs of equipment and transport for sediment used to replenish eroded beaches.
- Coastal reforestation costs include the costs of purchasing seedlings of resilient and appropriate species, costs of labour for replanting as well as capacity building for the sustainable management of rehabilitated zones and the enforcement of no-take zones.
- The project will also support the additional costs of policy measures required to ensure long-term durability of coastal rehabilitation efforts, specifically the costs of capacity building for the development of Ecosystem-Based Integrated Coastal Area Management Plans.

Baseline Situation	Value/Cost	Adaptation Activity	Cost
The mangrove forests and wetlands stretch along coastal districts from Tanga to Mtwara and cover an area of more than 111,000 ha. ⁵⁵ Although there is no evidence that shows a decrease in overall area under coverage, direct visual observation reveals areas of degradation, in some areas severe (e.g. around Dar es Salaam) due to deforestation.	The value of mangroves and wetlands is not known in monetary terms. However mangroves provides ecological services that include flood and inundation protection, fisheries as well as timber products.	In order to maintain and where possible increase the resilience of mangroves and wetlands particularly for their flood protection role, rehabilitation of degraded areas, and extension of buffer zones and no-take zones in cooperation with communities.	600,000 US\$ for achieving a 15% increase in mangrove coverage in all three sites.
Beaches, reefs and shorelines in Tanzania are subject to varying degrees of erosion. Non-climate	The value of beaches, reefs and shorelines is not	The project will support the costs of rehabilitating degraded beaches and shorelines, through beach	1,425,000 US\$ to support the costs of rehabilitation

⁵⁵ The distribution and socio-economic aspects of mangrove forests in Tanzania, J. R. Mainoya, S. Mesaki, and F. F. Banyikwa,

related causes include sand and coral mining and deforestation; climate-related causes include increased tidal activity, sea level rise and storms. There are a few ongoing initiatives related to coastal management though these do not factor in the potential impacts of climate change, are site specific, and not always integrated. There is no Ecosystem-Based Integrated Coastal Area Management activity currently in Tanzania.	known in monetary terms. However, these ecosystems provide numerous ecosystem services, including protection and livelihoods, as well as economic value for fisheries and tourism.	nourishment and other “soft” ecosystem-based management options that will provide resilience against anticipated climate changes. An estimated 200km of shoreline and beaches will be rehabilitated and placed under enhanced management, as well as 600ha of reefs to be rehabilitated using innovative techniques.	works for beaches, shorelines and reefs.
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Component 4 – Knowledge, monitoring and policy linkages

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 Climate Change 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. The additional costs of adaptation under Outcome 6 are therefore related to the costs of activities required to engage in scientific research, monitoring and evaluation of climate change and its impacts, as well as the costs of assessing resilience and cost effectiveness. They are the costs of activities designed to enable stakeholders to anticipate, analyse and adapt to climate change and to ensure this project’s durability and replicability.

The project will also support additional capacity building for district administrations to earmark budgets for ongoing maintenance after the project, to ensure maximum durability for coastal protective systems. This adaptation cost covers the required change in policy and practices due to climate change, along with other enabling activities such as engineering studies and modeling studies designed to make the activities above feasible and efficient.

Baseline Situation	Value/Cost	Adaptation Activity	Cost
There have been significant investments	While it is impossible to quantify the value of	The project will contribute to increased	175,000 US\$ will provide for a

<p>from national and international sources in developing knowledge related to climate change, science and assessments focusing on the coastal zone. Currently this knowledge is dispersed among the various partners and stakeholders throughout the country, and is therefore being under-utilized.</p>	<p>existing knowledge, the value of existing programs and projects as well as scientific research and infrastructure in the country is very high, in the order of millions of US\$. However there is duplication and repetition due to a lack of centralization and coordination.</p>	<p>knowledge effectiveness by centralizing and coordinating available science and knowledge on coastal climate change impacts and adaptation, including through the Climate Change Observatory. This will lead to reduced duplication and costs and increased impacts for future interventions. There is currently no such coordination function.</p>	<p>comprehensive baseline study as well as the setting up of the Climate Change Observatory infrastructure. Project Management budgets will also provide for increased coordination and meetings among various partners and stakeholders.</p>
<p>Regarding coastal vulnerability a number of studies have been conducted, many of which having focused on Dar Es Salaam region. There is however no comprehensive technical and engineering assessment of coastal infrastructure adaptation needs.</p>	<p>The value of existing studies on coastal vulnerability can be approximated from the costs of NAPA and National Communications, as well as the costs of other studies conducted under other initiatives. It is estimated at 1,500,000 US\$.</p>	<p>The project will support the costs of the assessment of coastal infrastructure needs, focusing on port infrastructure, coastal protection infrastructure, and key economic and social assets such as water infrastructure and roads.</p>	<p>The cost of the assessments covered by the project are 125,000 US\$.</p>
<p>Currently there are a number of efforts designed to assist the Tanzanian government in Mainstreaming climate change into its development planning and programming. Most of these are focused on sector-based approaches (for example agriculture and livestock) and on central planning. There are few initiatives focusing on decentralized planning and programming (e.g. at district level). That being said, climate change considerations are not currently included in</p>	<p>The value of mainstreaming climate change into planning is difficult to estimate as it involves a long term policy change.</p>	<p>The project will support the costs of capturing project lessons and of capacity building for policy planners at central and district level, focusing on coastal planning issues. The project will also support the cost of targeted assistance in developing appropriate maintenance budgets and programmes for rehabilitated infrastructures at the district level.</p>	<p>The project will provide a total of 275,000 US\$ to the development of briefing materials for policy makers, assessments of economic feasibility and effectiveness of adaptation measures (for financial mainstreaming) and training for district-level planners.</p>

infrastructure and land use planning at central or local levels.			
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PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

UNEP will be the Multilateral Implementing Entity⁵⁶ (MIE) for the project and will oversee and provide technical backstopping to the project. UNEP benefits from significant experience in implementing projects of this type⁵⁷, and has excellent relations with the National Executing Agency, the Vice president's Office (Division of Environment). UNEP will work closely with the VPO and 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 National Climate Change Steering Committee (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 (through the services of a Project Coordinator). 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.

⁵⁶ 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.

⁵⁷ See Annex 7 for additional information on UNEP's experience and expertise relevant to this project.

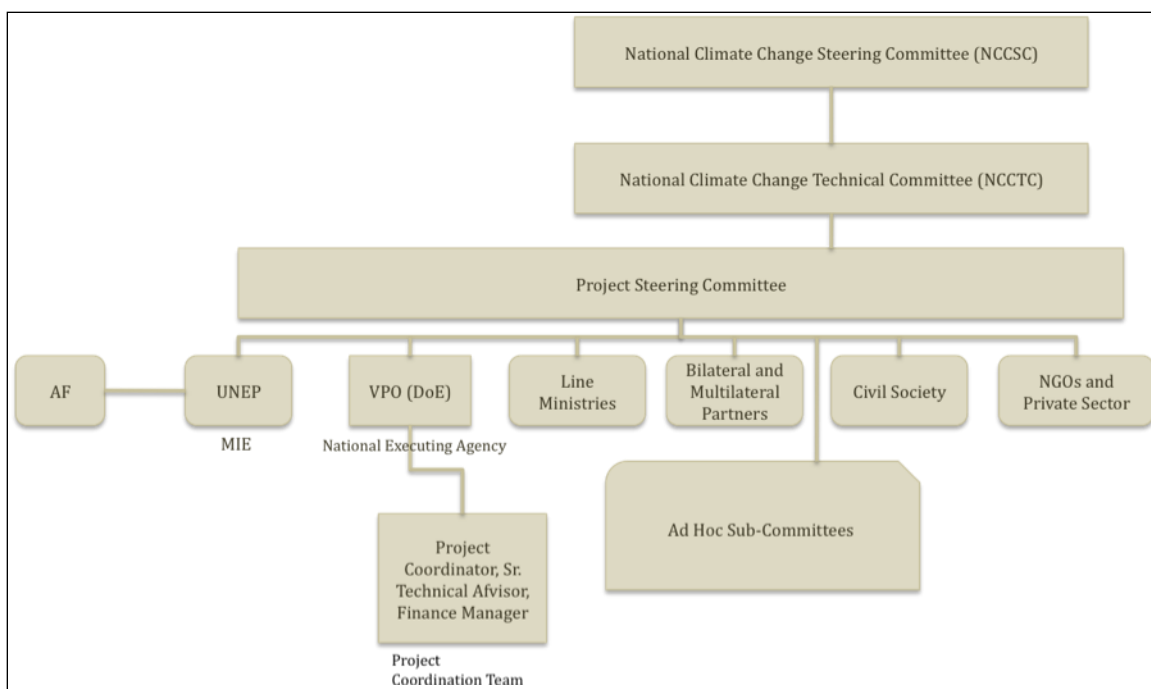


Figure 4: Project Management and Supervision structure

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 part –time. In this way, the project will strengthen and establish in-country capacity and ensure that project activities are sustainable after the project lifetime.

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

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. Participation in the Project Steering Committee will also be open to civil society representatives from the targeted communities, as well as key NGOs.

The Project Steering Committee will also be open to participation from representatives of other, relevant initiatives and partners, in order to facilitate coordination. In addition, joint implementation and execution arrangements will be sought with the LDCF project when implemented, in order to reduce costs, build synergies and avoid duplication.

A mechanism for the coordination of efforts to avoid overlaps and duplication with on-going projects and to benefit from synergies and mutual learning will be set up through the establishment of a “project manager’s coordination group”, comprised of project coordinators or managers of the ongoing relevant projects in Tanzania with which this project is seeking coordination. The group will be chaired by the VPO - DOE and will meet once every quarter with the following mandate:

i) Review the AF project implementation reports prepared by the project coordinator. The report will highlight: a) activities carried out and methods and approaches used, especially in areas of common interests; b) progress made towards the achievement of project objectives and outputs per project component; c) identification of areas of complementarity that need to be enhanced, and potential duplication and conflicts that need to be corrected; d) lessons learned including good practices and problems encountered.

ii) Make appropriate recommendations that will be shared with the steering /management committees of the participating projects;

iii) Make recommendations on how to better meet the objectives of enhancing synergy and reducing duplication among the projects, on the basis of lessons learned during quarterly meetings;

iv) Review on an annual basis, the implementation of recommendations made in previous meetings, and make appropriate comments to the respective steering or project management committees

In addition to various partners playing an advisory role, a number of project activities will be delivered through agreements, MOUs and sub-contracts where appropriate with relevant institutions, as follows:

Institutions	Responsibility for delivering
Prime Minister’s Office-Local Governments and Regional Administration	Oversee the work of the Local Government Authorities to make sure that it is in line with policy and legal requirements of the local governments including delegation by devolution
Ministry of Industry, Trade and Marketing	Joint responsibility for ecotourism, trade development and promotion of fisheries.

Ministry of Agriculture, Food Security and Co-operatives	Components related to agriculture, particularly as regards the provision of technical inputs, enhanced crops and other technologies for agricultural productivity. Joint responsibility for irrigation (with Ministry of water)
Ministry of Natural Resources and Tourism	Responsible for all activities related to ecosystem rehabilitation and monitoring, and providing support to district administrations in setting up the Resilient Ecotourism revolving funds.
Ministry of Water and Irrigation	Relocation of boreholes, water quality monitoring and extension of irrigation infrastructures to project zones.
Ministry of Energy and Minerals	Delivering the alternative energy technologies to targeted communities.
Ministry of Transport	Delivery and supervision of all coastal infrastructure components of this project.
Ministry of Education and Vocational Training	Joint responsibility for the GreenJobs program with Ministry of Labour.
Ministry of Labour, Employment and Youth Development	Lead responsibility for the operation of the GreenJobs program.

Due to the large scope of this project, as well as the need to coordinate closely with related ongoing initiatives, this project will place special emphasis on internal and external coordination. As the central coordinating unit, the VPO will provide central coordination functions, administration of contracts and sub-contracts and other administrative functions as per Tanzanian government rules and regulations. Technical consultants may be hired to provide ad hoc expertise during project implementation and to provide higher level thematic coordination.

Anticipated Execution Costs

The Project Execution Costs of this project include standard project management planning and budgeting. This involves the hiring of personnel whose responsibility will be to coordinate and oversee the daily tasks of the project implementation plan namely the project coordinator, finance manager and technical advisor. Staff contracted by the project will be housed within the Vice President's Office – Division of Environment, and will benefit from in-house support for issues related to legal matters, procurement, human resources management. The project will also provide for office equipment such as computers, software licenses, telephone and internet lines as well as costs related to reporting and regular communications through meetings and workshops with travel to the various project sites. Audit is a requirement for the project to ensure accurate reporting of funds.

Cost Item	Year - 1	Year - 2	Year - 3	Year - 4	Year - 5	Total
Execution costs						
Project Coordinator	20,000	20,000	20,000	20,000	20,000	100,000
Finance Manager	15,000	15,000	15,000	15,000	15,000	75,000
Senior Technical Advisor	15,000	15,000	15,000	15,000	15,000	75,000

Travel to project field sites	14,000	14,000	14,000	14,000	14,000	70,000
Management meetings and workshops	10,000	10,000	10,000	10,000	10,000	50,000
Computers; office supplies	18,000	3,000	2,500	2,500	2,750	28,750
Audit	2,000	2,000	2,000	2,000	2,000	10,000
TOTAL	94,000	79,000	78,500	78,500	78,750	408,750

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
Operational: The multiple ongoing initiatives on climate adaptation in Tanzania could cause operational 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. The Tanzanian government is firmly committed to achieving the objectives of this project for implementation of concrete adaptation activities.
Political: 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.
Political: the project could experience difficulties in coordination and oversight for activities delivered at various sectors, levels of governments or by multiple partners	Low	Dedicated personnel for project management will be provided through the Vice President's Office – who will act as overall coordinator and provide monitoring of project outputs and activities. Close collaboration among various ministries and stakeholders participating in the project will take place through national and district level mechanisms.
Environmental: 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.
Financial: market and price fluctuations could cause price variations and variations in costs of certain project activities, leading to budgetary constraints.	Low	A financial management strategy for the project will be established as per best management standards and accounts will be regularly monitored through regular audits. A financial risk strategy and contingency plans will also be developed as part of the financial management procedures used by Tanzanian government and UNEP.

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. A summary of the M&E cost is provided in the table below:

M&E costs

Monitoring and Evaluation Costs/Type of activity	Responsible Parties	Budget (\$, Excluding project team time)	Timeframe
Measurements of means of verification (baseline assessments)	Project Coordination Team, UNEP TM	52,000	First quarter of year 1.
Direct Project Monitoring and Quality Assurance including progress and financial reporting (APR-PIR), project revisions, technical assistance and risk management	Project Coordination Team, UNEP TM and FMO	163,888	Quarterly, half-yearly and annually and as needed
Evaluations (Mid-term review and Independent terminal evaluations)	UNEP EO	163,500	At midpoint and at end of project implementation
Inception meeting, field visits and steering committee meetings	UNEP, NCCC	82,500	Inception meeting within first 2 months and bi-annual PSC meetings (and sub-committee meetings)
	TOTAL	461,888	

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

	Activities	Outputs	Indicator	Target	Baseline	Means of Verification	Sites			Amount
Component 1 - Addressing climate change impacts on key infrastructure and settlements							1-coast Mtwara	2-coast Dar*	3-coast Muheza	
<i>Outcome 1 - Adverse impacts of SLR on coastal infrastructures and settlements are reduced</i>										
	Rehabilitate coastal protection facilities to protect settlements economic and cultural infrastructure	Sea wall raised or rehabilitated in areas showing particular damage	Length of sea walls raised and rehabilitated (m)	functional seawalls where appropriate in each sites by end of project	Dar es salaam seawall at ocean road showing signs of severe degradation	visual observation, engineering reports		x		3,075,000
<i>Outcome 2 - Adverse impacts of floods averted</i>										
	Cleaning up of the drainage channels, dredging of estuaries, installation of floodgates, 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	at least a 15% increase in drainage capacity	drainage is insufficient as seen by flooding incidents in targeted sites during heavy rains	visual observation, engineering reports		x	x	600,000
<i>Outcome 3 - Adverse impacts of climate change on water supply and quality averted</i>										

	Rehabilitation of resilient water mobilization 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 locations; 10% decrease in waterborne disease	N-A	project reports, questionnaires, household surveys	x		x	400,000
	Relocation of water extraction and conservation structures in coastal areas to avoid salinization	Boreholes and wells showing signs of salinization relocated, on the basis of ESIA studies	% reduction in salwater intrusion in coastal boreholes and wells	% salinity below national and WHO standards in relocated boreholes	tbd water quality study	visual observation, engineering reports, environmental and social impact assessment studies	x		x	600,000
TOTAL COMPONENT 1										4,675,000
Component 2 - Resilient livelihoods										
<i>Outcome 4 - Livelihoods are sustainable, diversified and resilient</i>										
	Promote resilient agricultural practices	agricultural tools, materials, and sustainable technologies and approaches transferred	% change in agricultural productivity;	15% increase in agricultural productivity	agricultural productivity is insufficient to ensure food security in targeted sites	reports, household surveys	x		x	300,000
		irrigation technology and equipment transferred in areas subject to drought or erratic rains			irrigation is only marginally available in targeted sites.		x		x	200,000
		Introduction of alternative resilient crops and crop management methods				reports, visual observation, mangrove and forest studies	x		x	150,000

	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	N-A	reports, visual observation, mangrove and forest studies	x	x	x	200,000
TOTAL COMPONENT 2										850,000
Component 3 - Ecosystem-Based Integrated Coastal Area Management (EBICAM)										
<i>Outcome 5 - Coastal ecosystems are rehabilitated and ICAM is implemented</i>										
	Coastal 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	15% increase in mangrove coverage and health	mangroves are showing signs of degradation and encroachment in targeted sites	reports, visual observation, mangrove and forest studies	x	x	x	600,000
		Coral reef rehabilitation and protection in coastal sites	% change in reef coverage and health	10% increase in reef coverages and health by end of project	reefs show signs of bleaching and death due to pollution and unsustainable fishing methods	visual observation , project reports	x	x		150,000
		Beach nourishment, coastline reforestation (trees and grasses)	Km of beach restored	200km	no beaches under restoration in targeted sites	visual observation , project reports	x	x	x	600,000
		Shoreline management and rehabilitation, using trees and grasses, replanting, stone dikes (rip rap) and no-build zones	Km of shoreline rehabilitated	200km	no shores under rehabilitation in targeted sites	visual observation , project reports				675,000
							x	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 approved	Number of plans approved	1 plan	no plans yet available but ICZM capacity exists	project reports, plans and policies				50,000
TOTAL COMPONENT 3										2,075,000
Component 4 - Knowledge, monitoring and policy linkages										
<i>Outcome 6 - Knowledge of climate impacts and adaptation measures is increased</i>										
	stocktaking and assessment	available knowledge, science and data gathered for project implementation	availability of a comprehensive baseline study for project indicators; available knowledge gathered	1 baseline study in year 1	no such study	project reports				50,000
		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				50,000
		Coastal infrastructure adaptation needs assessment and design study (enabling)	availability of technical specifications on coastal infrastructure vulnerability and adaptation needs	by end of first year	no such study	project reports				75,000
	monitoring	A climate change coastal observatory for Tanzania for ongoing monitoring of CZM and Coastal environmental status and scientific research	effective implementation of clearing house function	clearing house function is operational by mid-term	no such function	project reports, insitition reports				125,000


		Assessment of the economic viability and practical feasibility of adaptation measures (i.e. through undertaking cost-benefit analyses)	cost-effective measures are identified for upscaling and policy uptake	measures are identified for upscaling and policy uptake on an ongoing basis	ad hoc assessments available but none specific to this project	reports from climate observatory, project reports				50,000
	policy linkages	lessons learned from the project outputs documented and integrated into policy making	number of policy briefs provided to key sectors and regulators; number of workshops	5 briefing notes per year; 4 workshops during the project	no notes; no workshop	project reports; briefing materials; workshop reports				200,000
		district level administration have the capacity to adequately manage rehabilitated infrastructure	Amount dedicated to infrastructure maintenance from district budgets	each district earmarks appropriate annual allocations for infrastructure maintenance.	infrastructure budgets within district administrations are low	project reports, plans and policies, district-level budgets	x	x	x	25,000
TOTAL COMPONENT 4										575,000
										8,175,000
Management - Execution costs										
	Personnel	1 Natinal project coordinator	National	annual cost = 20000						100,000
		1 financial manager	national	annual cost 15000						75,000
		1 Senior technical advisor		annual cost 15000						75,000
	audit costs	2000 annual cost								10,000
	Equipment + communications	computers, internet, phones and software								28,750
	Travel									70,000
	meetings and workshops									50,000
TOTAL MANAGEMENT										408,750
MONITORING AND EVALUATION										
										461,888

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

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT⁵⁸ *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:*

<i>Eng. Ngosi C.X. Mwihava (see Annex 6: Letter of Endorsement)</i>	<i>Date: 14 April 2011</i>
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B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

<p>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.</p>
<p></p> <p><i>Maryam Niamir-Fuller</i></p> <p>Implementing Entity Coordinator GEF Executive Coordinator and Director</p>

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 of Global Environment Facility (GEF) Coordination UNEP PO Box 30552 Nairobi, Kenya Gigiri Complex, Block R-ground floor	
Date: <i>18 April 2011</i>	Tel. and email:254 20 762-4166 maryam.niamir-fuller@unep.org
Project Contact Person: Ermira Fida, Portfolio Manager GEF- Adaptation UNEP	
Tel. And Email: +254 20 762 3113 Ermira.fida@unep.org	

List of Annexes:

1. Itemized Budget and Expenditure Plan
2. List of Ongoing projects
3. Summary of key aspects of project sites
4. Additional technical specifications
5. Note on the use of the Implementing Entity Project Fee
6. Letter of Endorsement
7. Summary of UNEP Expertise and Experience
8. Preliminary Environmental and Social Impact Assessment
9. Letter from Mayor of Dar es Salaam
10. Coordination among site-level activities

Annex 1. Itemized Budget and Expenditure Plan

APPENDIX 1 - RECONCILIATION BETWEEN GEF ACTIVITY BASED BUDGET AND UNEP BUDGET LINE (GEF FUNDS ONLY US\$)

Project Title: Implementation of Concrete Adaptation measures to reduce Vulnerability of livelihoods and economy of coastal communities in Tanzania

Project number:

Project executing partner:

Vice President's office (Division of Environment)

Project implementation period:

Expenditure by project component/activity (provide description)

*Insert actual year

From:

Aug-11

Add additional components/activities as required

Add additional years as required

To:	Dec-16	Add additional components/activities as required				Monitoring and evaluation	Project Execution costs	Total	Expenditure by calendar year					Total
		1	2	3	4				Year 1*	Year 2*	Year 3*	Year 4	Year 5	
UNEP Budget Line														
10 PERSONNEL COMPONENT														
1100 Project personnel														
1101 Project coordinator							100,000.00	100,000	20,000	20,000	20,000	20,000	20,000	100,000
1199 Sub-total		-	-	-	-	-	100,000	100,000	20,000	20,000	20,000	20,000	20,000	100,000
1200 Consultants								-						-
1201 mangrove specialist				75,000				75,000	75,000					75,000
1202 reef specialist				50,000				50,000		50,000				50,000
1203 coastal rehabilitation specialist				75,000				75,000		25,000	25,000	25,000		75,000
								-						-
1205 coastal zone management specialist				30,000				30,000			20,000	10,000		30,000
1206 Ecosystem Management Specialist								50,000	50,000					50,000
1207 Coastal Infrastructure consultant					50,000			50,000	30,000	20,000				50,000
1208 Coastal Infrastructure engineering consultant					50,000			75,000	25,000	25,000	25,000			75,000
1210 Climate Change Knowledge Specialist					160,000			160,000	70,000	20,000	20,000	20,000	30,000	160,000
1211 Coastal Climate Adaptation Consultant					50,000			50,000	35,000			15,000		50,000
1212 Senior Technical Advisor							75,000	75,000	15,000	15,000	15,000	15,000	15,000	75,000
1281 Baseline assessments						52,000		52,000	52,000					52,000
1299 Sub-total		-	-	230,000	385,000	52,000	75,000	742,000	352,000	155,000	105,000	85,000	45,000	742,000
1300 Administrative Support								-						-
1301 Finance manager							75,000	75,000	15,000	15,000	15,000	15,000	15,000	75,000
1399 Sub-total		-	-	-	-	-	75,000	75,000	15,000	15,000	15,000	15,000	15,000	75,000
1600 Travel on official business								-						-
1601 Coordination travel to sites							70,000	70,000	14,000	14,000	14,000	14,000	14,000	70,000
1699 Sub-total		-	-	-	-	-	70,000	70,000	14,000	14,000	14,000	14,000	14,000	70,000
1999 Component total		-	-	230,000	385,000	52,000	320,000	987,000	401,000	204,000	154,000	134,000	94,000	987,000
					0			-				0		-

20	SUB-CONTRACT COMPONENT										-	-
2100	Sub-contracts (MOUs/LOAs for cooperating agencies)										-	-
2101	sub-contract NGO reef rehab		25,000								25,000	25,000
2199	Sub-total		-	-	25,000	-	-	-	-	-	25,000	25,000
2200	Sub-contracts (MOUs/LOAs for supporting organizations)										-	-
2201	sub-contract Water Agency		200,000								200,000	200,000
2202	sub-contract Water Agency for Borehole relocation		600,000							100,000	300,000	200,000
2203	sub-contract Min Agric extension services		250,000							50,000	50,000	50,000
2205	sub-contract agri-research lab			75,000							35,000	40,000
2299	Sub-total		800,000	75,000	-	-	-	-	-	150,000	450,000	385,000
			250,000	0						1,125,000	0	1,125,000
2300	Sub-contracts (for commercial purposes)										-	-
2301	subcontract coastal engineering firm for seawall rehab		3,075,000								1,525,000	1,550,000
2302	sub-contract civil engineering firm for drainage rehab		600,000							200,000	400,000	
2303	sub-contract env.engineering firm for mangrove			395,000							395,000	
2304	sub-contract coastal engineering firm			875,000							225,000	
2399	Sub-total		3,675,000	1,270,000	-	-	-	-	-	1,725,000	2,570,000	350,000
			0	0						0	0	300,000
2999	Component total		4,475,000	250,000	1,370,000	-	-	-	-	150,000	2,175,000	2,980,000
			0	0	0					0	0	440,000
												350,000
												0
												0
30	TRAINING COMPONENT										-	-
3200	Group training										-	-
3201	community level trainings		200,000	105,000	70,000						375,000	150,000
			0								50,000	55,000
3204	community-level and district training											25,000
3205	District-level trainings									15,000	15,000	15,000
3206	district-level and finance training										25,000	
3299	Sub-total		-	105,000	70,000	-	-	-	-	375,000	165,000	50,000
			200,000	0						70,000	50,000	40,000
3300	Meetings/Conferences										-	-
3301	EBICAM Consultation and validation meetings			20,000								10,000
											10,000	20,000
3302	Climate Change Observatory meetings				55,000					10,000	15,000	15,000
3303	Policy Briefing Workshops				45,000					15,000		15,000
3381	Inception meetings; SC meetings					82,500	50,000			40,000	30,000	30,000
										15,000	17,500	132,500

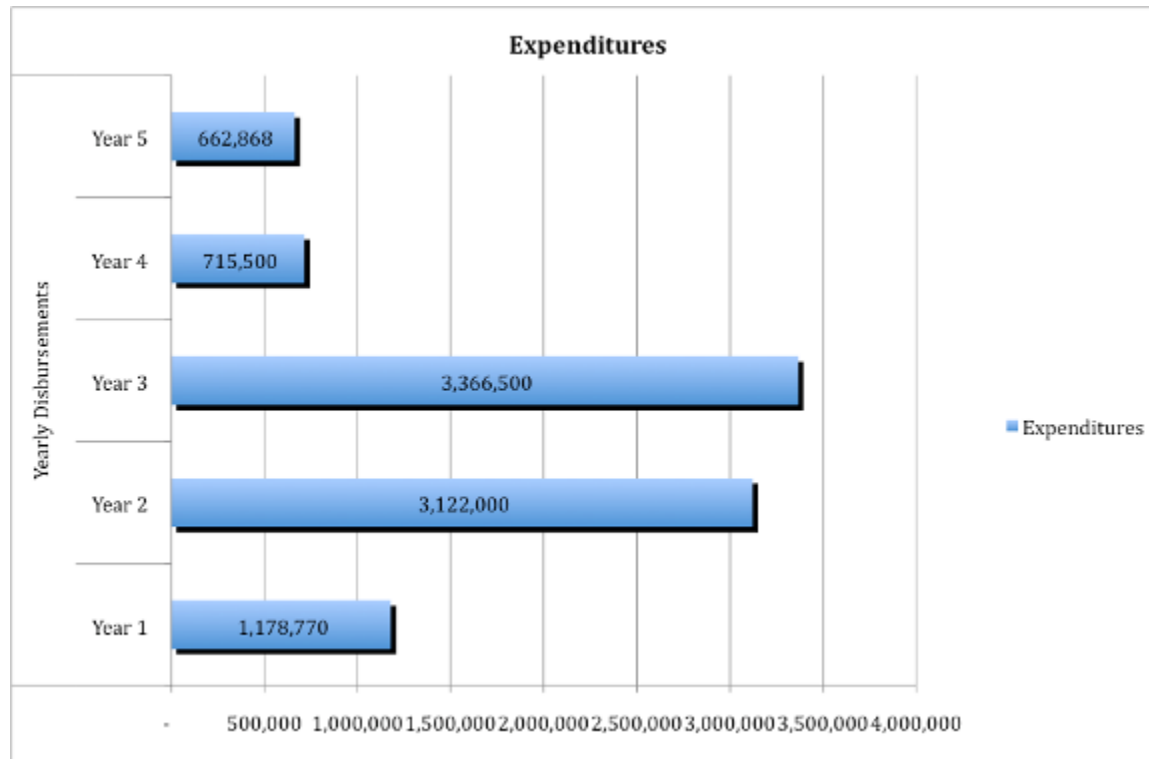
3399	Sub-total	-	-	20,000	100,000	82,500	50,000	252,500	40,000	55,000	45,000	55,000	57,500	252,500
3999	Component total	-	200,000	125,000	170,000	82,500	50,000	627,500	205,000	105,000	115,000	105,000	97,500	627,500
40	EQUIPMENT AND PREMISES COMPONENT													
4100	Expendable equipment													
4101	seeds, saplings, fertilizers (mangroves)		150,000	100,000				250,000	250,000					250,000
4102	trees, seedlings, fertilizers (forests and shores)			250,000				250,000		250,000				250,000
4103	office supplies and computer software					13,750		13,750	3,000	3,000	2,500	2,500	2,750	13,750
4199	Sub-total	-	150,000	350,000	-	-	13,750	513,750	253,000	253,000	2,500	2,500	2,750	513,750
4200	Non-expendable equipment													
4201	water pipes, pumps and cisterns	200,000						200,000		200,000				200,000
4202	irrigation equipment (tubing, pumps)		100,000					100,000	100,000					100,000
4203	small alternative energy appliances		150,000					150,000		150,000				150,000
4204	computers and database software				20,000	15,000		35,000	35,000					35,000
4299	Sub-total	200,000	250,000	-	20,000	-	15,000	485,000	135,000	350,000	-	-	-	485,000
4999	Component total	200,000	400,000	350,000	20,000	-	28,750	998,750	388,000	603,000	2,500	2,500	2,750	998,750
50	MISCELLANEOUS COMPONENT													
5500	Evaluation													
5501	Audit					10,000		10,000	2,000	2,000	2,000	2,000	2,000	10,000
5581	Project monitoring and quality assurance					163,888		163,888	32,770	33,000	33,000	32,000	33,118	163,888
5582	Mid term evaluation					80,000		80,000		80,000				80,000
5583	Terminal evaluation					83,500		83,500				83,500		83,500
5599	Sub-total	-	-	-	-	327,388	10,000	337,388	34,770	35,000	115,000	34,000	118,618	337,388
5999	Component total	-	-	-	-	327,388	10,000	337,388	34,770	35,000	115,000	34,000	118,618	337,388
99	GRAND TOTAL	4,675,000	850,000	2,075,000	575,000	461,888	408,750	9,045,638	1,178,770	3,122,000	3,366,500	715,500	662,868	9,045,638

768,879

9,814,517

Planned Expenditure Plan⁵⁹

	Yearly Disbursements					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Expenditures	1,178,770	3,122,000	3,366,500	715,500	662,868	9,045,638.00



⁵⁹ Costs reflected here do not include the MIE fee which is expected to be disbursed separately to the MIE as a one-time transfer.

Annex 2. List of Ongoing Projects

Project Title	Agency/ Financiers	Total Amount (Million USD - rounded)	Objective	Dates	Regional scope	Main Sector	Linkages, synergies or potential duplication
Agricultural Sector Development Programme	IFAD	180.9	<p>The objectives of the programme are to: improve farmers' access to and use of agricultural knowledge, technologies, marketing systems and infrastructure, for the purpose of contributing to higher productivity, profitability and farm incomes and to promote private investment based on an improved regulatory and policy environment</p> <p>Participating farmers will prepare village development plans, which will be consolidated into district agricultural plans financed by the programme, and they will directly implement activities under the village plans. The programme provides support for agricultural activities in the proportion of about two thirds at local levels and about one third at national level, at which it assists agricultural sector line ministries.</p>	2009-2016	National	Agriculture	project provides access to agricultural technologies and inputs; however project assumes that adaptation to climate change is already sufficient (spontaneous) and could be at risk for climate change; cooperation will be pursued if the project is intervening in AF regions
Agricultural Sector Development Programme - Livestock: Support for Pastoral and Agro-Pastoral Development	IFAD	29.1	<p>The programme targets the poorest members of herder and agro-pastoralist groups who depend mainly on livestock for their livelihoods. Women, young people and marginalized groups, and some Zanzibar fishing households, will be a particular focus of the programme. The programme will also address the special needs of the large numbers of poor rural people affected by HIV/AIDS.</p> <p>The overall objective of the programme is to improve food security and increase incomes within these communities. Specifically the programme will work to improve livelihoods for the target groups by:</p> <p>helping farmers identify and manage their own development needs improving livestock production through research and technology improving marketing systems and infrastructure for livestock products strengthening national and local government</p>	2007-2015	central and southwest - Zanzibar in its entirety and, on the mainland, Singida (Manyoni, Singida and Iramba districts), Pwani (Bagamoyo and Kibaha districts), Dodoma (Kondoa and Dodoma Rural districts), Manyara (Kiteto, Simanjiro and	livestock	project provides support for livestock production, animal health and insemination, sanitation and reproduction, as well as business support. Project intervenes in different areas than AF initiative

			<p>institutions to improve services to livestock farmers</p> <p>promoting a participatory approach to natural resource management within local administrations</p> <p>investing in improved health care and water management</p>		<p>Hanang districts), Tanga (Kilindi and Handeni districts), Morogoro (Mvomero, Morogoro and Kilosa districts), Arusha (Ngorongoro and Monduli districts), Kilimanjaro (Same district), Mbeya (Chunya and Mbarali districts) and Iringa (Iringa district)</p>		
Agricultural Services Support Programme	IFAD	114.4	<p>The programme targets a broad section of the country's farming population, with a particular focus on the poorest households, including landless labourers, women, households headed by women and orphans, and HIV/AIDS-affected smallholders. These poor farmers are held back by lack of access to technology, financing, markets and natural resources.</p> <p>The programme will work to improve agricultural productivity by:</p> <p>promoting farmer's organizations to prioritize and manage development needs</p> <p>strengthening linkages between farmers and local and central government as well as the private sector</p> <p>improving access to relevant agricultural knowledge and technologies</p> <p>promoting policy changes in favour of poor farmers</p>	2007-2014	<p>national (districts interventions undetermined) including Zanzibar</p>	<p>institutional and technical capacity for agriculture</p>	<p>this project provides a basis on which to build, through community mobilization, access to basic technology for agricultural production, reform of extension services and the promotion of pro-poor policies, along with institutional capacity building for relevant ministries and government technical institutions. Cooperation will be sought if districts are similar.</p>

Rural Micro, Small and Medium Enterprise Support Programme	IFAD	25.3	he programme has three goals: to improve the awareness of rural entrepreneurs of market opportunities and how these can be exploited through the development and implementation of a communication strategy (including radio linkages to poor and remote areas) and the training of the entrepreneurs to improve their businesses; to improve the coordination and cohesion of selected value chains, through the creation and strengthening of backward and forward linkages for the selected chains; to strengthen public and private sector institutions to provide efficient and effective support to rural enterprises.	2007-2014	Iringa, Manyara, Mwanza, Pwani, Ruvuma and Tanga	agriculture , small business	project provides a basis to build on through social mobilization, the creation of local rural networks and enterprises and the creation of enabling environments for the creation of alternative livelihoods. Project intervenes in some AF project regions, and cooperation will be sought.
Managing Water for Dar es Salaam	UN HABITAT	TBC	<ul style="list-style-type: none"> # Improve the efficiency and equity of water supply and use in Dar es Salaam # Improve the knowledge base of the impact of urbanization of water and aquatic ecosystems in Dar es Salaam # Create public awareness on urban water resources management and related environmental issues # To promote value based water education in formal and non-formal education aimed at increasing the understanding and creating a new water ethic among water providers and consumers 	2006-2007	Dar es Salaam	water and sanitation	this project is a direct complementary intervention to the AF project scope. Since the AF project does not intend to support water infrastructure activities in Dar es Salaam, it will directly benefit from the UN Habitat intervention, which includes efforts to reduce leakage, wastage and illegal connections. Cooperation will be sought to benefit from project studies, partners and to ensure climate risks are mainstreamed
Promoting Environmentally Sustainable Development in Tanzania	UN-HABITAT	3.65	The Sustainable Cities National Programme in Tanzania operates under the programme Promoting Environmentally Sustainable Urban Development in Tanzania. The programme focuses on two objectives: consolidation of the environmental planning and management (EPM) process in the Greater Dar es Salaam City Council and use of the methodology and experience gained from implementation of the SDP. the projec aims to build the capacity of urban local authorities to manage urban development through training and communication, to establish an environmental management information	1997-tbd	dar es salaam urban	urban developem nt and municipal planning	there are potential linkages between this initiative and the AF project through the development of spatial plans or building plans for coastal areas of Dar es Salaam city.

			system and strategic urban development planning framework; to create gender awareness in EPM and to address poverty eradication; and to assist the city municipalities to mobilize resources in order to ensure project sustainability.				
SFM Extending the Coastal Forests Protected Area Subsystem	UNDP-GEF	10,6	The aim of the project is to strengthen biodiversity management fundamentals within the Protected Area network in Tanzania. This project addresses the Coastal Forests which are arguably the most threatened of all hotspots ecosystems in Tanzania and Zanzibar islands.	2009-2014	Zanzibar, Kichi-Matumbi Hills, greater Rondo system on the Tanzanian mainland	forestry	This project benefits the AF project in that it provides a missing piece of ecosystem-based adaptation, namely the rehabilitation and protection of coastal forests as a buffering ecosystem. AF project and this project will cooperate on sharing lessons, studies and technical advice. Although pilot activities are not implemented in common areas, cooperation will be sought at technical levels
Strengthening the Protected Area Network in Southern Tanzania: Improving the Effectiveness of National Parks in Addressing Threats to Biodiversity	UNDP-GEF	16.9	The biodiversity of Southern Tanzania is better represented and buffered from threat within National Parks. The project supports the development of new national parks, strengthened management of existing national parks through training, capacity building and private-public =partnerships.	2010-2016	southern Tanzania	biodiversity	this project operates in a different geographic and ecosystemic region of the country. However, linkages will be established particularly through information sharing on nature-based tourism, and potential extension of the Tourism Revolving Fund to this project's districts
Mainstreaming Climate Change in Integrated Water Resources Management in Pangani River Basin	UNDP-GEF	2.5	This project will initiate Integrated Water Resource Management (IWRM) frameworks in the Pangani River Basin of Northern Tanzania. These frameworks will address climate change and pilot adaptation measures. It is one of the first field-based climate change preparation projects in Eastern Africa with strong links to basin and national planning and policy, and as such will build national and regional capacity, provide lessons and serve as a national and regional demonstration site.	2006-2009	pangani district	Water management	This project provides a valuable basis on which to build additional adaptation activities since it provides local and institutional capacity for integrated water resources management, namely through training, information and awareness raising, social mobilization. The project also promotes the integration of climate change concerns in basin management, and is therefore consistent with the principles of Ecosystem-based management as contained in the AF proposal

Integrating environment into National Strategy for growth and reduction of poverty – PEI	UNDP-PEI	4	As a follow-up to the project on mainstreaming environment into MKUKUTA, this project aims at promoting integration of environmental issues into the implementation of MKUKUTA strategies. Components include: Capacity strengthening to integrate environment in sector and district plans and implement strategic poverty-environment interventions at local level; Improved access and utilization of poverty-environment data in the MKUKUTA process and local level planning ; Sustainable financing of environment targets in the MKUKUTA and in local level planning processes; and Promotion of efficient utilization of rangelands and empowering pastoralists through improved livestock productivity and market access.	2007-2010	national	policy	this project continues to provide the basis for environmental mainstreaming into national plans, policies and regulations, and will provide essential linkages between the AF project and national policy frameworks.
Integrating Environment into Poverty Reduction policies (phase II)	UNDP-UNEP	4	the project aims to support the integration of environmental issues into the PSGRP (MKUKUTA) through the following expected outcomes: Institutional capacity further enhanced to integrate environment and livelihood issues into sector and district level plans, to implement strategic P-E interventions at local level, Improved access to and utilization of environment/livelihoods data for use in MKUKUTA process and at local level planning, Sustainable financing of environmental targets contained in the MKUKUTA. Promoting efficient utilization of rangelands and empowering pastoralist to improve livestock productivity through improved and market access	2007-2010	national	policy	this project provides a basis on which the AF project is built, namely efforts to build institutional capacity for the effective consideration of environmental issues, including climate change, into national development planning. This project will provide national-level awareness raising and a contribution to component 4 of the AF project on policy linkages.
Expedited Financing for (Interim) Measures for Capacity Building in Priority Areas (Phase II)	UNEP	0.1	The project is being implemented as an interim capacity-building activity between the Initial and the Second Communications. Hence it is intended to complement activities of the Phase 1 project, related to the Initial Communication, while at the same time forming basis for initiation of the Second National Communication to the UNFCCC.	2010-?	national	policy	this project provides valuable capacity and information particularly in terms of vulnerability studies and climate models which will be brought into play in the AF project
Developing Core Capacity to Address Adaptation to Climate Change in Productive Coastal Zones	UNEP	10.8	To develop institutional capacities to manage climate change impacts through improved climate information, technical capacity, the establishment of demonstration projects to reduce vulnerability in key vulnerable areas, and learning. This project seeks to implement priorities of the National Adaptation Programme of Action (NAPA) in addition to barriers to implementation as	pipeline d	tbd - national and coastal areas	coastal zone management	this project will be developed and executed in close collaboration with the AF project. Activities will be jointly implemented to minimize duplication and geographic scope will also be carefully delimited. It is expected that

			identified in the NAPA report and terminal evaluation of the preparation phase of this project.				the LDCF project will focus on smaller-scale pilot initiatives
Addressing Land-based Activities in the Western Indian Ocean (WIO-LaB)	UNEP	11.4	addresses some of the major environmental problems and issues related to the degradation of the marine and coastal environment resulting from land-based activities (LBA) in the Western Indian Ocean (WIO) region. Project Objectives: 1) Improve the knowledge base, and establish regional guidelines for the reduction of stress to the marine and coastal ecosystem by improving water and sediment quality; 2) Strengthen the regional legal basis for preventing land-based sources of pollution; and 3) Develop regional capacity and strengthen institutions for sustainable, less polluting development.		regional indian ocean	marine and coastal zones	This project provides technical lessons learned from pilot activities in Tanzania and other countries related to the development of ecotourism, as well as on technologies for ecosystem-based resilience in coastal systems (e.g. the use of vetiver grass in erosion control and leachate treatment; rehabilitation of mangroves; wastewater management and anti-erosion)
Coastal Resilience to Climate Change: Developing a Generalizable Method for Assessing Vulnerability and Adaptation of Mangroves and Associated Ecosystems	UNEP-GEF	2	he purpose of the project is to develop a generalizable method and process to develop an effective adaptation strategy that could be adapted in different sites within common ecosystems. The project will focus its initiatives on a single ecosystem type - mangrove with near shore coral reefs. Further, the project will initiate pilot initiatives to test the adaptation strategy in the ecosystem to address and ameliorate climate change impacts. The overall goal of the project is to increase the resilience of vulnerable mangrove and coral reef ecosystems to the impacts of climate change	2007-2010	national	ecosystem-based adaptation	this project and findings from its implementation has formed a basis for the development of the AF initiative as it concerns mangrove rehabilitation and protection for adaptation and resilience.
Marine and Coastal Environment Management Project (MACEMP)	WB	63	The project development objective is to improve lives and livelihoods of coastal communities of mainland Tanzania and Zanzibar, through implementing participatory and integrated coastal development/economic activities while sustaining coastal resources. The Tanzania Marine and Coastal Environment Management Project aims to strengthen the sustainable management and use of the Borrower's Exclusive Economic Zone, territorial seas, and coastal resources resulting in enhanced revenue collection, reduced threats to the environment, better livelihoods for participating coastal communities living in the Coastal Districts, and improved institutional arrangements. The project consists of the following components: Component 1) will	2005-2011	National with Community Funds in Kilwa, Rufiji, Mafia, Zanzibar	fisheries, coastal zone management	This project provides a basis on which to build adaptation initiatives because it supports planning and policy for sustainable fisheries, improved licensing of foreign vessels; enhanced monitoring, compliance and surveillance to regulate foreign commercial fishing fleets and reduce conflicts between artisanal and industrial fishing; establishment of a sustainable financing mechanism; and improved fishery stock assessments on near-shore stocks. the project

			<p>establish and implement a common governance regime for the Exclusive Economic Zone (EEZ) that contributes to the long-term sustainable use and management of EEZ resources. Component 2) will establish and support a comprehensive system of managed marine areas in the Territorial Seas, building on Integrated Coastal Management (ICM) strategies that empower and benefit coastal communities. Component 3) will empower coastal communities to access opportunities so that they can request, implement and monitor sub-projects that contribute to improved livelihoods and sustainable marine ecosystem management. Component 4) will provide efficient project implementation services</p>				<p>also supports strengthened spatial planning along the coastal margin, to develop a national system plan for marine managed and marine protected areas (MPAs), and to promote marine zoning that encourages local co-management. Although both projects do not work in similar areas, cooperation will be actively pursued</p>
<p>Second Additional Financing for Agriculture Sector Development Project</p>	WB	35	<p>The original project's overall goal is to raise and sustain agricultural growth to help achieve the MKUKUTA target of reducing the proportion of the rural population below the basic-needs poverty line from 38.6 percent in 2000/01 to 24 percent in 2010. The Project has two complementary objectives that contribute to the higher order of agricultural growth and poverty reduction: (i) to improve farmers' access to and use of agricultural knowledge, technologies, and infrastructure, all of which contribute to higher productivity, profitability, and farm incomes; and (ii) to promote agricultural private investment based on an improved regulatory and policy environment.</p>	2010-tbd	national with pilot locations unknown	Agriculture	<p>there are strong potential linkages as this project supports small scale irrigation infrastructure development at the district level; project also supports research and extension, institutional capacity building for agriculture planning. Cooperation will be sought, particularly for technical lessons on irrigation</p>
<p>Tanzania Strategic Cities Project</p>	WB		<p>The objective of the Strategic Cities Project for Tanzania is to improve the quality of and access to basic urban services in participating Local Government Authority's (LGAs). There are three components to the project. The first component of the project is core urban infrastructure and services. This component will support improvements in core infrastructure and key urban services in the participating LGAs. It will comprise two subcomponents that will provide: (a) investment in core urban infrastructure and services for subprojects prioritized by the participating LGAs; and (b) technical assistance for construction supervision and support for the implementation and monitoring of Environmental</p>	2010-2015	Mtwara, Arusha, Dodoma, Kigom, Mbeya, Mwanza	Infrastructure	<p>this project provides assistance for the rehabilitation and construction of key municipal infrastructures, namely roads, waste treatment facilities, storm drainage and key buildings. The AF project will provide direct services to this project by providing coastal protective infrastructure around these investments when necessary. Cooperation will be sought to share information on social and environmental impacts, as well as engineering studies and to</p>

			and Social Management Plans (ESMPs) and Resettlement Action Plans (RAPs) linked to individual subprojects, including the payment of compensation costs.				ensure coordination of works in common project areas. For example, in Mtwara urban district, the SCP is already rehabilitating storm drainage, meaning that the AF project will not need to provide support to this activity in this site.
Tanzania - Accelerated Food Security Project	WB	299	Project Objective. The objective of the Project is to contribute to higher food production and productivity in targeted areas by improving farmers' access to critical agricultural inputs. The proposed Project will have three components: (i) Improving access to agricultural inputs (fertilizer and seed); (ii) Strengthening input supply chains; and (iii) Project management and monitoring and evaluation (M&E). This project is an emergency response credit to the financial crisis which has affected Tanzanian agricultural exports	2009-2012	40 districts - tbc	agriculture	these two projects also provides a useful basis on which to build additional adaptation activities, as it seeks to provide basic productive assets to vulnerable communities and by strengthening the productive chains in the agriculture sector - all factors that are essential baselines for resilience. Where these projects are active in common AF project areas, cooperation will be sought to ensure lack of duplication and synergies and so that the AF project can focus on additional activities designed to promote adaptation and resilience
Tanzania Agricultural Sector Development Project	WB	151.5 million	The Agricultural sector Development Project for Tanzania has two complementary objectives: (1) to enable farmers to have better access to and use of agricultural knowledge, technologies, marketing systems and infrastructure; all of which contribute to higher productivity, profitability, and farm incomes; and (2) to promote agricultural private investment based on an improved regulatory and policy environment. The project has two components: (1) Local Level Support to improve agricultural service delivery; the quality of agricultural investments; and the local policy and regulatory environment for private investment in agriculture; and (2) National Level Support to improve the responsiveness and quality of agricultural research and policy; to carry out preparatory work and investment in national level irrigation through public-private partnerships; to improve	2010-2012	40 districts - tbc	agriculture	same as above

			food security and sector coordination, and to stimulate agricultural markets and private sector development.				
Sustainable Management of Inland Wetlands in Southern Africa: A Livelihoods and Ecosystem Approach	UNEP-GEF	1.3	The objective is to increase capacity for management of wetlands in government and non-governmental agencies in southern Africa by generating new knowledge on wetland functioning and development of sustainable land management (SLM) options for wetlands. The project will generate four outcomes. (1) Enhanced information available to decision-makers and other stakeholders in Southern Africa on wetland resources, attributes, linkages with surrounding catchments and degradation status and potential risk. (2) Guidelines for SLM in wetlands developed, based on new knowledge on functions of wetland types, their processes and linkages with catchments. These will comprise protocols to assess impacts and limits of human activities in wetlands and surrounding catchments. (3) Demonstrated innovative interventions for sustainable land and water management in wetland types utilized for agriculture and other livelihood-supporting activities. (4) Enhanced capacity and awareness of sustainable management of wetlands in the southern Africa region at government, extension and grassroots levels.	2004-2010	Regional Southern Africa	wetlands	this project will provide valuable technical insight on best available technologies for wetland rehabilitation as well as guidelines on sustainable land use. Cooperation will be established based on commonalities between project areas
Dar es Salaam Water Supply and Sanitation Project	WB	164.6 million	The objective of the Dar es Salaam Water Supply and Sanitation Project for Tanzania is to provide a reliable, affordable and sustainable water supply service and improve the sewerage and sanitation in the 'service area' of the Dar es Salaam Water and Sewerage Authority (DAWASA) that includes Dar es Salaam and part of the coast region to help improve public health and well-being in a city prone to cholera outbreaks or other water-borne diseases and support productive activities of the country's main economic center. The completion of this contract will increase the likelihood of sustainability by allowing for the: (i) replacement of aged high lift pumps; and (ii) the procurement	2003-2010	national	Water and sanitation and infrastructure	This project provides much needed support for water sector reform and rehabilitation in Dar Es Salaam. the AF project is not intervening in infrastructural works in Dar es Salaam due to this project's presence; however cooperation will be sought so that interventions conducted elsewhere benefit from best technology and knowledge generated by this project and so that aspects related to climate resilience are integrated

			of necessary spares deemed essential to the continued functioning of the Upper Ruvu and Lower Ruvu plants. Both have been experiencing frequent breakdowns that have disrupted service delivery to Dar es Salaam. Efforts to procure the pumps begin in June 2009, however, there have been significant delays. The borrower first requested the association's approval to proceed with the purchase of the pumps on July 6, 2009. However, the first attempt to procure the pumps failed as quotations from shortlisted suppliers were considered expensive and the proposed delivery period extended beyond the initial project closing date of December 31, 2009. Processing of a second request for bids was therefore suspended until an extension of the project was granted up to June 30, 2010.				and mainstreamed
Water Sector Support Project	WB	951 million	The Water Sector Support Project is to strengthen sector institutions for integrated water resources management and improve access to water supply and sanitation services. There are 4 components to the project: a) strengthening institutional capacity for improving the management of water resources. It will provide: (i) logistical and technical assistance for strengthening of the 9 basin institutions and their management systems, (ii) support for the planning and preparation of integrated (river and lake) basin development and management plans, (iii) support for the implementation of selected priority water resources (single and multi-purpose) investment projects identified by the Government of Tanzania; b) providing support to all local governments in the scaling up of the provision of rural water and sanitation services in pursuit of the MDGs; c) giving support to Dar es Salaam, all regional and district capitals, and gazetted small town utilities in the scaling up of provision of urban water and sanitation services in pursuit of the MDGs; and d) providing: (i) support for putting into operation the new role of the Ministry of Water, (ii) assistance for strengthening sub-sector planning and operational capacities, (iii) support to sector coordination and policy re-alignment, and (iv) support for sector capacity building.	2007-2012	national	water, sanitation, infrastructure	This project provides a useful basis on which to build additional adaptation activities, since it provides the institutional baseline for management of fragile ecosystems concerned by the AF proposal, including basin-wide organizations. This project also supports the rehabilitation of certain water sources, and cooperation will be sought in order to avoid duplication and to build resilience across implemented measures

Pangani - Saadani Coastal Protection	WTO - STEP	TBC	The Sustainable Tourism for Eliminating Poverty (STEP) project is a global initiative funded by a group of donors and steered by the UN World Tourism Organization. The ST-EP program includes four main components. The first is a research base to identify linkages, principles and model applications. There is also an operating framework for promoting and developing incentives for good practice among companies, consumers and communities. Forums for sharing and exchanging information, ideas and plans are designed to bring together private, public and non-governmental stakeholders. Finally, there is the ST-EP Foundation which was originally concerned with attracting new, dedicated financing from business, philanthropic and government sources.		Pangani district	tourism	this project provides a useful model for the Sustainable Tourism Revolving Fund sought to be established by the AF project since it promotes a similar small scale model in the Saadani national park. Lessons from this project will be gathered and cooperation will be sought for the tourism component of the AF project.

3. Summary of site vulnerabilities

	coastal sites		
	1. Mtwara	2. Dar Es Salaam	3. Muheza
rainfall	unimodal	bimodal	bimodal
mangrove	yes	yes	yes
sea wall		yes	
forest	yes	yes	yes
port	yes	yes	
reef	yes		
estuary	yes		yes
dunes		yes	
seagrass			
wetlands + swamps		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
fish	yes	yes	yes
livestock			
existing climate hazards	inundation, drought, erratic rains	drought, floods	inundation, coastal erosion
anthropogenic pressures		pollution, poor urbanization, deforestation	
future climate impacts	SLR, decreased precipitation - (=salinization of groundwater supplies)	droughts, floods, SLR, decreased precipitation	SLR, increased precipitation (flooding)
reg. population (district)	1.13 million	2.5 million	1.6 million
Community vulnerability			
Health			
poverty levels *% below poverty line in 2001	38% below poverty line	18% below poverty line (46% for Pwani region)	36% below poverty line

livelihoods

agriculture and
livestock,
fisheries, tourism

industry, agriculture
and livestock, fisheries
and tourism

agriculture and
livestock, fisheries
and tourism

Regional welfare ranking (from Tanzania PRSP, 2000)

Regional ^{6/}	Food Security	Unemployment	GDP per capita	Female illiterate Rate	Gross Enrollment (prim. School)	Health Status ^{7/}	Health services ^{8/}	Nutrition level ^{9/}
1. Dodoma	3	18	3	7	6	2	11	10
2. Kagera	10	15	1	11	4	1	5	3
3. Lindi	5	6	10	8	2	4	18	6
4. Kigoma	6	4	2	4	4	10	9	15
5. Coast	4	5	7	3	9	9	13	11
6. Morogoro	2	8	8	14	14	7	13	7
7. Mara	7	9	6	15	18	3	7	2
8. Tanga	1	3	5	16	12	13	13	17
9. Mtwara	9	11	9	8	13	8	12	9
10. Rukwa	18	14	19	5	3	5	2	5
11. Arusha	8	7	18	11	7	17	2	14
12. Mwanza	14	18	14	6	10	10	9	8
13. Iringa	11	20	17	17	17	5	13	1
14. Mbeya	15	12	11	13	15	10	7	12
15. Shinyanga	16	13	15	1	7	16	1	18
16. Tabora	17	17	12	2	1	18	4	19
17. Singida	12	19	13	10	10	19	5	12
18. Kilimanjaro	13	2	4	20	20	20	20	16
19. Ruvuma	19	10	16	18	15	15	19	3
20. DSM	20	1	20	19	19	13	13	20

Source: Poverty and Welfare Monitoring Indicators, Vice President's Office, Dar es Salaam November, 1999

^{6/} Rank "1" Implies most deprived region and "20" least deprived region.

^{7/} Weighted average ranking for infant mortality rate, life expectancy and crude death rate

^{8/} Average weight and ranking for population per health facility and population per hospital bed

^{9/} Average weighted rate for population per health facility and population per hospital bed

Annex 4 – ADDITIONAL TECHNICAL SPECIFICATIONS

A. Rehabilitation of the Sea wall at Dar es Salaam

All the initiatives related to the protection of the Tanzania coast are well coordinated and design through important documents such as Port Master Plan (2008-2028) and National Adaptation Programme of Action, 2007.

In all cases the functions of the seawall are to:

- To control the wave overtopping in consideration of the environmental conditions and others to which the sea walls concerned are subjected.
- To protect the land area behind the seawall from waves and storm surges.

As seen below, the seawall at Dar es Salaam in Ilala district is showing signs of severe degradation and near disappearance in places and needs to be rehabilitated to take into account the projected sea level rise. In the central area of the city, the main road, Ocean road, links the major city buildings (State House, commercial buildings and offices, foreign embassies, hospital, parks) and neighborhoods. In some areas, this road is now mere meters away from the water.

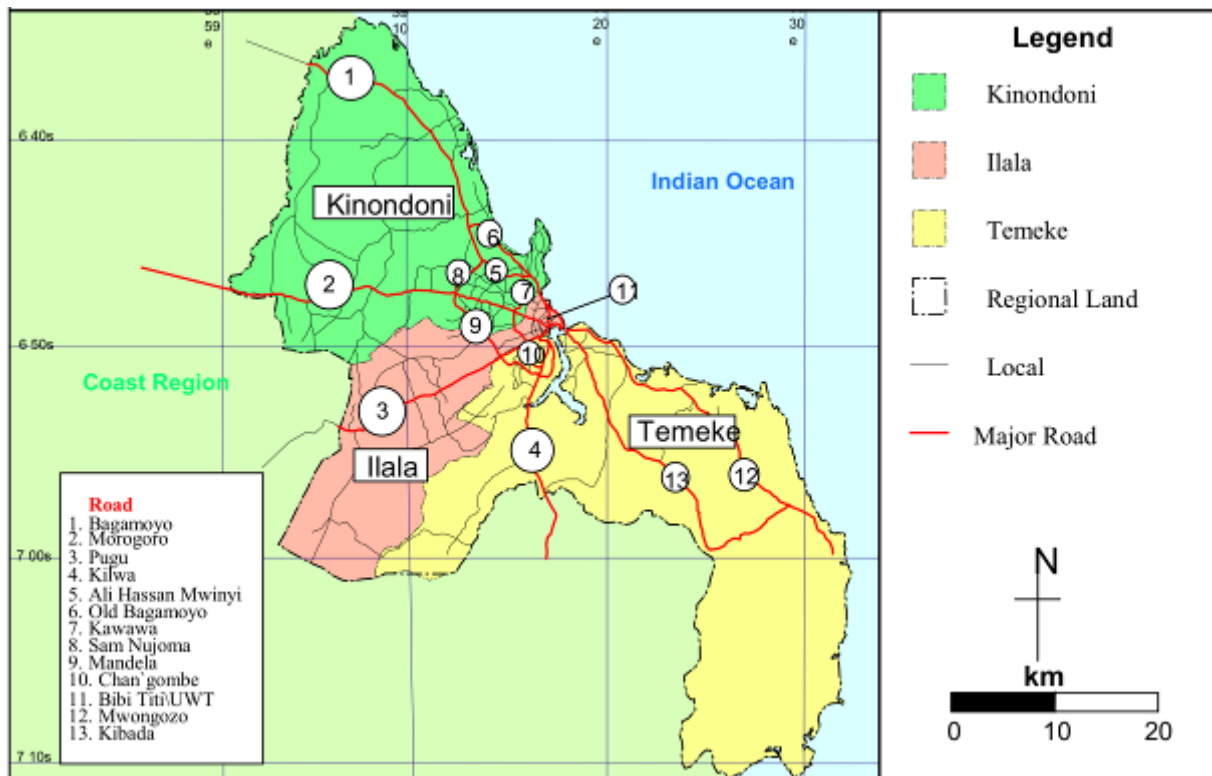


Figure 4: Map and major Roads of Dar es Salaam – the area concerned by this project is in the Ilala zone, along the water.

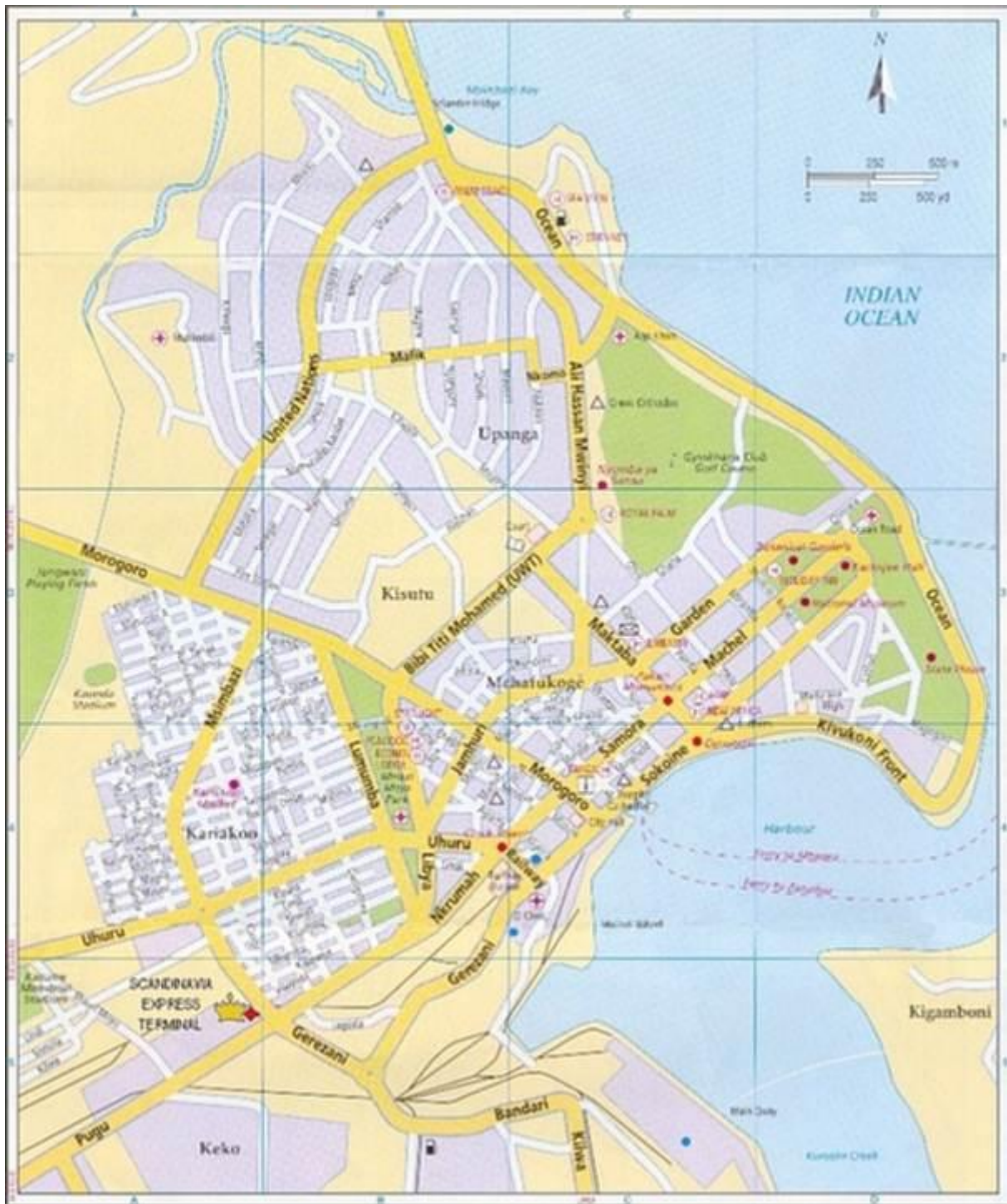


Figure 5: map of Dar Es Salaam, Ocean Road and major sites



Figure 3: Current Situation along Coastal Zone in Dar es Salaam



Figure 4: Current Situation Of The Sea Wall In Dar Es Salaam To Be Re-Constructed



Figure 5: Evidence of water movement towards the wall



**Figure 6: Relation of the current sea wall to Ocean road and other infrastructure
Proposed rehabilitation of Dar es Salaam seawall at Ocean Road.**

The height of the peak of the wall will be set to + 4.50 m Chart Datum based on the following elements⁶⁰:

- Tides: The coast of Tanzania experiences a semi-diurnal tide with two almost equal maxima and minima during a lunar day (24.8 solar hours). Using Admiralty Charts and data published by the Tanzania Port Authority, it has been established that Dar es Salaam has the lowest water level after Lindi, while Bagamoyo has the highest water levels. From measured tides it was evident that the highest water levels are observed just before the winds change direction, i.e. in March/April and October/November. The maximum tidal range was over 4 metres (e.g. 4.25 metres in 1989). Flood tide the current direction is southerly (an average of 210 degrees) and at high tide the average direction is 150 degrees around Dar es Salaam. Under climate change scenario, a tidal current of between 1Kn – 3Kn was used to derive the specifications of the seawall.
- Wave action: Wave action on the coast is usually low because the shore is nearly everywhere protected by coral barrier islands, some 5 to 15 miles offshore. Wave action is strongest during those rare times when especially high tides coincide with local storms accompanied by strong onshore winds. On the average, the current speed is 0.1 m/s. Significant waves heights increase with increasing water level, from 0.1 metres in water depth of 0.5 metres to about 0.4 metres when the water depth reaches 2.4 metres. The wave period does not show significant variation with increasing water depth. The average wave period is 8 seconds. There is currently no reliable data on the impact of sea level rise on the amplitude and frequency of wave action: ESE swell with peak period of 8 seconds to 10seconds and wave height 0.5m and 2.5m from March to December, and NE wind wave with peak wave period of 6s to 8s and wave heights between 0.5m to 2.0m from December to February.
- Sea Level Rise: the potential mean sea level rise based on present and future climate change scenarios. As per National Communications and NAPA, the minimum level expected is 50cm and the maximum level expected is +1m.
- Surcote (local weather conditions): Analysed wind data shows that the 50-year return wind speeds are 13.5 m/s for Dar es salaam. Wind peaks in Dar es Salaam occur during February, April and July. Under a climate change scenario, the data has been also adjusted to take into consideration a

⁶⁰ These elements were provided through existing data, as well as discussed at a workshop with engineers and experts from relevant ministries. While there exists no single repository of technical data on coastal parameters, and while a specific design of the sea wall should be subject to its own survey and engineering plans, the data included here is judged to be the best available approximation. See also Annotated Bibliography of Tanzania Coastal and Marine Science, 2000.

modified precipitation regime (higher frequency of stronger rain events), and higher mean temperatures.

- And a safety margin (for example to take into account the phenomenon of compressing which follows construction).

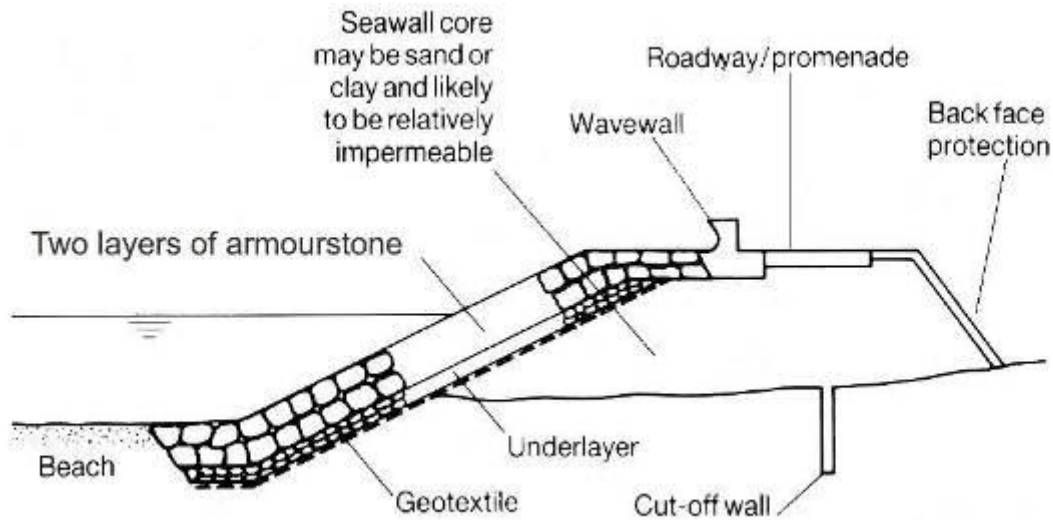


Figure 7: Typical cross section of the seawall

The table below shows the specifications of the planned coastal infrastructure.

General Configuration	Value
Total Length of the zone to be rehabilitated/constructed (m)	1020
Width wall and walk and riprap (m)	17
Total width (m)	22.5
Distance of the structure from the line of reference (m)	+10
Baseline on which the basis of the work will rest (m)	-3.4

B. Relocation and redesign of boreholes

One of the major concerns related to sea level rise along the coast of Tanzania is inundation and salinization of wells. In areas where salinity has penetrated to water wells, or where existing wells have been inundated due to coastal erosion and SLR, existing wells will be decommissioned, and new wells or boreholes will be constructed in higher locations. The precise locations of new wells will be based on recommendations of proper hydrogeological surveys and models.

Typical well details for coastal conditions is presented in figure 8 . The boreholes will range from 40 to 100m and are cased in uPVC pipes which are corrosion resistant. The exact depth and well details will depend on engineering desing at specific sites. It is envisaged that boreholes will constructed in Mtwara and Muheza areas.

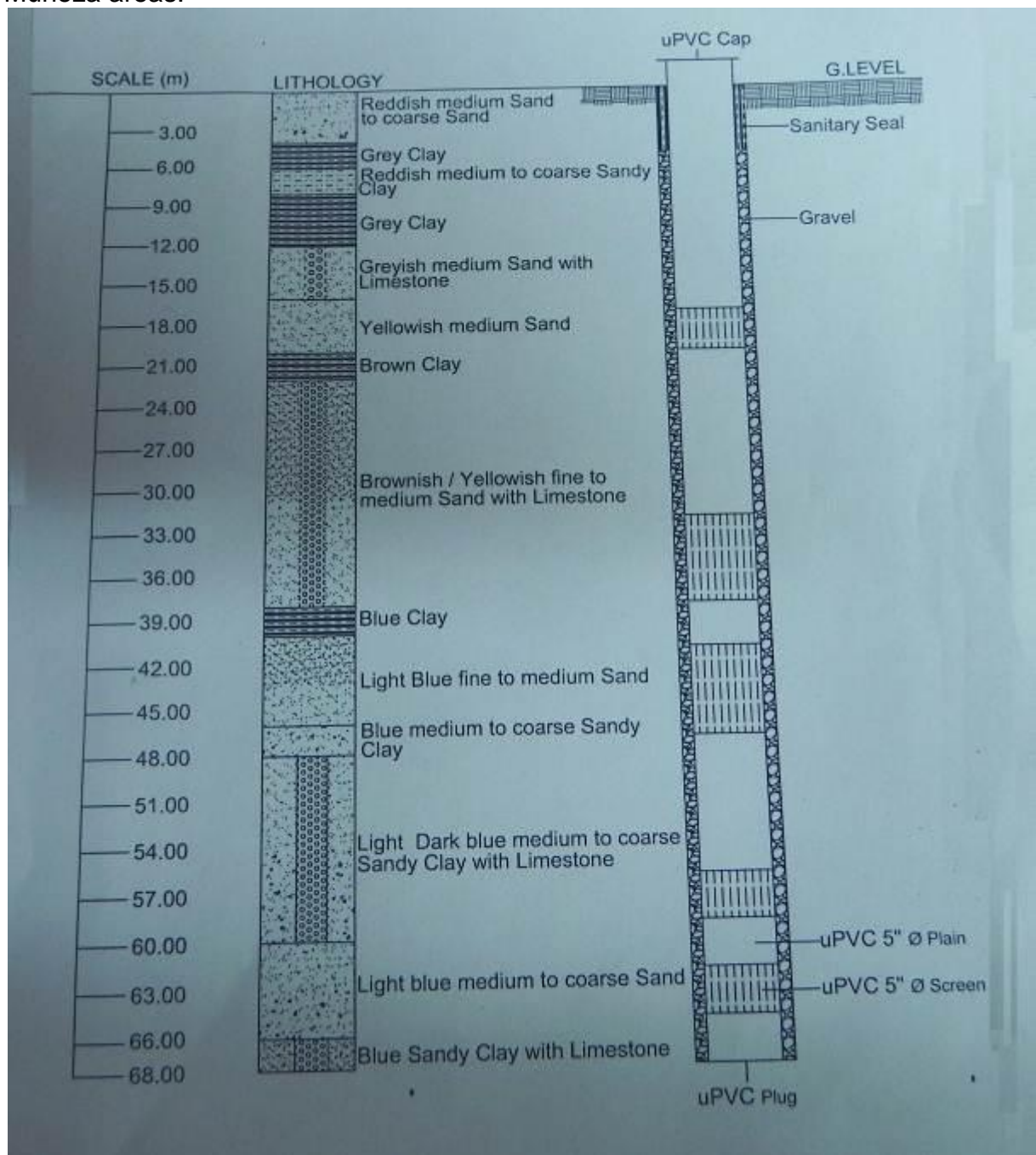


Figure 8: Typical borehole details for coastal areas in Tanzania (DDCA, 2008)

Specifications for new boreholes

	value
Depth (m)	40-100
Casing	uPVC
Casing diameter (inches)	4.5-12.0

C. Cleaning and Rehabilitation of Drainage systems

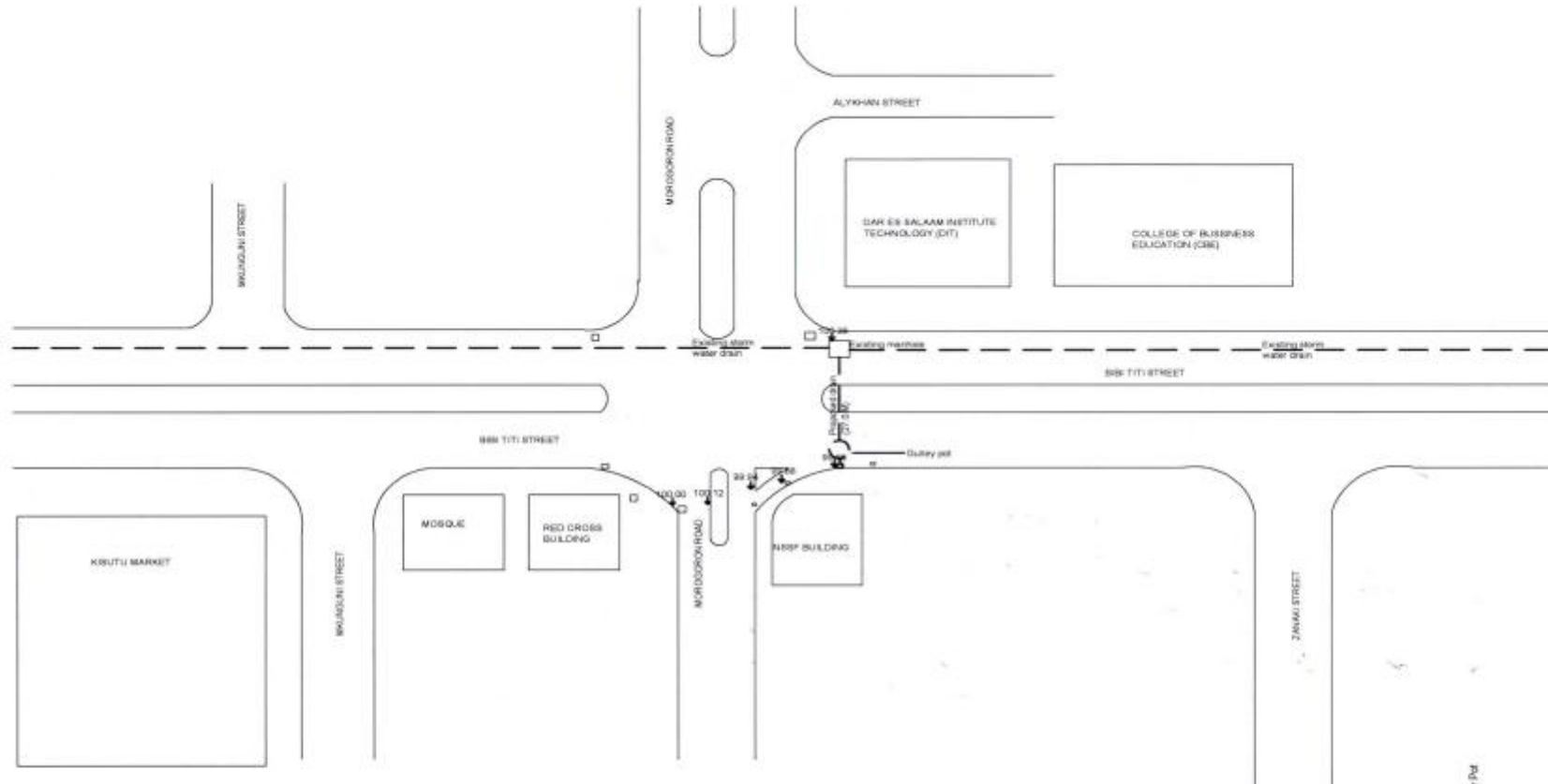
The design and technical specifications of the drainage systems in Tanzania will be subject to targeted, site-specific, engineering and hydrological reviews during project implementation. For example, new storm drain designs are usually subject to highly specific data requirements, including: total drainage area, length of the hydraulically longest drainage path, elevation of the watershed ridge, elevation of the watershed outlet, hydrologic soil group, type of terrain, land use, and information on the extent of development in urban areas.

However, as this project concerns the rehabilitation, cleaning or upgrade of existing systems, based on available information and technical data, the following parameters have been outlined for the upgrade of urban drainage (e.g. storm drains), based on the Dar es Salaam case.

As per current practice, storm drain systems are designed to take into consideration the following minimum requirements (each element is defined according to recognized engineering standards and formulas):

- Base flood, flood frequency, and magnitude: The Base flood is a flood occurring every 100 years (taken as the maximum extreme). The frequency of occurrence or return period represents the average period of time between events equal to or greater than a given magnitude.
- Inlet type and positioning, conduit location and length: Trunk or main line conduits are located outside the roadway pavement. The final location of a conduit system is established in such a manner that its length is a minimum consistent with hydraulic requirements. Flowline depth or vertical location of conduit is generally determined by size of conduit and slope requirements. Flowline depth or vertical location of conduit is generally determined by size of conduit and slope requirements. A minimum depth of cover of 3.0 ft. is recommended. Manholes are installed at all changes in pipe grade or size.
- Time of concentration and rate of discharge: The time of concentration (for pipe sizing) is defined as the time required for water to travel from the most hydraulically distant point. Typically, this time consists of two components: 1) the time for overland and/or gutter flow to reach the inlet, and 2) the time to flow through the storm sewer system to the design point.

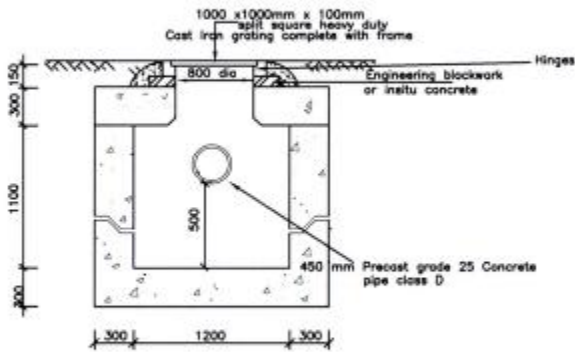
Below are additional details on the design of the Dar es Salaam drainage system, and expected rehabilitation works. Similar methods and models are to be applied in Muheza.



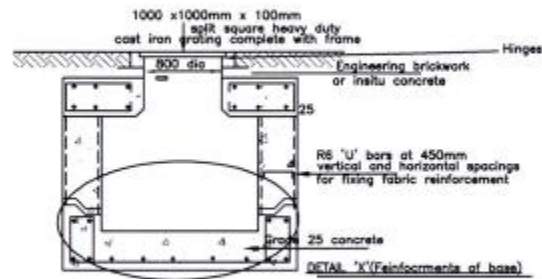
Layout Plan

Reduced L(m)		Existing Manhole
Pipe Invert Level (m)	86.19/86.88	Quarry Pit
Gradient (%)	0.5 %	
Chainage (m)	0 + 40	0 + 67
Remarks		

Longitudinal section 6



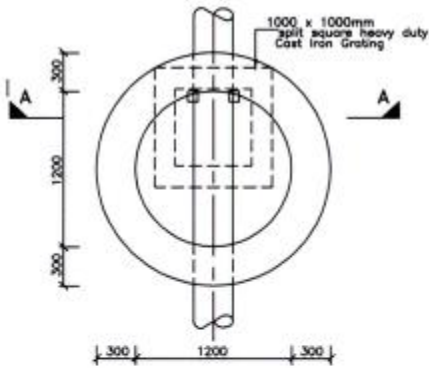
GULLEY POT



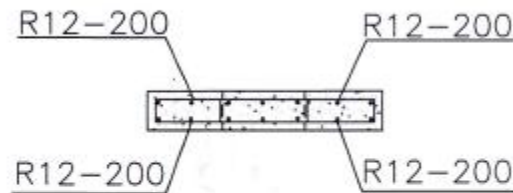
REINFORCEMENTS OF GULLEY POT



DETAIL 'X'(Reinforcements of base)

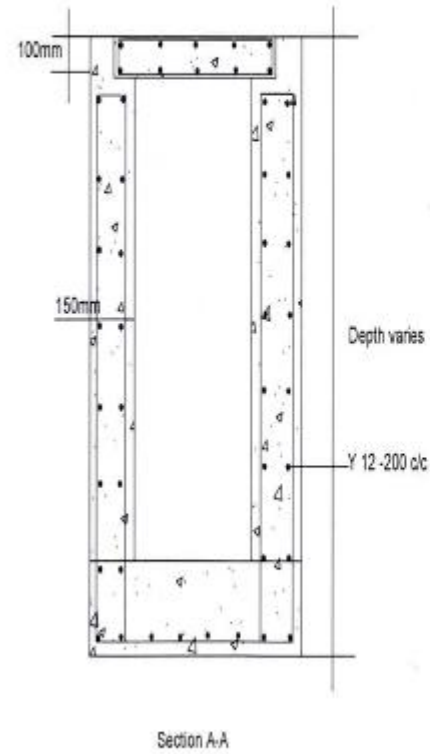
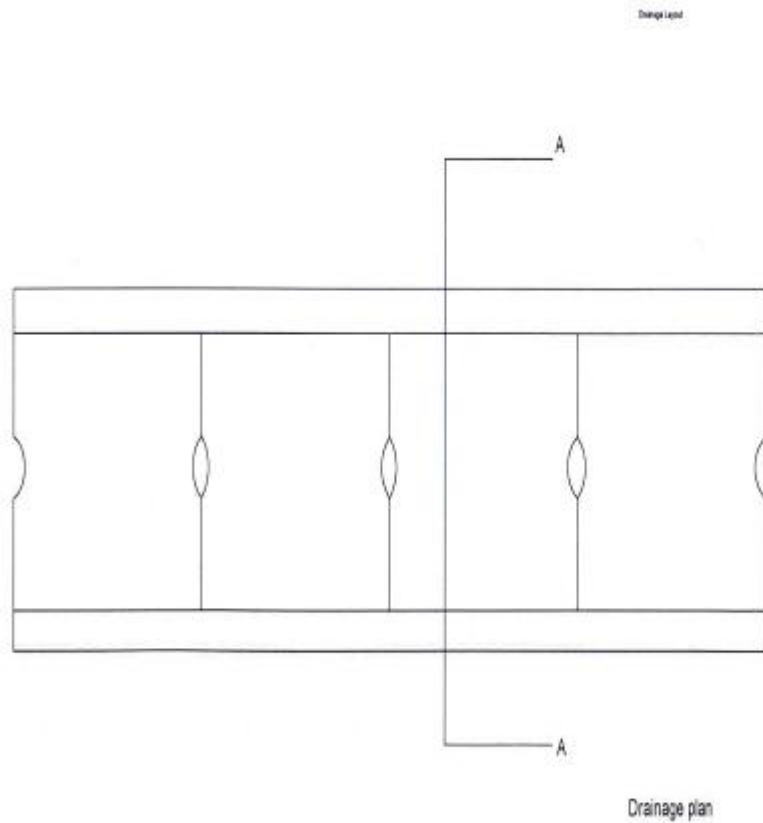


GULLEY POT PLAN



REINFORCEMENTS OF COVERS

Rev	Date	June 2009
Architects		
Engineers		
ILALA MUNICIPAL COUNCIL		
Client		
ILALA MUNICIPAL COUNCIL		
Job Title		
PROPOSED STORMA WATER DRAIN AT BIBI TITI STR/MOROGORO ROAD		
Drawing Title		
GULLEY POT DETAIL		
Designed By		Checked By
WWD IMC		
Scale	Date	Drawn
NO SHOWN	AUG 2009	CMH
Dwg. No 1		Rev. Non 1
IMC/WD/BM/DR/O2		



Client
ILALA MUNICIPAL COUNCIL



Job Title
CONSTRUCTION OF STORM WATER
DRAIN ALONG OMARI RONDO STREET

Drawing Title
Layout Plan & Sections

Designed By Checked By

Scale	Date	Drawn
1:250 & 1:20	Aug 2009	

Org. No Rev. No

IMC/WD/ OR/01

D. Technical Specifications for Ecosystem Rehabilitation

Below are additional technical details on the activities that are proposed as part of Component 3.

D.1 Mangrove Rehabilitation

Mangrove rehabilitation is to be undertaken in each of the three sites, with a targeted area of 600ha total rehabilitated mangrove surface. Mangrove restoration aims to return an area to a condition more closely resembling its original state, including restoring the full range of biological diversity and all the essential ecological processes.

First for a given area of man- groves or former mangroves, the existing watershed needs to be analyzed, and in this case in particular, changes to the coastal plain hydrology will be documented. A forward-looking analysis will also be performed to determine the potential impacts of sea level rise on saltwater content and internal hydrological flows and bathymetry. Factors to be analysed in mangrove restoration projects include:

- Size and extent of drainage basin
- Extent and area of mangroves at the downslope (i.e., toward the sea) end of the basin
- Topography and bathymetry of the mangrove areas
- Hypsometric characteristics to calculate the current tidal prism of the mangrove areas
- Rates of terrestrial input of water, sediment, and nutrients

Mangrove restoration can take two paths: one, based on natural processes, consists in restoring the hydrological flows and functions (ie the natural ecology of the mangrove) and to establish no-take zones, so as to allow for natural revegetation (known as the Ecological Mangrove Restoration method). However, this may not achieve intended results in terms of growth speed and quality. In this event, mangrove tree species produce propagules that can be collected and planted and, in the right conditions, growth is fast. Propagules may be planted directly which is generally adequate (particularly for *Rhizophora* spp.), although seedlings and saplings can be grown to a height of 0.3-1.2m beforehand. Where seedlings will be planted, they will be grown from existing species (taken from local samples).

In the case of Tanzania, both methods will be applied in all three sites, including with the creation of temporary mangrove tree nurseries, when not already existing. In Dar es Salaam, the accent will be on replanting. In all cases, locally available seeds will be used. Nine mangrove tree species are found in Tanzania⁶¹.

Tree species	Family
--------------	--------

⁶¹ Remote Sensing of Mangrove Change along the Tanzania Coast, *Marine Geodesy*, 26:1–14, 2003

1	<i>Avicennia marina</i>	<i>Verbenaceae</i>
2	<i>Bruguiera gymnorrhiza</i>	<i>Rhizophoraceae</i>
3	<i>Ceriops tagal</i>	<i>Rhizophoraceae</i>
4	<i>Heritiera littoralis</i>	<i>Sterculiaceae</i>
5	<i>Lumnitzera racemosa</i>	<i>Combretaceae</i>
6	<i>Rhizophora mucronata</i>	<i>Rhizophoraceae</i>
7	<i>Sonneratia alba</i>	<i>Sonneratiaceae</i>
8	<i>Xylocarpus granatum</i>	<i>Meliaceae</i>
9	<i>Xylocarpus molluccensis</i>	<i>Meliaceae</i>

A buffer zone will be established around replanted and transplanted sites, and no-take zones will be enforced through community-based management agreements. Monitoring of tree growth will occur every 6 months.

D.2 Coral Reef Rehabilitation

Coral reefs have great socio-economic importance in Tanzania. They are abundant with finfish, lobsters, prawns, crabs, octopuses, mollusks and sea cucumbers, thus supporting a large part of artisanal fish production as well as being important for commercial fishing. Coral reefs are located along about two thirds (600 km) of Tanzania's continental shelf. Fringing reefs and patch reefs predominate. These reefs are found along the continental shelf, which is 8–10 km wide along most of the coast (IUCN Conservation Monitoring Center, 1988). The islands of Zanzibar, Pemba and Mafia, as well as numerous small islands all along the coast, are for the most part surrounded by fringing reefs. Also an outer fringing reef runs along the eastern side of both the Mafia and Songo Songo archipelagos. Fringing reefs of Tanzania are usually narrow and often consist primarily of a reef flat. The fringing reef system is broken by numerous mangrove stands. Reefs on the landward sides of offshore islands and patch reefs usually have good coral development, but often the reef slope does not extend below 10 m. On the contrary, reefs on the seaward sides of islands and patch reefs have extensive reef slopes⁶².

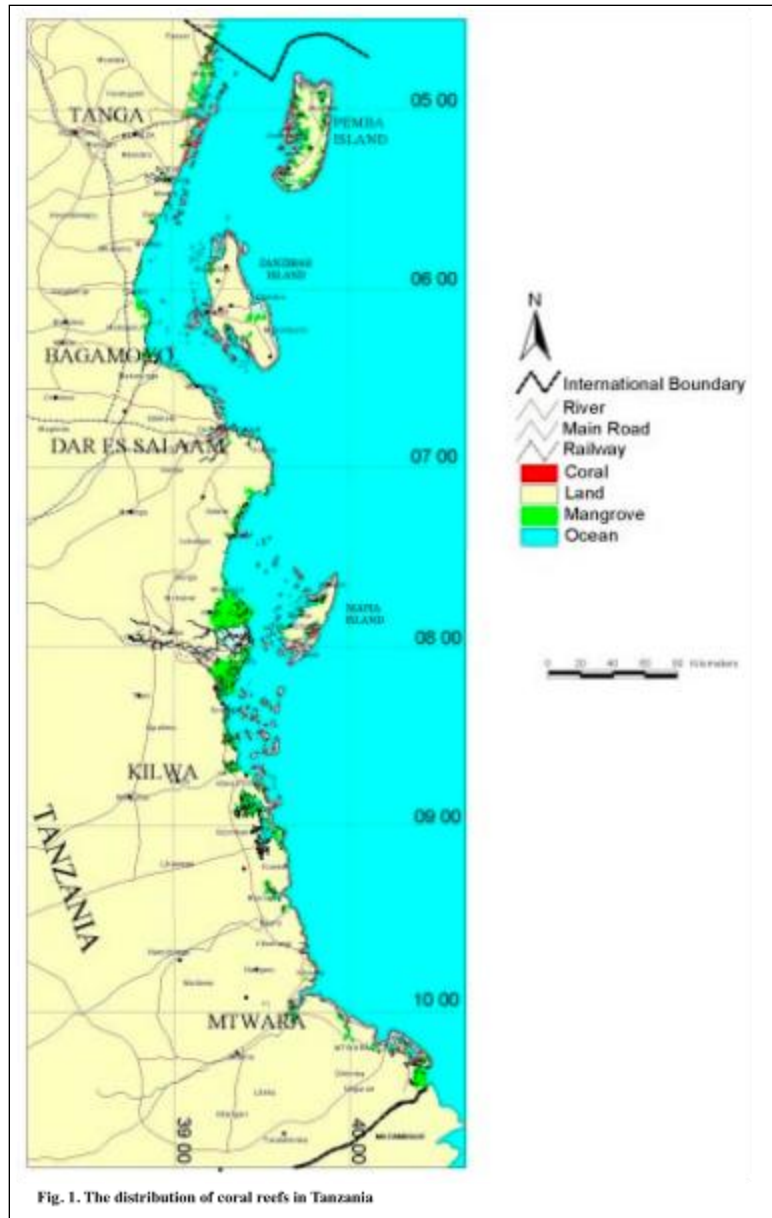
In the case of coral reef ecosystems, several restoration techniques can be applied (Wagner, 2000). A simple technique is the physical removal of sediments, rubble, and sometimes algae from the surface of reef structures to facilitate the settlement and establishment of corals. A second method is the transplantation of coral fragments taken from healthy colonies (Guzman, 1991; Clark and Edwards, 1994). Coral fragments are stuck onto suitable substrate using cement or glue. A third method is the broadcasting of coral fragments loosely onto the substratum (Lindahl, 1998). This method can be used for transplanting large, heavy fragments in deeper sites. A fourth method is the placement or creation of artificial substrates or reef structures (Edwards and Clark, 1992; Clark and Edwards, 1994), such as concrete blocks or ceramic tiles (Nzali et al., 1998). These provide suitable substrate for the settlement and establishment of coral larvae.

Methods to be used in this project will include, for the most part, assisted passive restoration, meaning that some restoration activities will be put in place in order to facilitate the ecosystem's natural regeneration – coupled with conservation and enhanced management. For example, coral larvae transplants will be used to reestablish

⁶² Greg M. Wagner, Coral Reefs and Their Management in Tanzania, Western Indian Ocean Journal, 2004.

coral populations. Recruitment to a restoration site can be regarded as a three-stage process. Firstly, planktonic coral larvae can either be produced by spawning or planulation of remnant corals at the site or be carried from nearby reefs with healthy coral populations. A range of factors, including the topographic complexity of the site, presence of crustose coralline algae, amount of fleshy macro-algae, sediment build-up on surfaces, and amount of grazing by herbivorous fish and urchins to create bare space will determine what proportion of the larvae succeed in settling⁶³. Stabilisation of the substrate is also another factor and various methods have been used, ranging from highly specialized civil engineering works, to low-tech methods such as the use of plastic mesh placed over the substrate. In this case, low-tech measures will be used wherever stabilization is necessary. No ex situ nurseries will be established, but rather coral material will be taken from existing healthy sites and transplanted to damaged areas, using in situ floating nurseries.

⁶³ Coral Reef rehabilitation manual, Alastair Edwards, Ed. 2010.



D.3 Beach Nourishment, Coastline reforestation

Beach nourishment involves transporting and depositing sand from elsewhere to the depleted area. Beach nourishment concerns the transport of sand to the entire beach profile, including below the water. Nourishing a beach can be accomplished by four different methods (Hanson et al. 2006):

1. Beach nourishment, a method where the sand is placed on the beach by a vessel through a pipeline or by trucks from land.
2. Foreshore nourishment, slurry of sand is sprayed on the beach from a

vessel. This method requires calm wind conditions.

3. Shoreface nourishment, sand is emptied from the bottom of a ship at a depth of five to six meters outside the shoreline.

4. Profile nourishment, a method where sediment is distributed over the whole cross-shore beach profile.

A number of parameters enter into consideration when undertaking beach nourishment:

- nature of in-fill material: sediment's grain size to match native material, origin of material.

- dredge placement and dredge/transport type: pipeline, hopper, truck transport, pumping, conveyer belts. These are generally determined by questions of feasibility and costs.

- long-term erosion and flow dynamics: rates of replenishment, currents, tidal action and sea level rise.

In the case of Tanzania, due to the high cost of beach nourishment, the activity will only be undertaken in 2 locations (Mtwara and Muhwza), along beaches that have been severely depleted or eroded. Beach nourishment will also only be undertaken in conjunction with other measures for coastal management, including coastal reforestation, rehabilitation of natural buffer ecosystems.

Subject to targeted engineering studies and final design (to be submitted during procurement), nourishment will be undertaken using local off-shore sand resources, through pumping and pipelines (methods 1 and 4). The recreated beach distance will be 60m from the water line, to ensure proper duration and sustainability, absorption of tidal impacts and an adequate buffer zone. Actual linear distance of beach to be nourished using this method will be of approximately 10km (5 km in each site), whereas the total intended area of 200km will be subject to reforestation, using native local species and resilient species.

Annex 5. Note on the use of the Implementing Entity Project Fee

Tanzania - Adaptation Fund MIE fee budget	8.5% Fee	Project	Total financing
Overall coordination and management	157,620		
Oversight and management of project development and project implementation	198,371		
Financial management, including accounting, treasury, grant and trust fund management	119,945		
Information and communication management	42,288		
Quality assurance including internal and external audits (Note 1)	76,888		
Overall administration and support costs	<u>173,767</u>		
Total indirect costs (Note 2)	<u>768,879</u>	9,045,638	9,814,517
<p>Note 1 - This portion of the MIE fees covers the cost of overseeing the M&E function of the project by the MIE</p> <p>Note 2 - Direct costs will be recovered from the project</p>			

Annex 6. Letter of Endorsement

UNITED REPUBLIC OF TANZANIA

Telegraphic address: "MAKAMU",
Telephone: +255 222113857/2116995
Fax. No.: +255 222113856
E-mail: ps@vpo.go.tz



VICE PRESIDENT'S OFFICE,
Luthuli Street,
P.O.Box 5380,
DAR-ES-SALAAM
TANZANIA

In reply please quote:

Ref. No: **BA.38/49/01**

15th April, 2011

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 COMMUNITIES
IN TANZANIA" PROJECT**

Kindly refer to the subject and Decision B.13/14 of the Adaptation Fund Board at its thirteenth meeting.

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 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 and re-submit this proposal amounting to US\$ 9, 814,517 and submit it for funding through UNEP as a Multilateral Implementing Entity.

Your consideration and cooperation is highly appreciated.


Eng. Ngosi C.X. Mwihava
For: **PERMANENT SECRETARY**

All correspondences should be Addressed to Permanent Secretary,

Annex 7 - Summary of UNEP Expertise and Experience relevant to this project

At the request of the Secretariat, and as a supplement to the information provided to the Adaptation Fund Board during its accreditation process, UNEP is providing the following information highlighting relevant areas of experience and expertise. UNEP in Tanzania works closely with other UN agencies through the One UN platform.

UNEP's Comparative Advantage in Implementing the Project

This project will be implemented by the United Nations Environment Programme (UNEP) as selected Multilateral Implementing Entity. UNEP's experience in implementing large-scale climate change adaptation projects provides comparative advantage and value-added for the successful management and completion of this project.

UNEP's work on climate change adaptation focuses on three main areas: science and assessments; knowledge and policy support; and building the resilience of ecosystems for adaptation. UNEP's credibility as a capacity builder, ecosystem manager and knowledge mobilizer is built on the implementation of approximately 80 projects on adaptation at global, regional and national levels, spread across the globe.

UNEP has demonstrated experience in managing large projects, promoting and supporting interventions and investments on the ground, and implementing projects at a distance. More specifically, UNEP's commitments provide concrete examples of how it will meet the six objectives of the project:

- adverse impacts of sea level rise on coastal infrastructures and settlements are reduced
- adverse impacts of floods averted
- adverse impacts of climate change on water supply and quality averted
- livelihoods are sustainable, diversified and resilient
- coastal and shoreline ecosystems are rehabilitated and ICAM is implemented
- knowledge of climate impacts and adaptation measures is increased

For instance, in Haiti, UNEP is engaged in a 20 year programme to restore watersheds and coastal areas, with a particular focus on mangroves. UNEP has also helped implement Mangroves for the Future (MFF), a regional partner-led initiative to promote investment in coastal ecosystems conservation for sustainable development. It aims at strengthening the environmental sustainability of coastal development and at promoting sound investment and action in coastal ecosystem management. MFF includes all coastal ecosystems, coastal forests, coral reefs, estuaries, lagoons, sandy beaches, sea grasses and wetlands. In its first Phase (2007-2009) MFF worked in India, Indonesia, Maldives, Seychelles, Sri Lanka, and Thailand, where UNEP provided implementation of technical activities in the areas of climate change, disaster risk reduction and analysis of marine protected areas. This work demonstrates know-how in the area of coastal and shoreline ecosystem rehabilitation.

UNEP has experience in assisting countries in the prevention of impacts from sea-level rise, natural disasters and climate change. For instance, UNEP supports member countries of the Coordinating Body on the Seas of East Asia (COBSEA) in the sustainable development and rehabilitation of coastal areas. UNEP has also addressed the issue of adverse effects of climate change on water supply and quality. In Iraq, for example, UNEP has been working with the International Environmental Technology Centre in Japan, on the rehabilitation of the Iraqi marshlands, the largest wetlands ecosystem in the Middle East. This work promotes environmental sustainable technologies (EST) to improve water quality. Similarly, in Comoros UNEP has supported the water resource management to increase the water supply and improve water quality. This has been carried out by strengthening the capacity of institutions at a national and community levels to integrate climate change information into water resources management.

UNEP's work has ensured that livelihoods in climate vulnerable regions are sustained, diversified and resilient. In Kenya for instance, UNEP is working with the government to rehabilitate the Mau Forest Complex. This ecosystem is one of Kenya's five water towers and is critical for the economic and social development of the country. UNEP has been supporting this work to promote livelihood sustainability in the areas of eco-tourism, tea plantation, local food production, and investments in the Lake Victoria basin as well as providing incentives for the local population to finance forest protection.

UNEP has been a mobilizer of knowledge on climate change impacts and adaptation measures; it has assisted 38 developing countries to conduct comprehensive vulnerability assessments and identify adaptation options through the process of preparation of National Communications. Moreover, UNEP has recently completed the Economic Analysis of Adaptation Options in Africa.

For purposes of knowledge-sharing and to meet increasing demands from developing countries for climate change responses, UNEP has launched three flagship programs, of which Ecosystem-based Adaptation (EBA) is used to build resilience of vulnerable ecosystems, and use ecosystem services for adaptation and disaster risk reduction, such as floods and coastal infrastructure degradation. UNEP is thus providing support through:

- (i) methods, tools, guidelines and good practices to assess ecosystem vulnerabilities, value and evaluate ecosystem services for adaptation and equitable payment mechanisms, restore ecosystem adaptation functions, and manage trans-boundary ecosystems;
- (ii) piloting, experimenting and demonstrating adaptation at ecosystem and community levels, incorporating good practices of community-based adaptation and micro-credits;
- (iii) national impact and vulnerability assessments of targeted ecosystems, capacity building and technical supports for integration of EBA into national policy, planning and investment framework; and (iv) collection, packaging and dissemination of good practices through the Global Adaptation Network

This project is consistent with UNEP's comparative advantage as identified through the GEF Council paper C.31/5. This document delineates UNEP's comparative advantage in providing the

GEF with a range of relevant experiences, a proof of concept, the testing of ideas, and the best available science and knowledge upon which it can base its investments. UNEP has demonstrated experience in managing large projects, promoting and supporting interventions and investments on the ground, and implementing projects at a distance which provides comparative advantage in implementing this project.

Annex 8. Preliminary Environmental and Social Impact Assessment

Under the guidance of the Vice President's Office, a preliminary screening of Environmental and Social Impacts was undertaken for this project. Findings are summarized below using the recently developed template for UNEP Environmental and Social Safeguards. Detailed ESIA will be undertaken for specific activities during project implementation, as per Tanzanian laws and regulations, and under the authority of the Vice President's Office, Division of Environment.

Project location:		Yes	No	Comments and scope of impact
Is the project area in or close to -				
	- densely populated area	X		Population density in Dar Es Salaam is high, as is the degree of concentration of buildings and economic assets along Ocean Road, where the sea wall is to be rehabilitated. Negative impacts could include disruption of circulation and road traffic during construction, temporary air pollution.
	- cultural heritage site		X	
	- protected area	X		The project intends to strengthen the current protected areas by rehabilitating the environment in the coast. No negative impacts expected.
	- wetland	X		The project intends to perform wetland rehabilitation and sustainable management. No negative impacts expected.
	- mangrove	X		The project intends to implement mangrove rehabilitation. No negative impacts expected.
	- estuarine			The project intends to promote the dredging of silted estuaries as a mechanism to reduce coastal flooding. Negative impacts could include temporary disruptions during dredging works, and longer term impacts could include modifications in river flows. A detailed EIA will be undertaken as per Tanzanian Rules and Regulations.
	- buffer zone of protected area	x		The project intends to increase buffer zones of protected mangroves in areas not currently occupied. No negative impacts expected.
	- special area for protecting biodiversity		x	
Environmental impacts, i.e. will the project cause		Yes	No	Comment/explanation
	Need for temporary or permanent support facilities?		X	
	- Increase in soil erosion and siltation?		X	The project intends to promote soil fertility maintenance through reforestation and shoreline management.
	Increase in peak and		X	The project intends to reduce flooding from excessive

	flood flows? (including from temporary or permanent waste waters)			rains.
	- Loss of downstream beneficial uses (water supply or fisheries)?		X	
	- Impairment of ecological opportunities?		X	The project is designed to protect and maintain ecological services in coastal areas.
	- Any loss of precious ecology?		X	
	- Threat to local biodiversity due to invasive species?		X	No alien species will be introduced. Alternative crops and reforestation activities will be undertaken using locally viable and adapted species.
	- Loss of downstream ecological and economic functions due to any construction of social infrastructure (e.g., road, training or information center, office or housing)?		X	Temporary disruptions may occur during sea wall rehabilitation works and ecosystem rehabilitation; however these disruptions are not expected to last beyond the duration of works, and the impacts of such works are expected to be positive.
	- Unnecessary loss of ecological value and decreased biodiversity by replacement of natural forest with plantation with limited number of species?		X	Reforestation, wetland rehabilitation and mangrove rehabilitation will be undertaken using locally adapted species and in respect of the ecosystem, using integrated approaches.
	- Ecological problems due to land clearance prior to reforestation (e.g., soil erosion, disruption of hydrological cycle, loss of nutrients, or decline in soil fertility)?		X	No land clearance is expected to take place during the project. Agricultural productivity increases are expected to take place without an expansion of area under cultivation.
	- Other ecological problems (e.g., pollution of water bodies from fertilizers, pesticides, and herbicides used in plantation)?		X	For agricultural elements of the project, the use of organic fertilization methods will be privileged. Where absolutely necessary, chemical fertilizers may be used, subject to Tanzanian standards and regulations.
	- Increased waste production?	X		Wastes may be produced during construction and rehabilitation works, particularly for sea wall rehabilitation and water well relocation. Waste disposal will take place in accordance with Tanzanian rules and regulations and practices, and construction works will be subject to a detailed EIA study prior to commencement.

	- Increased traffic?	X		Potential traffic increases along Ocean Road during rehabilitation works. A traffic redirection and mitigation plan will be developed prior to work initiation and during the EIA study.
	Polluting emissions to air?	X		Construction works may create additional temporary pollution.
	Other environmental problems, e.g. noise?	X		Noise may increase during construction works. These disruptions will be temporary and localized.
SOCIAL IMPACTS, I.E. WILL THE PROJECT CAUSE		Yes	No	Comment
	- Dislocation or involuntary resettlement of people?		X	The project does not intend to create relocation or resettlement of populations.
	- Disproportionate impact to women or other disadvantaged or vulnerable groups?		X	There will be a beneficial impact on women and youth during the project due to job creation, and increased water and energy availability.
	- Impairment of beneficial uses of traditional areas?		X	The project will not intervene in traditional areas.
	- Impairment of recreational opportunities?	X		There may be temporary disruptions to beach access during beach nourishment activities. These are intended to be limited in time, and will lead to longer term beneficial impacts due to beach enlargement and beautification.
	- Impairment of indigenous people's livelihoods or belief systems?		X	Beneficial impacts on livelihoods are expected, particularly in terms of agriculture and fisheries.
	- Possible conflicts with established management policies?		X	The project has been designed to supplement and enhance current management policies in order to promote resilience.
	- Social problems and conflicts related to land tenure and access to resources?		X	
	- Technology or land use modification that may change present social and economic activities?	X		The project intends to promote more sustainable land use patterns and agricultural practices in order to achieve higher productivity and promote alternative patterns of livelihoods. These initiatives will be undertaken with communities full participation and on a voluntary basis, and are expected to lead to positive impacts on communities' overall well being.
	- Uncontrolled in-migration (short- and long-term) with opening of roads to area and		X	

	overloading of social infrastructure?			
	- Increased local or regional unemployment?		X	The project is expected to contribute to job creation, through the GreenJobs program as well as through the creation of opportunities for private sector companies in project initiatives.
OTHER CONSIDERATIONS		Yes	No	Comment
	Does national regulation in affected country (-ies) require EIA and/or ESIA for this type of activity?	X		EIA will be undertaken as per requirements specified in Tanzanian Law.
	Is there national capacity to ensure a sound implementation of EIA and/or SIA requirements present in affected country (-ies)?	X		The Vice President's Office, Division of Environment, is legally responsible for the administration and oversight of the EIA requirement in the country. It has the capacity to administer EIA effectively.

Annex 9: Letter from Mayor of Dar es Salaam

DAR ES SALAAM CITY COUNCIL



STATEMENT OF LORD MAYOR ON CLIMATE ADAPTATION ACTIVITIES IN DAR ES SALAAM CITY.

Being a coastal city Dar es Salaam is one of the most vulnerable cities due to climate change. Local leaders have been addressing the impacts of climate change within their jurisdiction areas. These impacts, mostly coastal erosion due to sea level rise and floods due to precipitate rains, are continuing to threaten human lives especially the urban poor, public infrastructure and other properties.


The economic loss that will occur in the near future if no efforts are done to protect or take remedial measures within these areas is beyond what the City can afford.

We are part of the efforts being undertaken by UNEP and Vice President's office in the implementation of concrete adaptation measures to reduce Vulnerability of Livelihood and Coastal Communities in Tanzania. Through my office and on behalf of VPO I have undertaken consultations with councilors and vulnerable communities in the project areas and we look forward to the start of the implementation of this project. Each vulnerable communities and councilors consulted are highly supportive of this Project.

Some of important activities within the City of Dar es Salaam include reinforcing of seawall along Ocean Road and construction of new protection wall along Kigamboni creek within the City area highly impacted by sea level rise. We have also requested through this project the construction of storm water drains within the City Centre and Msasani Bonde la Mpunga which we hope will be part of key activities under this project.

On behalf of the people of Dar es Salaam we are highly complimenting these efforts, and we will give all the required assistance during preparation, implementation and life circle of the project.

Lord Mayor,

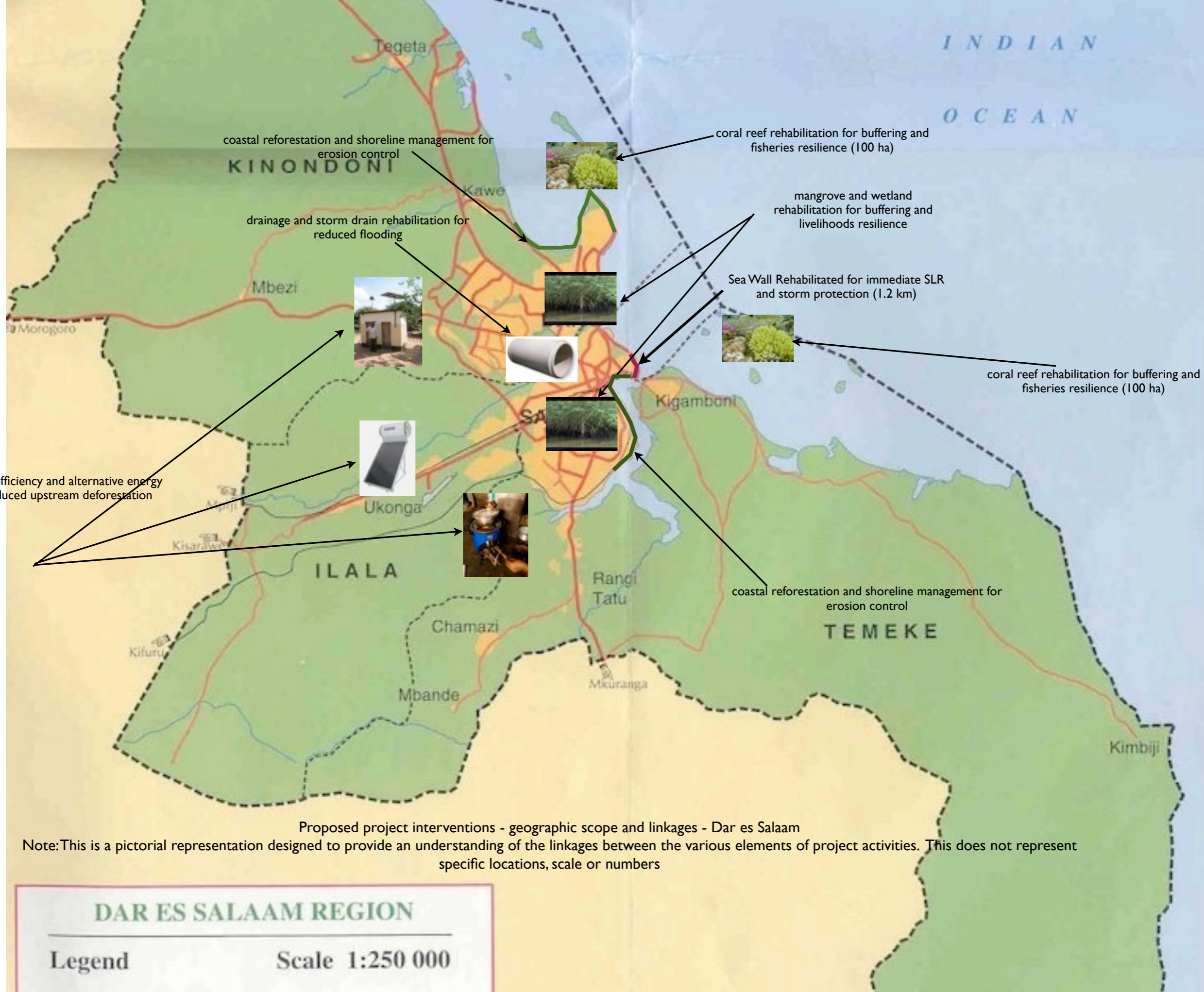

Didas John Masaburi. 20/3/2011

Annex 10: Coordination among site-level activities



Proposed project interventions - geographic scope and linkages - Mtwara

Note: This is a pictorial representation designed to provide an understanding of the linkages between the various elements of project activities. This does not represent specific locations, scale or numbers

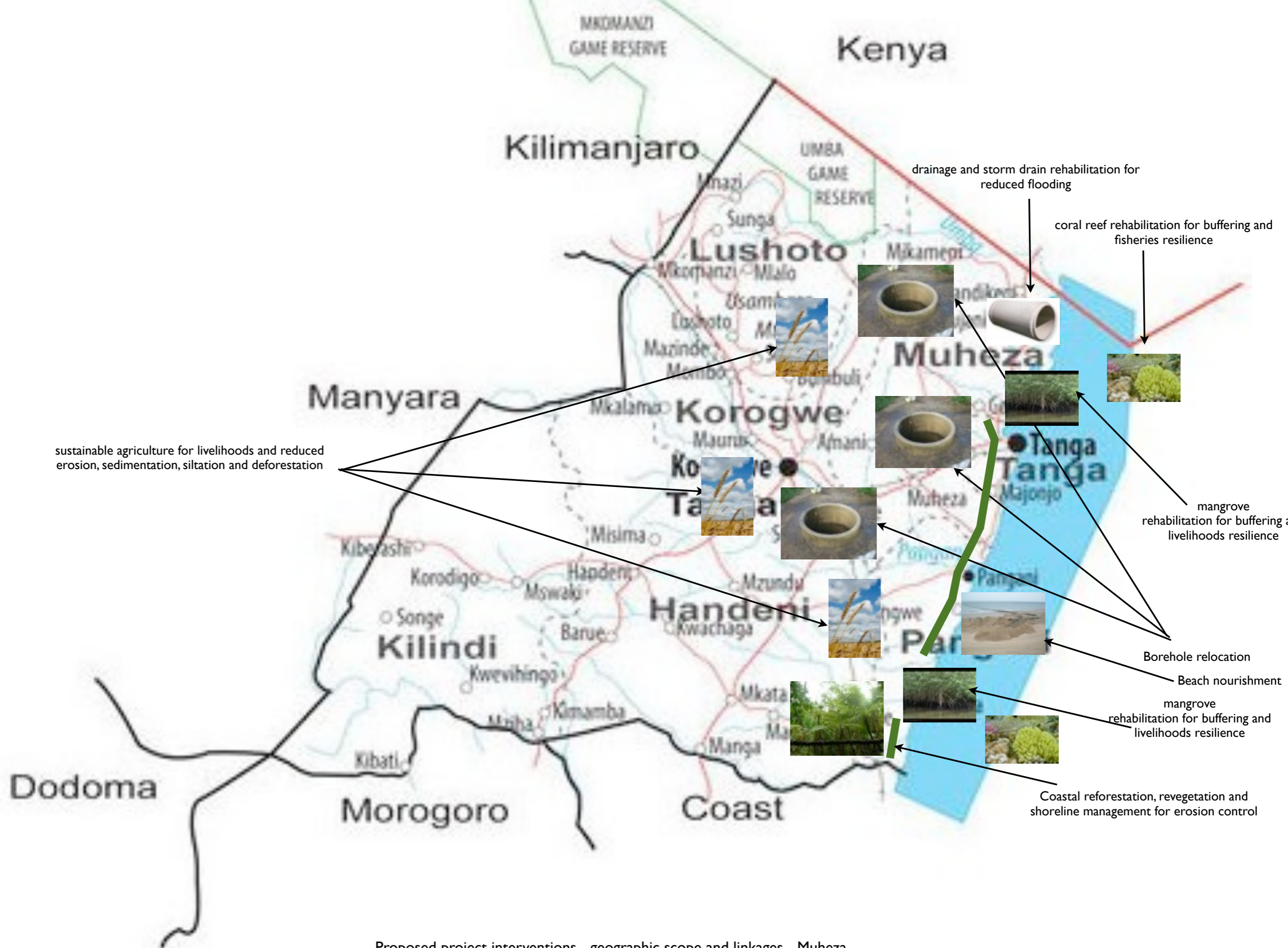


Proposed project interventions - geographic scope and linkages - Dar es Salaam

Note: This is a pictorial representation designed to provide an understanding of the linkages between the various elements of project activities. This does not represent specific locations, scale or numbers

DAR ES SALAAM REGION

Legend **Scale 1:250 000**



Proposed project interventions - geographic scope and linkages - Muheza

Note: This is a pictorial representation designed to provide an understanding of the linkages between the various elements of project activities. This does not represent specific locations, scale or numbers