



# **POLICY BRIEF CLIMATE CHANGE AND MARINE AND COASTAL ENVIRONMENT IN TANZANIA**



2014

## 1. Background

The coastline of Tanzania stretches over 800 kilometres from Tanga to Mtwara regions. Sustaining the marine and coastal environment is important in terms of economic improvement and the wellbeing of Tanzanians. It is rich in living resources such as coastal forests (e.g. mangroves), coral reefs, fisheries sea grass, and non – living resources like gas, beautiful beaches, minerals, rivers, and the ocean. Economically, the marine and coastal ecosystems provide employment and income to coastal people through fishing, beekeeping and ecotourism activities. Blessed with world-class coastal natural and cultural attractions, the potential for coastal tourism development in Tanzania is unlimited.

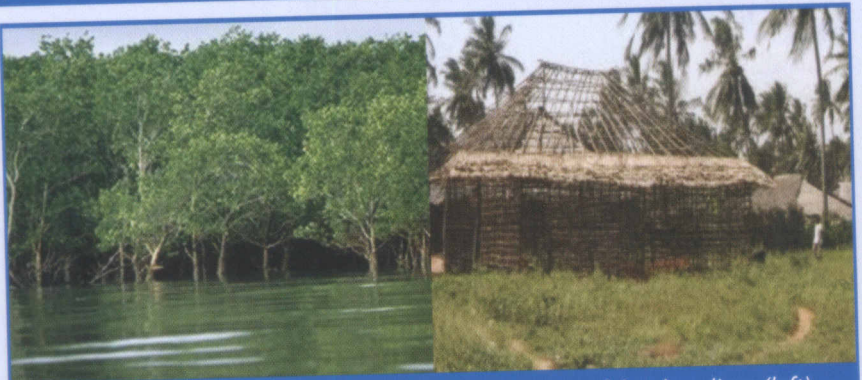
Resources such as mangroves are sources of fuel wood, timber, building poles, tannin and fodder. Mangrove leaves and fruits are also used for medicinal purposes.

*Climate Change is change in the state of the climate that can be identified (i.e. by statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer.*

The mangrove, seagrass beds, and coral reefs are major ecosystems in the coastal and marine environment, playing a crucial ecological role. These ecosystems are important habitats, breeding sites, nurseries and feeding grounds for a wide variety of living organisms. Amongst their many functions, the ecosystems protect the coast from erosion, filter dissolved chemicals from terrestrial environment that could harm the subsequent ecosystem, absorb carbon dioxide from atmosphere and trap sediment from terrestrial environment.

It is estimated that 25% of Tanzania's population is hosted by the coastal environment. Most of the industries in Tanzania (75%) are located along the coast and the coast is the entry and exit point of major cargos of the country. The coast has been attracting a number of people from inland for employment, leading to increased coastal population.

Climate change is threatening the coastal and marine environment. Critical ecosystems are also being threatened thus jeopardizing longterm provision of ecosystem services. This has therefore attracted the attention of all coastal inhabitants, the government and private sector to address threats emanating from climate change.



*Coastal resources such as mangroves offer protection of the shorelines (left). They are also used by many coastal communities as building poles (right).*

## **2. Climate Change Impacts and Vulnerability on Coastal and Marine Environment**

The coast has a very dynamic environment being the meeting point of the ocean and the land. The dynamism of the coastal area coupled with climate change impacts make coastal inhabitants more vulnerable to the associated impacts.

There is evidence that the impacts of climate change are already occurring and will increase in the future resulting in significant alteration of coastal ecosystems, coastal hazards, and lifestyle changes for fishers, coastal resource users, waterfront property owners and entire coastal communities. These have far-reaching impacts on a range of challenges for coastal resource managers.

The impacts currently being observed in our coastal area include:

- ♦ Sea level rise leading to land loss and damage to coastal structures and properties due to erosion of shorelines e.g. loss of properties in Kunduchi area;
- ♦ Submergence of coastal islands e.g. Fungu la Nyani in Rufiji. There is evidence that lower lying coastal areas like Lindi, Moa-Mkinga and Salale in Dar es Salaam have been inundated. Fungu la Nyani Island in Rufiji is believed to have submerged as a result of sea level rise (DPG-E, 2009). The projected sea level rise in the nation will have major impacts namely land loss of between 247 to 494 km<sup>2</sup> based on sea level rise of 0.5 and 1.0 metre respectively (Mwandosya *et al.*, 1998) ;

- ◆ Saline water intrusion in fresh water bodies e.g. Rufiji Delta, Mlingotini in Bagamoyo (Kasonta and Antony 1999);
- ◆ Coral reef bleaching due to rise in sea surface temperature such as the one that occurred in 1998 during the el-Niño phenomenon with detrimental impacts to fisheries and tourism (Mohammed et al., 2002). Climate change will undoubtedly continue to cause a rise in sea surface temperature; and
- ◆ Extreme weather events e.g. more frequent and severe coastal flooding as the one experienced in Dar es Salaam in 2011.



*Beach erosion in Pangani (left), erosion threatened structures at Kunduchi - Dar es Salaam (right)*

### **3. Adaptation Measures in the Coastal and marine Environments**

Tanzania has prepared the National Adaptation Programme of Action (NAPA) which has set short and medium term adaptation priorities. The Country has also prepared the National Climate Change Strategy that describes the impacts of climate change to various sectors and identified priority strategic actions needed for the country to adapt to the predicted impacts.

*Adaptation refers to the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.*

There are national marine and coastal environment strategies, programmes, projects and activities that have been addressing among others, the impacts of climate change. These include: the National

Integrated Coastal Environment Management Strategy (NICEMS); the Mangrove Management Programme; Conservation of Low land Coastal Forests Project; Tanzania Coastal Management Partnership (TCMP) – Pwani

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Project, Marine and Coastal Environment Management Project (MACEMP) and Kinondoni integrated Coastal Area Management Project (KICAMP).

There are also regional programmes and projects that are contributing to the National initiatives such as Regional Programme for the Sustainable Management of the Coastal Zones of the Indian Ocean Countries (RECOMAP), Agulhas Somali Currents Large Marine Ecosystems (ASCLME) which among others, have implemented adaptation activities related to coastal and marine environments.

In addition, there are conservation areas set up to conserve marine and coastal resources by setting up Marine Parks. These include Mafia Island Marine Park; Mnazi Bay and Ruvuma Estuary Marine Park; Dar es Salaam Marine Reserves; Tanga Coelacanth Marine Park. Recently the Tanzania Coral Reef Task Force (TzCRTF) was established to promote protection of coral reefs.

Other adaptation initiatives has been the construction of seawalls to protect the coastline. The Government and its partners have been implementing the construction of seawalls in selected areas along the coast in Dar es Salaam and Tanga. At Kigombe in Muheza, Tanga, an area under threat from sea level rise, affected communities with support from RECOMAP have constructed sea wall protection. In Dar es Salaam, the Government with financial support from the Adaptation Fund and the Least Developed Countries Fund<sup>1</sup> is implementing a project for the protection of shorelines along Baraka Obama road and Mwalimu Nyerere Memorial Academy in Dar es Salaam. Shoreline protection will also be implemented in Pangani District.

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<sup>1</sup> The Adaptation Fund and the Least Developed Countries Fund were funding established under the Climate Change Convention to finance the climate adaptation efforts for developing countries and Least Developed Countries respectively



*Mangrove planting in Lindi (left) and the seawall constructed at Kigombe village in Muheza District (right) are some of the adaptation measures*

#### **4. Benefits of investing in adaptation measures in the Coastal and Marine Environment**

The report on the Economics of The Climate Change in the United Republic of Tanzania (2011) has indicated that climate change adaptation measures to protect the coast from flooding and erosion are cost effective. With adaptation measures, the cost for addressing the impacts of climate change is estimated to fall from US\$ 55 million per year to US\$ 20 million per year by 2030. On the other hand impacted people will be reduced from 0.3 – 1.6 million per year (with no adaptation) to 0.04 – 0.1 million per year (with adaptation). It should be noted that, the above estimates will depend on the sea level rise.

*Sea level rise could lead to large impacts and economic costs on coastal zones in Tanzania, flooding large numbers of people. The economic costs are estimated to be \$26 to 55 million per year by 2030, and rise to as much as \$200 million per year by 2050s.*

Additional benefits to the coastal environment and communities include:

- ◆ Increased income from the restoration of mangrove and coral reef ecosystems which can lead to increased fishery products and coastal tourism opportunities;
- ◆ Protection of unique, endemic, rare and threatened species;
- ◆ Protection of ecological systems essential for coastal and marine ecosystem functions;
- ◆ Provision of recreational, educational, research and aesthetic needs from the conservation of the ecosystems; and

- ♦ Protection of coastal infrastructure

## 5. Policy Recommendations

It is recommended that in order to address the impacts of climate change to the coastal and marine environment, the following policy options need to be considered:

- ♦ Continue with efforts to raise the awareness of decision makers and the public in general on impacts of climate change to the coastal and marine environment;
- ♦ Facilitate sectors relevant to the management of coastal and marine environment in conducting vulnerability assessment and prepare site specific adaptation measures;
- ♦ Observe and protect buffer zones along the coastal line to reduce impacts of climate change;
- ♦ Strengthen legislation and regulatory frameworks to enhance management and protection of marine and coastal environments;
- ♦ Review policies, strategies, programmes and plans relevant to the coastal and marine environment and facilitate the incorporation of issues related to climate change and adaptation;
- ♦ Promote Integrated Coastal Environment Management (ICEM) to allow iterative and flexible decision pathways to address future climate change;
- ♦ Establish programs for monitoring of sea level and extreme coastal events; and
- ♦ Strengthen programmes for restoration of coastal and marine environment e.g. mangrove and coral reefs restoration;

## 6. Further Reading

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