Tana Delta Integrated Management Plan, 2017 - 2027

Promoting sustainable development and ecosystem integrity

For bibliographic purpose, this document should be cited as follows:

Government of Kenya, 2017. Tana Delta Integrated Management Plan, 2017- 2017. NEMA, PP 130.

Sources of information for Management Plan Development:

i) Government Institutions

- National Environment Management Authority
- County Government of Tana River
- County Government of Lamu
- Kenya Wildlife Service
- State Department of Fisheries
- Kenya Forestry Service
- National Museums of Kenya
- Tana and Athi River Development Authority (TARDA)
- Kenya Marine & Fisheries Research Institute
- Ministry of Lands, Housing and Urban Development
- National Land Commission (NLC)

ii) Civil Society (NGOs, Private sector and CBOs):

- WWF Kenya
- Nature Kenya
- Community Action for Nature (CANCO)
- Kenya Wetlands Biodiversity Forum (KENWEB)
- Wetlands International
- Lower Tana Delta Nature Conservancy
- Lake Moa Beach Management Unit (BMU)
- Tana Delta Conservation Organization

iii) Local communities in Tana delta

iv) Individual experts

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BMU - Beach Management Unit
CANCO - Community Action for Nature
CBD - Convention on Biological Diversity
CBO - Community Based Organization
CDA - Coast Development Authority
CFA - Community Forest Association
CGL - County Government of Lamu
CGTR - County Government of Tana River
CIDP - County Integrated Development Plan
CITES - Convention on International Trade in Endangered Species
CMS - Convention on Migratory Species
DRSRS - Department of Remote Sensing and Resource Survey
EAWLS - East African Wildlife Society
EFA - Environmental Flow Assessment
EIA - Environmental Impact Assessment
EA - Environmental Audit
EMCA - Environmental Management and Coordination Act
ESA - Environmentally Sensitive Areas
GOK - Government of Kenya
IBA - Important Bird Area
ICZM - Integrated Coastal Zone Management
IK - Indigenous Knowledge

IUCN	- The World Conservation Union
KALRO	- Kenya Agriculture and Livestock Research Organization
KCDP	- Kenya Coastal Development Organization
KEFRI	- Kenya Forest Research Institute
KMD	- Kenya Meteorological Organization
KMFRI	- Kenya Marine and Fisheries Research Institute
KENWEB	- Kenya Wetlands Biodiversity Forum
KFS	- Kenya Forest Service
KWS	- Kenya Wildlife Service
LUP	- Land Use Plan
M&E	- Monitoring and Evaluation
NC	- Nairobi Convention
NDMA	- National Drought Management Authority
NEMA	- National Environment Management Authority
NGO	- Non Governmental Organization
NLC	- National Land Commission
NMK	- National Museum of Kenya
PPP	- Public Private Partnership
SDF	- State Department of Fisheries
TADECO	- Tana Delta Conservation organization
TARDA	- Tana and Athi Rivers Development Authority
TDIMP	- Tana Delta Integrated Management Plan
TDIMPIC	- Tana Delta Integrated Management Plan Implementation Committee
TNC	- The Nature Conservancy
UNCLOS	- United Nations Law of the Sea
UNEP	- United Nations Environment Programme
UNFCCC	- United Nations Framework Convention on Climate Change
WIO	- Western Indian Ocean
WRMA	- Water Resources Management Authority
WRUA	- Water Resource Users Association
WWF	- Wild Wide Fund for Nature

PREFACE

Tana Delta is among the largest wetlands in Kenya. It is important not only at local level but also at national and international level due to its rich and diverse biodiversity that supports local livelihoods and the national economy. Ecologically, the delta has rich and diverse habitats including floodplain grasslands, riverine forests, mangrove forests, sand dunes and acacia woodlands among other resources. It is home to many endangered, vulnerable and threatened species such as the Tana River red Colobus and the crested mangabey monkeys, marine turtles, dugongs and elephants among others. The delta was declared a Ramsar - a wetland of international importance, in 2012 due to its rich and diverse resources. It is also an Important Bird Area.

The rich resource base in the delta is a source of livelihood for the local communities in the delta. The pastoralists, farmers and fishermen living in the delta have for centuries built an intricate connection with the delta through exploitation and conservation of the delta's resources. The production systems and livelihoods of the delta's communities are linked to the dynamics and functioning of the river -wetland ecosystem. Pastoralists from outside have also depended on the delta as a fallback dry season grazing area for many decades. Large scale irrigation farming has also taken root in some parts of the delta.

Despite wide recognition of the delta as a key biodiversity hotspot in the country environmental degradation continues unabated threatening the ecological processes and economic livelihoods dependent on the delta. The major threats facing the delta include: competing interests between development and conservation; degradation of forests; unsustainable livelihood activities characterized by slash-and-burn agriculture and overgrazing; resource use conflicts; and uncoordinated development and conservation activities in the delta which has led to over-lap and ineffective development as well as conservation efforts in the delta. Potential threats also exists from large scale economic development activities (sugarcane, jatropha, oil-seed production), gas and oil exploration and infrastructural development.

In 2014 the National Government in collaboration with the County Government of Tana River and County Government of Lamu put in place a Land Use Plan (LUP) to guide future development in Tana delta. The aim of the LUP is to guide public and private investments and contribute to reduced tensions and conflict over land resources in the delta. To achieve this broad objective the LUP has defined specific zones called 'Planning zones' for various land uses in the delta. In view of the rich biodiversity supporting socio-economic activities in the delta conservation of the environment has been recognized as an important land use form and as such the LUP has identified biodiversity conservation areas in the delta. In order to ensure conservation of the biodiversity areas the LUP further called for development of detailed guidelines providing measures to address the environmental issues and conserve the various ecosystems and habitats in the delta. The Tana delta

Management plan has been prepared to serve this purpose. It is the first management plan for Tana delta. The goal of the management plan is to ensure the delta and associated resources are managed sustainably towards ecological integrity and socio-economic development for posterity.

Preparation of the management plan was undertaken through a participatory process involving stakeholders at local, national and international level. The stakeholders included County Government of Tana River, County Government of Lamu, National government agencies, NGOs, private sector, experts, CBOs and local communities.

The management plan has identified priority interventions under seven management programmes. They are: Biodiversity Management, Water resources management, Land resources management, Socio-economic development, Governance improvement, and Climate Change mitigation and adaptation. Implementation of the interventions is anticipated to lead to improved biodiversity conservation, sustainable livelihoods, improved access to resources, and improved climate change adaptive capacity in the delta.

Political good will and stakeholders support and commitment in the implementation of the management plan are paramount in order to achieve the goal and operational objectives of the management plan. Having participated in the preparation of the management plan the County Government of Tana River and County Government of Lamu welcome and support the management plan as a major road map to promotion of conservation and sustainable development in the delta and call upon all stakeholders including the national government, NGOs, private sector, researchers, experts, CBO and the local communities to support its implementation. Implementation of the plan will provide a means to ensuring ecological integrity of the delta while meeting the developmental needs of the area in line with the concept of wise use of wetland resources.

…….
H.E Hussein Dado,
Governor, Tana River County

…….
H.E Issa Timamy,
Governor, Lamu County

FOREWORD

Tana delta is a unique estuarine and deltaic ecosystem located in the lower parts of Tana River basin in the coast region. About 95% of the delta is in Tana River County while the rest of the area is in Lamu County. It is estimated to be about 130,000ha of which 69,000 are regularly inundated. The delta is one of the six deltaic areas of Eastern Africa and is Kenya's largest deltaic zone. It was declared a Ramsar site in 2012. The area is home to indigenous and minority communities including the Orma, Wardei and Pokomo peoples and provides the essential resources for their livelihoods.

Ecologically, Tana delta habours diverse habitats including floodplain grasslands, riverine forests, mangrove forests, high coastal dunes covered by coastal scrub forests, and Acacia woodlands. It is home to many endangered, vulnerable, threatened and range restricted species such as marine turtles, Tana River red Colobus and the crested mangabey monkeys, dugongs and elephants among others.

Tana Delta is immensely valuable to the local people who have built an intricate connection with it. The major economic activities within the delta include livestock keeping, fishing, subsistence crop farming, tourism and large scale agriculture projects by the government.

Despite the recognition of the delta as a Ramsar site and a key biodiversity hotspot in the country, environmental degradation continues unabated threatening the ecological processes and economic livelihoods dependent on the delta. The major threats include: degradation of upper forest catchments, unsustainable livelihood activities, uncoordinated development and conservation activities, and potential threats from large scale economic development activities among others. These threats need to be contained in order to restore the health and functions of the ecosystems and achieve sustainable development in the delta. It is against this background that NEMA with support from the World Bank funded Kenya Coastal Development Project (KCDP) engaged stakeholders to develop this management plan to address the environmental issues and ensure integrity of the delta biodiversity while meeting the developmental needs of the areas in line with the concept of wise use of wetland resources. It will be implemented in the period 2017- 2027.

The Tana Delta Integrated Management Plan (TDIMP) has proposed a number of interventions that if implemented will not only help to address the environmental issues in the delta but will also contribute to the achievement of the objectives of Vision 2030. The Authority is committed to implementing the management plan and therefore I call upon all stakeholders to support implementation of the management plan in order to realize sustainable development in Tana delta.

Mr. John Konchellah
Chairman, NEMA Board of Management

ACKNOWLEDGEMENT

I wish to gratefully acknowledge the financial support provided by the government of Kenya; World Bank through the Kenya Coastal Development Project (KCDP); Danish International Development Agency; WWF Kenya; and Nature Kenya for the preparation of this management plan for Tana delta.

The successful preparation of the management plan was made possible by the invaluable contributions from various institutions and individuals. Stakeholders including National Government institutions, Tana River County Government, Lamu County Government, NGOs, private sector players, experts and local communities in Tana delta played a significant role in preparation of the management plan by providing invaluable information and participating in forums to prepare the management plan. Their contribution is highly appreciated.

NEMA coordinated development of the management plan through a Technical Committee drawing membership from various stakeholders culminating in the final management plan that was validated by stakeholders. This final management plan is a testimony to the hard work and dedication to the management planning process by the committee. I wish to express my gratitude to the Technical Committee members: Mr. Stephen Katua (NEMA), Mr. Issak Elmi (NEMA), Mr. James Kamula (NEMA), Mr. Dan Ashitiva (NEMA), Mr. Hadley Becha (CANCO), Dr. Taita Terer (NMK), Dr. Judith Nyunja (KWS), Mr. Francis Kagema (Nature Kenya), Mr. Mike Olendo (WWF Kenya), Mr. Protus Musawa (NEMA), Mr. Benjamin Mwakio (TARDA), Mrs. Mwaka Barabara (SDF), Mr. Maulidi Diwayu (local community Rep), Mr. Kolde Hashako (local community Rep), Mr. Bakari Abae (local community Rep), Mr. John Maina (NEMA) and Ms Anne Kabeni (NEMA).

I also wish to appreciate the NEMA Board of Management for its unwavering support throughout the management planning process. The Coastal Marine and Freshwaters sub-department led by Mr. Stephen Katua is also much appreciated for the effective coordination of the management plan preparation process.

It is my sincere hope that this management plan will go a long way in not only addressing the issues affecting Tana delta but also promote conservation and sustainable development in the delta. I urge all stakeholders to actively participate in implementation of the management plan with a view to achieving its goal on ensuring the delta and associated resources are managed sustainably towards ecological integrity and socio-economic development for posterity.

Prof. Geoffrey Wahungu
Director General, NEMA

EXECUTIVE SUMMARY

The Tana Delta Integrated Management Plan (TDIMP) has been developed pursuant to Sec 42 of the Environmental Management and Coordination Act (CAP 387) which provides for conservation and management of wetlands in the country. It is the first management plan for Tana delta. The management plan has identified key priority activities that will be implemented in the period 2017-2027 to address the numerous environmental issues facing the delta and ensure integrity of the area biodiversity while meeting the developmental needs of the areas in line with the concept of wise use of wetland resources. The goal of the management plan is to ensure the delta and associated resources are managed sustainably towards ecological integrity and socio-economic development for posterity. In implementing the management plan the country will not only manage and develop the delta sustainably, but also contribute to the regional and international obligations on conservation of wetlands and maintaining their integrity for sustainable development in line with vision 2030.

The management plan is a product of an extensive and highly participatory process that involved stakeholders from national government institutions, County government of Tana River, County government of Lamu, NGOs; private sector players, experts and local communities in Tana delta. Information gathered during stakeholder consultative meetings and surveys done in the delta during the planning process provided key information in terms of highlighting the key issues that the management plan seeks to address. Reports by various institutions that have worked in the delta also provided crucial information in drafting of the management plan.

The management plan is divided into nine chapters. Chapter one gives the introduction and presents the environmental and socio-economic profile of Tana delta. These include the bio-physical setting of the delta, socio-economic and ecological characteristics, and the history of conservation and development efforts in the delta. The chapter also describes the justification for and preparatory process of the management plan.

Chapter two presents in detail the ecological and socio-economic characteristics of the delta while Chapter 3 provides a review of policy, legal and institutional framework relevant for the conservation and sustainable development of Tana delta. Chapter 3 has also highlighted the relevant international agreements supporting conservation and management of wetlands resources.

Chapter four provides an analysis of the stakeholders for Tana delta. The analysis shows that the area has many stakeholders with diverse resource-specific interests and stakes, which are often conflicting and competing. It is important to note that the stakeholders analyzed in the chapter were those that existed at the time of the management planning process and therefore the analysis is subject to periodic review as new stakeholders and interest emerge over time.

Chapter five has presented in detail the issues and threats facing the delta while Chapter 6 introduces the vision expected of Tana delta as an area sustainably managed supporting biodiversity conservation and providing ecosystem services for socio-economic development. The overall goal, management objectives, guiding principles, operational objectives for achieving the goal and the vision are also outlined.

The management programmes, operational objectives, management actions and outcomes are articulated in detail in chapter seven. The management programmes are: Biodiversity Management, Water management, Land resources management, Socio-economic development, Governance improvement, and Climate Change mitigation and adaptation.

Chapter eight presents the management plan implementation framework/modalities. Articulated in the implementation framework is the need for wide stakeholder involvement and building of partnerships; coordination of the management plan implementation; resource mobilisation; and capacity building in order to ensure effective and efficient implementation process. A detailed implementation matrix is also tabulated in this chapter showing the activities to be undertaken, expected outputs, performance/M & E indicators, the agencies responsible, activities estimate costs and time frames. The potential risks that may hinder effective implementation of the management plan have also been articulated in this chapter.

Monitoring and evaluation of the management plan is discussed in Chapter nine. This is in recognition of the fact that successful implementation of the management plan will depend on how the activities are effectively executed, monitored and evaluated and, where necessary, adjustments made to ensure that the activities lead to achievement of the desired outcomes and objectives.

CHAPTER 1: INTRODUCTION

1.1 Tana delta Location, Size and Ecological characteristics

Tana Delta is among the largest wetlands in Kenya. It is estimated to be about 130,000ha of which 69,000 are regularly inundated. It is located in both Tana River and Lamu Counties (40" 10' and 40" 20' E and Latitudes 2" 10' and 2" 20' S). It is found at the terminal stage of Tana River as it flows into the Ungwana Bay, Indian Ocean. The Tana River is the largest river in Kenya with a catchment area of 127,000 km^2 and discharges an average of 4,000 million cubic meters of freshwater and 6.8 million tons of sediment, annually (*Kitheka et al. 2005*). The river and its main tributaries originate from Mount Kenya and the Aberdare Range and it contributes 32% of the total river runoff in Kenya through its river drainage basin. Its length from the farthest source to the Indian Ocean is approximately 1012 kilometers.

The limit of the area to be managed under this management plan for the Tana Delta is mainly the inundated area stretching from the southern tip of Tana primates Reserve down to the coastal area. The area includes the designated Tana Delta Ramsar site and its buffer zones. The Tana delta was designated as Kenya's sixth Ramsar site in October 2012.

The Tana delta is immensely valuable and is the lifeline of local people who have built an intricate connection with it, linking their production systems and livelihoods to the dynamics of the river-wetlands ecosystem. For many years, the delta has been the nerve of livelihoods to various categories of local users namely agriculturalists, pastoralists and fishermen. The variety of its wetland habitats and the richness of its biodiversity are striking. The ecosystem encompasses a number of habitats which include coastal marine and intertidal waters, sand dunes, mangrove forests, riverine forests, lowland coastal dry forests, tidal wetlands, freshwater wetlands, floodplain grasslands, and bush lands. These habitats support a rich diversity of flora and fauna, some of which are endemic to the area.

The Tana delta ecosystem maintains a vast number of herbivores including topi, waterbucks, hippo, buffalo, zebra, bushbuck, baboons and vervet monkeys. Recent ecological studies have indicated sighting of the endemic and threatened Tana River Red Columbus monkey and Tana River Crested Mangabey monkeys in some of the riverine forest patches found in the delta. The delta has one of the largest concentrations of Nile crocodiles in Kenya. The beaches and sand dunes are important nesting sites for marine turtles.

The Tana Delta - Ungwana Bay seagrass beds support one of the few remaining dugong (*Dugong dugon*) populations in Kenya, and possibly in East Africa. Other remnant populations are in Mozambique and the Rufiji Delta, Tanzania. Dugongs are listed as Vulnerable on IUCN's Red List (IUCN 2010). The tidal and fresh water wetlands support a diversity and significant number of

fish species. The river mouth is an important feeding ground for migratory species. The Tana delta is also an important marine eco-region as well as an important bird area of global significance.

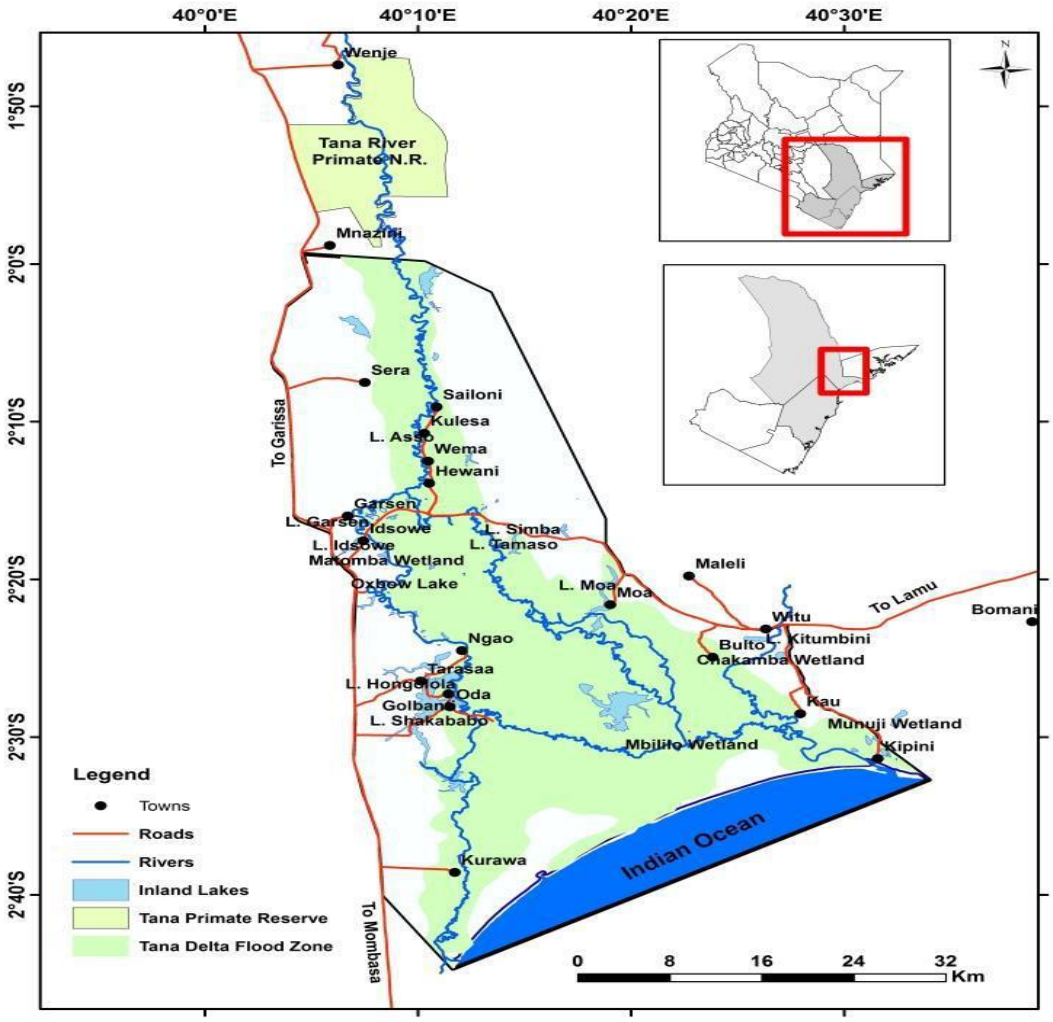

Fig. 1.1: Tana delta management plan area

1.2 Demography, Cultural, Ethnic and Social Groupings

The population of Tana River County was projected at 262,684 in 2012 *(Kenya National Bureau of Statistics 2009 census)*. The County has an inter-census population growth rate of 3%, slightly higher than the national average of 2.9%. The majority of the population (over 90%) lives in the rural areas.

The estimated population within the Tana delta is 96,664 while the total number of households is 12,457, giving a mean household size of 8 persons. These households are spread out in slightly over

56 cluster settlements or villages. The average village has about 150 households (Odhengo et al. 2014).

Settlement patterns within the delta are more or less confined to a relatively narrow strip along the river channel on elevated areas protected from normal flooding, apart from a few that are flanking the delta towards Witu and Kipini. The population density in the delta is generally sparse and low. However, the Lamu County side of the delta has higher population density than that of Tana River County.

Traditionally, the Tana delta has two major ethnic groups, the Pokomo - 44%, and the Orma- 44%. However, there are other local communities such as Wardei - 8%, Bajuni, Malakote, Wata, Munyoyaya, and Sanye. A number of other Kenyan ethnic groups have increasingly settled in the delta over time. These include the Mijikenda, Somali, Luo, Manyala, Galjeel, Kamba, Kikuyu, and Kalenjins. These communities account for the remaining 4% (*Government of Kenya, 2009*).

In the cultural grouping, the Pokomo have the following sub-tribes: Milalulu, Zubaki, Ndura, Kinakomba, Gwano, Ndera, Mwina, Kulesa, Ngatana, Dzunza, Buu and Kalindi. In addition, the Pokomo have the following major clans: Meta, Dulo, Karhayu, Wayu, Burenkundu, Burenyeusi Kidziwi, Karara, Kinamwiti, Wagomeni and Wamamboo while the Orma have the following major clans: Ilani, Uta, Gatsan, Karara, Genu, Garjeda, and Mandoyo.

In the traditional setting, the Pokomo council of elders is called the Gassa, while that of the Orma council of elder is called Matadeda. The council of elders are the custodians and managers of the area's natural resources including the watering points (malkas), sacred sites and shrines. The elders are also revered for their wisdom and ability to resolve conflict within and from outside.

The social groupings found at the Tana delta are many and diverse. They include women groups, youth groups, community self-help and conservation groups, community and group ranches, non-governmental organizations, resource users associations (Beach management Units, Community Forest Associations, and Water Resource Users Associations), and Faith based Organizations.

Socio-economic linkages

The main economic activities in the Tana delta are centered on livestock keeping for the pastoralists, crop production for the agriculturalists, and fisheries for the fishing communities. There are also cases of agro-pastoralism. A small minority are in formal employment either locally or outside the area. Off-farm economic activities include weaving, basketry, pottery, fishing, beekeeping and making of beehives and fishing traps and vessels. The main crops grown are mangoes, bananas, Maize, Green grams, paddy-rice, cotton and coconuts, while the livestock breed include cattle, goats and sheep. Extreme weather situations including erratic flooding, recurrent and prolonged droughts,

and unreliable rainfall patterns are, however, major constraints to socio-economic sectors. Agriculture particularly face challenges due to lack of effective and efficient control of the water resources.

OCCUPATION	**PERCENTAGE %**
Pastoralism / Herding and livestock Keeping	47.2
Crop Farming Agriculture	35.5
Agro-pastoralism (farming and livestock keeping)	8.9
Business	1.7
Employed	6.7
TOTAL	**100**

Source: *Socio-economic Survey – TARDA/Mumias Tana Integrated Sugar Project- EIA Report*

In respect to income, pastoralism and livestock keeping fetch higher and stable income returns compared to other economic activities. Large scale agriculture has been attempted in the past. For instance, Tana Delta Irrigation Project for rice growing was started in 1988 and was expected to cover 160000 ha of land. The project was not successful as it collapsed due to a myriad of reasons including the effects of el-nino of 1998. The proposed Tana Integrated Sugar Project has never taken off beyond setting up of the demonstration plot as a result of conflicting interests.

Transport, Communication, Potable Water Infrastructure

Transport infrastructure within the Tana delta is poor. The only tarmac road that transects the area is the Malindi-Garsen-Lamu road. Most roads are seasonal and impassable during flooding and rain season. The total road network in the County is 3,076 km with about 55% in motorable condition. The major roads in the County include Madogo – Hola - Malindi road. The county has 5 airstrips at Hola, Bura, Garsen, Ngao and Wayu; and a 35km sea front, which has high operating potential for fishing vessels, with Kipini operating as a fish landing site. Majority of the people (41.9%) of Tana River live in mud/wood walled houses, with about 29.5% living in grass straw houses. About 26.4% of the roofing materials used are made of corrugated iron sheets and 13.9 per cent are made of coconut palm fronds (*makuti) (Tana River County Integrated Development Plan, 2013).*

Tana delta is connected to electricity. However, very few settlements have access to it. Similarly, access to potable piped water is limited to a few areas including Ngao location, a bit of Wachu, Orda and Bilisa locations. Communication is largely through mobile phone technology and radio.

1.3 Topography, Hydrology and Soils

The Tana delta falls within the coastal lowland plain, one of the three physiographic zones on the Kenyan coast that rises from sea level to 140m. The geomorphology of the coastal plain is

dominated by a series of raised old sea level terraces, whose configuration follow the 0-5m and the 5-15m sea level terrace complexes. The delta is generally flat with the gradient ranging from 1/500 to 1/1700. The altitude of the delta is low. It varies from zero meters at sea level, 6 m at Gomesa village to 20m above sea level at Sailoni headwaters. The delta has a coastal strip 35 km long protected by a 50m high sand dune system.

The Tana delta land is characterised by tidal channels, savannah grasslands, palm trees, riverine forests, freshwater and intertidal swamps. The delta is formed by the Tana and Ozi rivers and their numerous tributaries, which range across vast swampy plains with complex river tributaries, the deep and wide Tana River bordering fertile flood plains to narrow mangrove lined channels draining to the sea. As with all deltas, the ecosystem is constantly changing with changes in water flow causing shifting beaches, sand dunes and mangrove forests. Changes in the Tana delta have been partially documented through old historic accounts since the 1800s. In the mid to southern end of Ungwana Bay the beach borders Elephant Island, a large dune that becomes isolated at high tide, followed by a series of old vegetated dunes stretching inland.

The hard compacted beach of Ungwana Bay stretches for around 32 km and flanks a shallow (<20m) sandy-muddy bay which extends out for around 8km (Mwatha 2002). Offshore the bay gives rise to the North Kenya Bank, a wide extension of the continental shelf, at depths of 100 to 200m, off Ungwana Bay and Ras Tenewi. The shallow Ungwana Bay receives a huge volume of nutrient-laden freshwater from the Sabaki (to the south of the bay) and Tana Rivers, and this combined with the associated mangrove systems of the Tana delta make it one of the richest and most productive fishery grounds along the Kenyan coast (Mwatha 2002).

The basins of oxbow lakes and the deeper parts of dammed lakes where water remains for most of the year include Lakes Bilisa, Shakababo, Kongolola, Silowa, Muthanya, Singwaya, Mwanapaka, Kitumbuini, Dide Waride, Harakisa, Moa and Kenyatta. In these lakes, profuse growths of true aquatic plants occur.

Soils at the Tana delta are generally fluvisols, which are categorised under two sub-groups namely; eutric and vertic fluvisols. All vertic fluvisols have a high degree of fertility as they are rich in phosphorous and potassium. The vertic soils consist of silt clay, and heavy-to-very heavy clays due to sedimentation. These soils are largely on the fringes of the levee river basin land. Top soils ranges from sand to clay while sub-soil is firm clay. Top soils are non-saline but salinity increases with depth. Other soils in the delta include the gleysols, luvisols and solonchanks (Division of Agriculture - Garsen, September 2007).

1.4 Climate and Agro-ecological Zone

The Tana delta is characterised by four agro-ecological zones namely the:

Agro-Ecological Zone	Mean Annual Rainfall
Lowland Ranching	Less than 5000mm
Livestock-Millet	500mm - 600mm
Livestock	700mm – 800mm
Coconut-Cassava	1000 – 1000mm

Rainfall is bimodal but erratic ranging. Long rains occur between April and May, while short rains occur between October and November, November being the wettest month. The average annual temperatures are about 30°C, but the highest is 41°C occurring from between January to March. However with increased climate variation and changes, the temperatures throughout the delta are becoming more severe.

1.5 Historical Perspective of Development and Conservation

Changes in the Tana delta have been partially documented through old historic accounts since the 1800s. The creation of the Belasoni canal in 1896 which connected the Tana and Ozi rivers changed the course of the Tana River dramatically. The canal was dug for trade and transport of agricultural products to Lamu during the Sultanate of Witu's reign. The present mouth of the Tana River near Kipini town used to be the estuary of a smaller river, the Ozi, and is referred to as such in historic records. Prior to 1896, the Ozi River mouth at Kipini formed a large and natural harbor, and the original mouth of the Tana River was located about 30 km southward, (called Mto Tana on old maps), at Shekiko, in the middle of the Ungwana Bay beach. This is where the Delta Dunes tourism camp is situated (Mwatha 2002).

Economic agents see the Tana delta as the new frontier for economic development and wealth creation in major sectors particularly agriculture, energy (hydro-power, oil, gas, biofuel), mining. The two schools of thought or extremes have had conflicting and competing interests making the situation at the delta complex and precarious. There have been several conservation efforts in the wake of the various challenges and threats to the delta. These include:

- The establishment of the Tana River Primates National Reserve (to the immediate north of the Tana Delta from Mnazini/Baomo village on the southern tip of the reserve to Wenje in the north). This served to protect the endemic primate species of the Tana River Mangabey, the Red Colobus and the gallery riverine forest.

- In 1990, Kenya ratified the Ramsar Convention on wetlands of international importance. As such Kenya was obligated to designate at least one wetland as a Ramsar site and also develop a national wetlands policy and management plans among other things. KWS became the Ramsar authority in Kenya

- In 1991, KWS commissioned a feasibility study at the Tana Delta. This study recommended the establishment of a wetlands national park at the Tana delta. However, this never happened because of resistance from local communities arising from suspicions that establishment of a national reserve would deny them traditional user rights. In 1992, IUCN, KWS, National Museums of Kenya (NMK) and other Government agencies organized a National Wetland Conference. One of the recommendations was that Tana delta be designated as the first Ramsar Site in Kenya.

- In 1993, a Presidential directive stated that a Management Plan for the Tana Delta be developed in close consultations with the local communities. A multi-institutional committee known as 'The Tana Delta Wetland Steering Committee' was formed under two co-chairs: Tana and Athi River Development Authority (TARDA) and KWS. Other members included the Tana River County Council, The District administration, IUCN, EAWLS and representatives of local communities. The directive arose after massive wetlands advocacy campaigns spearheaded by EAWLS against the proposal by coastal aquaculture to establish an industrial shrimp aquaculture project at the delta.

- The Steering Committee carried out a number of activities including an Education and Awareness project on Ramsar and wise use of wetlands implemented by EAWLS and funded by IUCN. The management plan never materialized largely due to lack of consensus statement on the land issue from the government. And may be vested interests by some of the institutional stakeholders working at cross-purpose

- In 1997 TDWSC held a stakeholders meeting for the Delta in Naivasha. The focus of this meeting was to drum up support for the Tana delta to be designated as a Ramsar site.

- In 1998 through the support of the wetlands programme of KWS funded by Netherlands Government a district stakeholder week-long meeting was held in Kipini to define the development and environment strategy for the Tana delta.

- In October 2012 Tana Delta was designated as Kenya's sixth Ramsar site.

Annex 2 has given a chronology of the various conservation efforts and development projects initiated in the delta in the past. Both conservation and development efforts have had conflicting and competing interests making the situation at the delta complex and precarious. By and large, there have been several efforts by conservation NGOs and CBOs to advocate against the developmental initiatives that would have negative effects on the fragile delta ecosystems.

1.6 The planning context (link to existing policy frameworks)

The development of this plan is backed and streamlined with the Constitution of Kenya and appropriate enabling Acts of Parliament that provide for management, utilization and conservation

of wetlands resources. The existing national laws, policies and frameworks that back the plan are: Constitution of Kenya 2010; Kenya Vision 2030; EMCA CAP 387 (Section 42, 54 and 55); Integrated Coastal Zone Management (ICZM) Action Plan; Wetlands regulations (2009); Fisheries Act (cap 378); Wildlife Conservation and Management Act (2013); Water Act (2002); Water Resource Management Rules (2007); Forest Act (2005); County Integrated Development Plans for Tana River county and Lamu County; and the Tana Delta Land Use Plan among others. The management plan is also backed by relevant international legal agreements that govern wetlands resources including the Ramsar Convention, Nairobi Convention among others. Chapter 3 has provided a detailed review of review of policy, legal and institutional framework backing the management plan development and their relevance in conservation and sustainable development of Tana delta.

The management plan builds on development and environmental conservation initiatives being spearheaded by government agencies, NGOs, CBOs and other stakeholders in Tana delta. The plan attempts to establish a viable and sustainable management system for the Wetland in order to meet the needs of farmers, pastoralists, fishermen, community conservancies and the government. This plan has taken due cognizance of existing stakeholders, institutions and sectoral policies.

1.7 Why the need for a management plan?

There are several factors that explain the need for a management plan for Tana delta. Firstly, Tana delta is an area of rich natural resource with varied ecosystems inhabited by various communities whose livelihood is dependent on the delta's natural resources. It is also a global biodiversity hotspot and a Ramsar site. It is therefore important that an overarching framework for the management of Tana Delta wetland resources is developed and implemented to ensure conservation and sustainable development in the delta.

Secondly, conservation of environment including wetlands resources is provided for in the country's development framework (Vision 2030) and environmental conservation legal frameworks including Environmental Management and coordination Act (CAP 387), Wetlands regulations, 2009 and the Ramsar Convention on wetlands. In the first Medium Term Plan 2008 -2012 for Vision 2030 designation of Tana delta was set as a target to be realized by 2012. This target was realized when the lower part of the delta was designated as a Ramsar site in October 2012.

Thirdly, the Ramsar Convention provides that a management plan should be prepared and implemented in order to ensure sustainable management and conservation of a wetland that has been declared a Ramsar site. Preparation of this management plan therefore serves to also meet this requirement of the Convention that the country is party to.

Fourthly, management planning for the delta is important in order to maximize the benefits derived from ecosystem goods and services derived from the delta and avoid resource use conflicts and harmful effects of activities upon each other and the environment. Implementation of the

management plan will ensure sustainable utilization of natural resources and eradicate conflicting development and conservation interests in the delta.

Fifth, the plan will guide the utilization and management of resources within the area by specifying activities that should or should not be carried out or regulated by the various interested parties in specified parts of the delta. The management plan has elaborated management actions needed to deal with existing and potential threats as well as spelt out the roles and responsibilities of all stakeholders in the management plan implementation process and the resources needed for implementation of the proposed management actions.

Sixth, The Tana delta ecosystem faces a myriad of challenges due to unplanned development and excessive exploitation of resources upstream and within the delta. Planning for the delta therefore is important in order to accommodate the diverse, complex, competing and often conflicting development and conservation interests.

Last but not the least planning for the delta will not only lead to effective management of the ecosystem but also contribute to the country's regional and international obligations on protection of important fragile ecosystems.

1.8 Scope of the plan

Geographically, the planning area comprises of the Ramsar site and the flood zone between Garsen and Mnazini/ Batarito wetlands near Kotile town (See figure 1). The Malindi-Garsen- Hola road is the western boundary while the stretch from Kurawa town (along Malindi road) to Mto Kilifi is the Southern boundary of the planning area. On the Northern side, the Witu - Kipini road is the northern boundary while the Eastern boundary is the 12 mile nautical zone. The North-west boundary stretches from Nyagoro bridge (at Garsen/Witu road) to Mnazini/Batarito wetlands near Kotile Area. Despite the geographical limits of the planning area described above, the ecosystem based approach to natural resources management will be applied in the management of the delta as some of the pressures affecting the delta are external to the delta such as the Tana River upstream catchment areas. Successful implementation of the management actions will require close cross-sectoral coordination and involvement of relevant stakeholders and use of participatory approach in designing and implementation of programmes.

Regarding management actions, the scope of the actions will be broadened as far as possible in order to effectively respond to the issues facing the delta. The delta is experiencing several issues and challenges that require concerted management efforts by various stakeholders. The issues resonate around biodiversity conservation; water (both quality and quantity); socio-economic issues; land use tenure; climate change related; and resource governance issues. These issues have resulted into loss of important livelihoods, loss of social cohesion and peaceful coexistence, loss of biodiversity as well as, weakened community and ecosystem resilience compounded by natural related innuendos

such a climate change. Implementation of actions that respond to these issues will be within the scope of the management plan.

1.9 Linkage between the Tana delta Management plan and Tana delta Land Use Plan

The National Government in collaboration with County Government of Tana River and County Government of Lamu have put in place a Land Use Plan (LUP) to guide future development in Tana delta. The overall aim of LUP is to guide public and private investments and contribute to reduced tensions and conflict over land resources in the delta. To achieve this broad objective the LUP has defined specific zones called 'Planning zones' for various land uses in the delta. In view of the rich biodiversity supporting socio-economic activities in the delta conservation of the environment has been recognized as an important land use form and as such the LUP has identified biodiversity conservation areas in the delta. In order to ensure conservation of the biodiversity areas the LUP has further called for development of detailed guidelines providing measures to protect the various ecosystems and habitats in the delta. The Tana delta Management plan has been prepared to serve this purpose. The goal of the management plan is to ensure the delta and associated resources are managed sustainably towards ecological integrity and socio-economic development for posterity.

1.10 Planning approach

The management planning process adopted was a multipronged approach through effective stakeholder engagement processes. These included community level consultations, expert based field assessments and observations, focus group discussions, interviews and discussions with opinion leaders and community opinion leaders, stakeholder workshops, expert working group sessions, GIS and remote sensing techniques for mapping of plan boundary and biodiversity.

The development of the plan also took cognizance of both the explicit and tacit knowledge. In this case, explicit knowledge was mainly derived from authorities and documented information from experts through research and other studies, while tacit knowledge was based on community experiences and knowledge (community of experts). The planning process was equally alive to other ongoing processes and initiatives both by the government such as energy development, hydropower generation, irrigation and agriculture, LAPSSET, inter-basin water transfer; Land Use Planning Process for Tana delta; National Wetlands Conservation and Management Strategy Development; as well as other grass root level interventions by various actors.

Since 2013, a series of community level under tree consultative meetings were held in order to marshal community support and gather their inputs that have been integral in shaping this plan. A total of 26 community meeting were held in various villages in the delta. In addition, expert based field assessments to determine and profile the delta issues, the delta benefits/resources and

alternative management options to secure the livelihoods of the communities and enhance ecosystem resilience were conducted. The experts provided much needed expertise, skills and knowledge on diverse issues ranging from water and hydrology, biodiversity, socioeconomic and cultural as well as sustainable livelihood options. The planning process was spearheaded by a technical team drawing officers from both government and non-governmental organizations. From the government side, they included NEMA, KWS, NMK, TARDA, State Department of Fisheries and County Governments of Tana River and Lamu. Non-state actors included community representatives, WWF Kenya, Nature Kenya, CANCO and KENWEB.

Participatory GIS was employed during boundary delineation and scoping of the planning area. In this regard, both technical GIS and remote sensing techniques as well as community perspectives were incorporated into the mapping process. This technique helped to generate both the planning area map as well the issue/biodiversity based map.

Further, stakeholder workshops were held in order to provide further inputs into the management planning process. Specifically, workshops were held with both the technical and legislative wings of the Tana River and Lamu county governments comprising of county executive committee members in charge of environment and other natural resources within the delta together with members of the county assemblies.

Finally, expert drafting sessions were used to put together all the inputs and viewpoints of the various stakeholders that would be affected by and affect the plan. Approximately about 4-5 expert drafting sessions were held with various experts that finally culminated into the final plan.

CHAPTER 2: ECOLOGICAL AND SOCIO-ECONOMIC FEATURES OF TANA DELTA

2.1 Ecological and biological features

The Tana Delta has been accorded eco-regional importance under the East African Marine Eco-region for being a system with diverse habitats. These habitats include wetlands, mangrove forest, savannah grassland, riverine forests and rangelands. The mosaic of riverine forests, grasslands, woodlands, lakes, mangroves, extensive pristine beaches, sand dunes and coastal waters creates a diversity of habitats, ecosystems and landscapes with a rich flora and fauna. The high diversity of ecosystems and associated species is the result of a dynamic equilibrium of hydrological conditions, soils, topography and coastal influences.

It is home to rare, vulnerable, migratory and threatened species. The riverine forests provide habitat for two endangered primates: the Tana River Red Colombus and the Tana River Crested Mangabey monkeys. It is also recognised as an important bird area (IBA). Due to its diverse and rich natural resources, the lower part of the delta bound by the Garsen-Witu road was declared a Wetland of International Importance (Ramsar site) in October 2012.

2.1.1 Shallow coastal waters

The shallow coastal waters of Tana delta known as Ungwana bay, are highly productive. The bay is characterised by rich coral reef patches, seaweed and seagrass beds that provide important nursery and feeding ground for a variety of marine fauna. Exploitation of the fisheries resources in the bay is in the form of semi-commercial and small scale fishing. The fish caught in the area include sardines, prawns, mullets, rabbit fish, sharks, rays, parrot fish and snappers.

The rare marine mammal known as dugongs as well as the five species of threatened marine turtles: Hawksbill Turtle (*Eretmochelys imbricate)*, the Green Turtle (*Chelonia mydas)*, Olive Ridley Turtle (*Lepidochelys olivacea)*, Leatherback turtle (*Dermochelys coriacea)* and the *L*oggerhead Turtle (*Caretta caretta)* are also found in the bay (Fulanda et al. 2011).

Fig 2.1 Ungwana bay at Tana River discharge point (Source: J. Kamula)

2.1.2 Sandy beaches and sand dunes

Extensive sandy beaches are found along the shorelines dominated by sediment derived from broken down coral skeletons, algae and shells. Sand of terrestrial origin deposited by the river Tana also constitutes a significant component of the sandy beaches. In the delta, wind-blown sand from the beach and some sand deposited by the Tana river generate the sand dunes. Some of the dunes are large reaching 50m above sea level (Samoilys et al. 2011).

The sandy beaches and dunes support rich biodiversity and other natural resources. They are important nesting sites for the endangered sea turtles mainly the Green Turtle (*Chelonia mydas)* and the critically endangered Hawksbill Turtle (*Eretmochelys imbricata*). The beaches and mudflats at the river mouth are also important feeding and roosting sites for important shorebirds and other migratory birds of the Eastern African Flyway e.g. waders and terns (Bennun & Njoroge 1999).

2.1.3 Coastal forest and mangroves

The lower Tana forests are characterised by five types of riverine forests: evergreen forests, mixed forest variant, Acacia forest, Garcinia forest, and cultivation forest types (Figure 2.2). The forests contain many endemic tree species. Dominant tree species in the evergreen forest include: *Ficus sycomorus, Diospyros mespiliformis, Sorindeia madagascariensis* and *Pachystela msolo.* These tree species are important food resources for two endangered primates: the Tana River Red Colombus and the Tana River Crested Mangabey. The forest also provides the local communities with fuelwood, medicinal and materials for construction of houses, beehives, canoes, mats and baskets among other uses (Dahdouh-Guebas 2000). Most of the tree species in the lower Tana forests are dependent on flooding regimes of Tana River and are disappearing due to the altered flooding

regime and forest clearance for agriculture. Additionally, extensive damming upstream and encroachment of riparian land for farming have reduced the extent of these forests (NEMA 2004).

The coastal strip of the delta is dominated by extensive mangrove forest that cover about 4,500 ha (45 km^2). All the mangrove species found in Kenya are present in the delta. They are: *Avicenia marina, Ceriops tagal, Sonneratia alba, Xylocarpus granatum, Rhizophora mueronata, Lumnitzera racemosa and Bruguiera gymnorrhiza*. The dominant species is *Avicenia marina*. The *Lumnitzera racemosa* species is only found in Tana delta.

The mangrove forests and intertidal mud flats in the delta play an important ecological as well as socio-economic role. Ecologically they serve as fish breeding areas; and, also provide habitats for commercially important prawns, shrimps, bivalves and fish. The mangrove forest also act as buffer that protect the shore against storms; and, stabilize the shoreline through sediment accumulation thus countering impacts of sea level rise. Economically, the local communities get fuelwood and harvest poles for housing construction (Kairo 2001).

Fig 2.2 Some of the pristine forests in the lower part of Tana delta. The forest serve as habitat for the endangered Tana River Red Colombus monkey and the Tana River Crested Mangabey besides providing other ecosystem services (Source: J. Kamula)

2.1.4 Grassland

Flood plain grassland cover a large portion of the lower Tana Delta. Seasonal flooding and poorly drained soils are important factors that maintain these ecosystems. The grasslands provide important dry season grazing areas for pastoral communities from Tana River, Lamu, Ijaara, and Malindi.

2.1.5 Freshwater wetlands

The Tana delta flood plain is characterized by several oxbow lakes and freshwater marshes. The main oxbow lakes found in the delta are: Lake Shakababo, Bilisa, Kongolola, Baratiro, Kitumbuini, Moa and Dide Waride (Figure 2.3 & 2.4). The water surface of the floodplain wetlands is covered by the invasive Nile cabbage (*Pistia Stratiotes)* interspersed with the water lily (*Nymphaea Lotus)* and the floating aquatic fern (*Azolla Nilotica)*. The emergent vegetation is dominated by aquatic grasses (*Bothriochloa bladhii* and *Echinochloa haploclada*) and sedges (*Cyperus frerei* and *C. heterophylla*). These wetlands including the river system support important fisheries resources and birdlife. Fishing is a major activity in the oxbow lakes and in the river.

Through the natural flooding regime the Tana delta wetlands provide a series of water-associated supporting ecosystem services such as soil formation (through silt deposits), primary production, nutrient and water cycling that underlie the production of all the other services including regulating and provisioning. For example the wetlands provide provisioning services such as food (through capture fisheries, subsistence agriculture, small-scale irrigation, livestock grazing and the collection of wild plant and animal food products); timber (for construction of canoes, beehives, houses); wood fuel and reeds and palm fronds (for roof thatch and weaving) as well as clay for pottery. Other uses of the wetlands include harvesting of the aquatic grasses for use as fodder for milk cows and calves by the pastoral communities; harvesting of medicinal plants and source of water for domestic use. Since most of the groundwater underlying the delta is saline, the groundwater recharge by the floods, especially in the sandy river banks and on old meanders and temporary river beds, is important as a source of safe drinking water.

Fig 2.3 Lake Moa (Left) and Lake Tamaso (right) are some of the oxbow lakes in Tana delta. The wetlands in the delta host diverse biological resources and support socio-economic activities such as fishing among others (Source: J. Kamula)

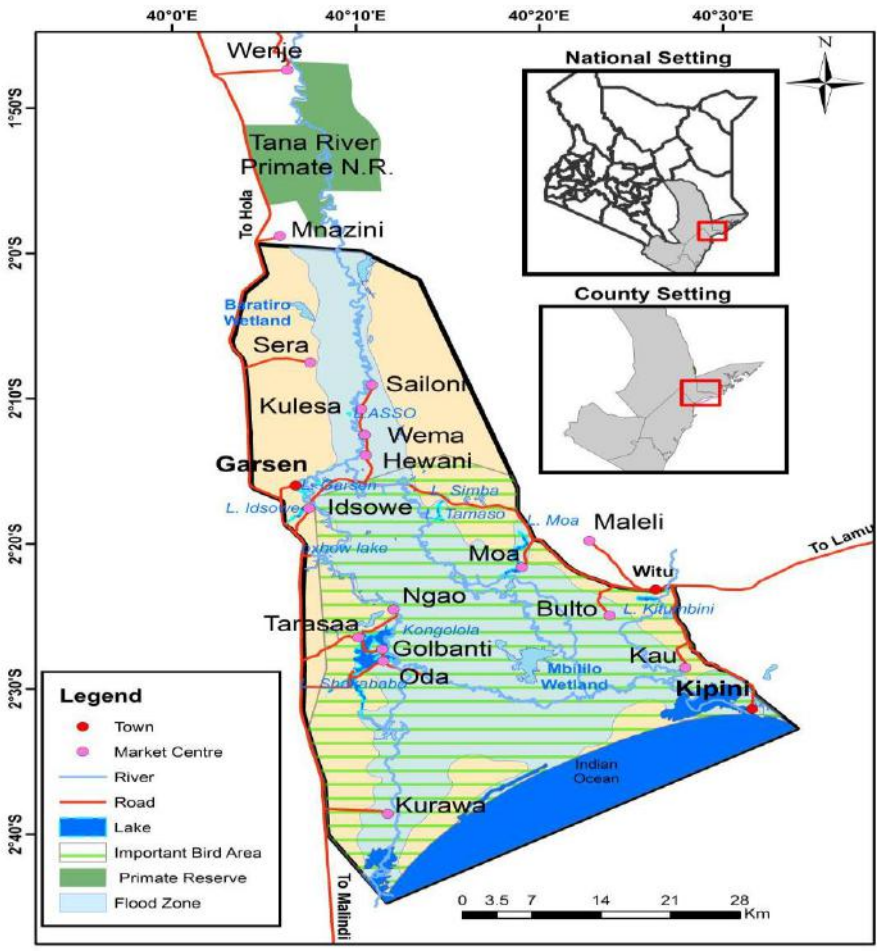

Fig 2.4 Map showing the distribution of key wetlands found in Tana delta. Note that the flood zone covers a big percentage of the delta

2.1.6 Highlights of key biodiversity

Birds

Tana delta is designated by Birdlife International as an Important Bird Area (IBA). It is an important breeding and feeding site for thousands of birds. More than 345 species of birds are found in this IBA. Threatened birds such as the Basra Reed-warbler (*Acrocephalus griseldis) and* Tana River Cisticola are found in the delta. The delta is also a stronghold for near-threatened Malindi Pipit (*Anthus melindae),* Lappet-faced Vulture (*Torgos tracheliotos)* and Madagascar Pratincole (*Glareola ocularis)*. These make the delta one of the key sites in the country for waterbird conservation (Bennun and Njoroge, 1999).The delta also supports one of the very few breeding sites for colonial waterbirds in Kenya that attracts herons and storks from over much of the East African region. This heronry is near Idsowe, south of Garsen on Ziwa La Matomba, a seasonally-flooded lagoon where

the birds nest in a thicket of Terminalia brevipes. The peak nesting period for these birds is usually between May and September but also at other times if the lagoon is flooded.

Mammals

The Critically Endangered Tana Red Colobus monkey *(Procolobus rufomitratus*) is one of 25 primates faced with extinction globally and listed in the IUCN red list is found in Tana delta. Also found in the delta is the endangered Tana Crested Mangabey *(Cercocebus galeritus).* The Tana River Primate National Reserve was established in 1976 in an effort to protect these endemic and critically endangered species. Besides the Primate Reserve the patchy riverine forests in the delta are also critical for the survival of these endangered primates. Other primates found in the delta include the White-collared Monkey, grivet monkey, Yellow baboon, Garnett's galago and Senegal galago (Butynski & Mwangi 1994). Large mammals such as the African elephant, bushpig, bushbuck, leopard, lion, buffaloes, and hippopotamus are also found in the delta.

Fish

The Tana Delta wetland area is home to more than 300 fish species. In the Tana River Primate Reserve alone 30 species belonging to 18 genera and 13 families have been documented. (Fulanda et al. 2011). Marine fish species include sardines, prawns, mullets, rabbit fish, sharks, rays, parrot fish and snappers. Several threatened fish species have been recorded e.g. in the sawfish family Pristidae; Narrowsnouth Sawfish (*Pristis zijsron)* and Wide sawfish (*Pristis pectinata).* Three sharks species seen in Ungwana bay are protected under CITES.

2.2 Socio-economic features

Tana Delta provide important socio-economic services to the local people. These include fishing, livestock grazing and crop farming among others. Studies have shown that the importance attached to these socio-economic activities varies from one community to another, and from one wetland type to another (e.g. Ox-bow lake vs. river). The river is the main source of water for domestic use. The sections below have described in detail the economic features and their status in the delta.

2.2.1 Livestock and crop farming

Agriculture and livestock keeping is the most important economic activities in the Tana Delta, contributing 82.2% of the household income. During the dry season, the delta is used as a fall back grazing area by pastoralists (Tana River CIDP, 2013). The traditional pastoralists/livestock communities within the Tana River Delta are the Ormas, Wardei and Somali. They keep cattle, sheep, goats, camels, donkeys, chicken and ducks. The main challenges encountered are lack of reliable water sources and possibly overgrazing during extreme droughts. These have made the cattle more prone to diseases during the dry seasons. There are about 60,000 cattle in out of which 20,000

are permanently in the delta (Tana River CIDP, 2013). These animals are kept here to provide milk for household consumption. The other 40,000 to 45,000 are moved to the hinterland during the wet season. There were more than 13,500 cattle sold in Tana Delta in the year 2006 at an average price of KSh 18,000 per mature bull (Tana River CIDP, 2013). Most of the Orma also plant crops (intercropped maize) as livestock keeping is now less reliable and small herds are no longer enough to sustain an entire family.

Crop farming in the Tana River Delta employs about 80% of the population who produce about 832 tons of food annually. The main crops grown are mangoes, rice, bananas, green grams, cotton, coconut, cassava and maize. Recurrent droughts, unreliable rainfall, crop raids and decrease in flooding have threatened the agricultural activities in the past decades. This has rendered the local communities more vulnerable to food shortages and more dependent on economic inflow and remittances from the nearby towns.

The historical farming communities are the Pokomo and immigrant Mijikenda. These communities used a multi-strategy agro-system depending on the flooding extent to maintain their food production and cash income. Fishing was their main activity during the wet years when lakes and swamps provided major reproductive zones for the fish. During the drier years when fish resources were scarce, the Pokomo would mainly practice recession agriculture in the upper floodplains. Mango trees were planted during the 1970s and 1980s and provided the cash inflow necessary to buy non-agricultural products. With the modification of the water regime in the 1980s and 1990s, the Pokomo took up news strategies to adapt to the changing environment characterised by decrease in flooding extent. The decrease in water availability alongside with the decrease in sediment deposition through floods rendered recession agriculture less productive. The Pokomo therefore switched to rain-fed and irrigation crop farming with rice and maize as their major crops. Currently, the Pokomo depend on small scale livestock keeping which provide the cash inflow as mango production has dropped significantly due to the drying up of the Orda branch of the Tana River. Agriculture still has a high potential in the County but is largely dependent on the utilization of the Tana River water resources.

2.2.2 Cultural heritage sites

There are several historical sites found in the Tana River Delta. These include: Fumo Liongo graves, Waungwana, Wanawali Saba, Shariff Twahib grave (pilgrim site), Makubani shrine and Shaka ruins (all in Kipini), the colonial District Commissioner house in Kilelengwani, Old Swahili/Shirazi Village ruin in Kau, Anasa in Chara and Nkozi shrine (in Ndera). The delta also has two historical cultural shrines in Bilisa which are Sheik Abdalla's Grave and Ziwa wa Waku/Kijo shrine. In Salama, there is Mudzi Uzunguni which is a colonial site and Chamadho forest shrine. In Galili there is Kone Ebba Shrine.

In the traditional setting the Pokomo council of Elders is called the *Gassa* while that of the Orma's is called *Matadeda*. The council of elders is seen as the safe custodians of the areas that were identified for common use and those that were to be protected. The council of elders have been managing the resources for a long time and are also revered for their wisdom and ability to resolve conflict within and from outside. The elders are also custodians and managers of the traditional sites and shrines. These councils also used to impose very strict regulations on forest and water access and use. However, since independence the activities and powers of these councils have dwindled. Uncontrolled and unmanaged use of wetland resources has resulted in ecosystem degradation.

2.2.3 Tourism

The Tana delta has a great potential for tourism. There are various tourism opportunities within the delta that requires further exploration and marketing. While some recreational activities may be undertaken privately, many require the support of local tour operators providing further livelihood opportunities for local populations. Tourist attractions in the Tana Delta include diverse birdlife, wetland fauna including crocodiles and hippos, terrestrial wildlife (including elephants and buffaloes) and sand dunes. In Tana delta there are private wildlife conservancies e.g. Lower Tana Delta Conservancy Trust and Kipini Conservancy. Ecotourism at Mulikani and Mto Tana are some tourism activities carried out by Community Based Organization from Ozi and Chara locations respectively.

2.2.4 Fishing

Fish resources in Tana delta supports both subsistence and commercial fisheries. The fishing activities contribute to poverty alleviation by providing food, income and employment. The delta artisanal fisheries is estimated at producing average of five hundred tonnes per annum, with estimated three thousand artisanal fishermen making a living from fishing in the delta alone. Marine fisheries production is carried out along the 35 km coastline of the Indian Ocean. Inland fishing takes place in the oxbow lakes and in the river itself (Fig 2.5). However, due to occasional change of river course, most of the oxbow lakes downstream have dried up. According to marine Fisheries Frame Survey (GOK 2014a), there are 477 fishermen within the Ungwana bay in the Delta, using 48 fishing boats, most of which are wind propelled. The different fishing gears used are gill nets, hand lines, traps, fences, pointed sticks and spear guns.

The Delta has several documented threatened species including the sawfish family Pristidae, probably Narrowsnouth Sawfish (*Pristis zijsron)* and wide sawfish (*Pristis pectinata).* The artisanal freshwater fisheries of the delta are supported by four main fresh water fish species Sabaki Tilapia (*Oreochromis spilurus*), the large-tooth catfish (*Clarias gariepinus*), the Tana lung fish (*Protopterus affinis annectens*), the wide head catfish (*Clarotes laticeps*) producing a collective average of five hundred tonnes per annum (GOK 2014b).

Fishing is carried out mainly by the Pokomo. Other communities engaged in fisheries activities in the delta include the Bajuni, Mijikenda and immigrants in areas such as Lake Moa. The fisher forks have used traditional traps and spears for several decades, which have ensured that the fishery does not exceed sustainable levels. However, several populations are showing trends of rapid decline due to recent fishing methods which include use of mosquito nets and small mesh size gill nets. Due to reduced water levels resulting from water deviation for irrigation and or low rainfall and floods most people concentrate on fishing as an alternative for food and source of earning. The most important prawn and shrimp species are Giant tiger prawn *Penaeus monodon*, Indian white prawn *Penaeus indicus*, Kuruma shrimp Penaeus *japonicus*, Green tiger prawn *Penaeus semisulcatus*, Speckled shrimps *Metapenaeus monoceros*, *Macrobrachium scabriculum*, and *Macrobrachium rude* which are dependent on the extensive mangroves in the Tana River Delta (Fulanda, 2003).

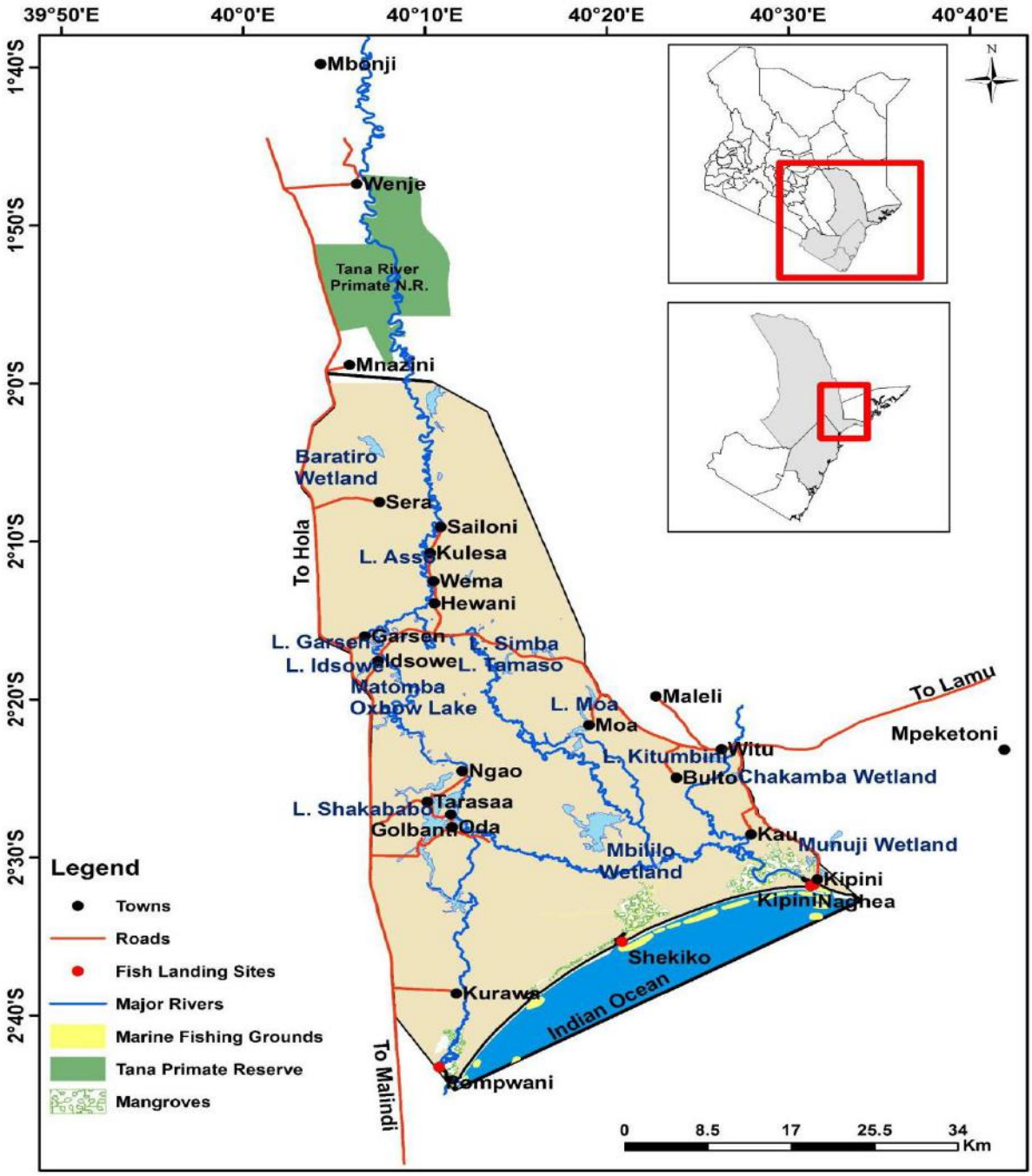

Fig 2.5 Map showing the distribution of fishing grounds in Tana delta. The fishing grounds include the river, the oxbow lakes and ungwana bay.

2.2.5 Hunting and gathering

Hunting and gathering is still practiced by the Boni and Watta. The target animals include Antelopes, Giraffes, Elephants, Gazelles, Warthogs, Waterbucks, etc. This activity is currently

illegal under the Wildlife and conservation Act hence conflict between the Government and Hunters/Gatherers.

2.2.6 Emerging Large scale economic land uses

Tana delta has and continues to attract large economic activities despite being considered as fragile and vital for traditional uses; and extremely rich in important biological diversity. Some of the developments that have been proposed or proposed but rejected include: Sugarcane farming, Jatropha farming for biofuel; and oil and gas exploration as detailed in Section (Table 1.3).

2.2.7 Poverty

Poverty in Tana Delta is at 76.9% of the total population meaning that majority of the population lives below the poverty line (Kenya Integrated Budget Household Survey, 2005/2006). As a result, the majority of the population is unable to afford basic needs such as food, clothing and shelter. This is attributed to unreliable rainfall, poor crop and animal husbandry; and high levels of illiteracy. Other factors relating to poverty levels include poor infrastructure, lack of credit facilities, poor marketing systems and livestock diseases. Insecurity, unemployment, human-wildlife conflicts, and environmental degradation have also contributed to increased poverty level.

2.2.8 Gender equality

Tana delta is faced with gender inequality that is strongly associated with culture of the communities. Gender inequality manifests itself through little involvement of women in leadership and elective position that excludes them from decision making; low school enrolment rate for girls as compared to boys; and early marriage for girl child. Additionally, women are deprived of their rights to own property.

2.2.9 Infrastructure

The Tana Delta has the benefit of a major road passing through it and linking it to Garsen, Malindi (and the rest of the southern coastal towns) and Lamu in the north. The total road network in the Tana River County is 3,076 km with about 55% in motorable condition. Seasonal rivers commonly known as *laghas* intercept most of the roads. This makes the roads impassable during the rainy seasons. The county has 5 airstrips at Hola, Bura and Garsen and a 35 km sea front, which is a potential for fishing vessels, with Kipini, Ozi, Mto Tana operating as fish landing sites.

Majority of the people, 41.9%, of Tana River live in mud/wood walled houses, with about 29.5% living in grass straw houses. 26.4% of the roofing materials used are made of corrugated iron sheets and 13.9 per cent are made of coconut palm fronds, also locally called *makuti*.

The building of Lamu Port will introduce new developments and pressures, including a proposed road and railway linking Malindi to Lamu Port. Preliminary consultations show that eco-tourism is emerging as an alternative economic activity. Lodges, boat rides and wildlife conservancies are currently being developed within the delta.

Mobile services are only concentrated in the urban centers and have not properly covered the entire county especially the Western hinterlands of the county. Efforts are being made by the Government to lobby the telephone services providers to expand their coverage in the county through initiatives like the Public Private Partnerships (PPPs). Investments in DSTV, GTV and other free to air satellite television has nevertheless made access to local and international broadcasts possible in the county

Electricity supplies to the principle settlements have been significantly upgraded with the construction of a new National grid powerline linking Mombasa and Lamu. Much of rural area however has no electricity connection (Odhengo et al. 2014).

2.2.10 Education and employment

The county have the following public education institutions: primary schools (161), Secondary schools (17), Early child development education Centers / Nurseries (349) and Youth polytechnics (4) and other religious institutes e.g. Bible translation Literacy center and Madrasas (*Tana River County Integrated Development Plan, 2013)*. The unemployment rate is high at 33%, compared with the national average of 20% (GOK 2013).

CHAPTER 3: REVIEW OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS

This chapter provides a review of policy, legal and institutional framework relevant for the conservation and sustainable development of Tana delta. The main policy and legal frameworks are described below while others are summarized in Table 3.1.

3.1 Policy and Legal Framework

3.1.1 The Constitution of Kenya 2010

Article 42 of the Constitution of Kenya, under Chapter IV of the bill of rights guarantees the right to a clean and healthy environment. Article 69 obliges the state to ensure sustainable exploitation, management and conservation of the environment and its natural resources. Article 67 provides guiding principles on the governance of land and the environment in the country. The principle of sustainable development has been entrenched in the Constitution (article 10 2(d)) as one of the national values and principles of governance. Article 60 (1) (e) provides for sound conservation and protection of ecologically sensitive areas. The State is obliged to (a) Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure equitable sharing of the accruing benefits; (b) Encourage public participation in the management, protection and conservation of the environment; (c) Establish systems of environmental impact assessment, environmental audit and monitoring of the environment; (d) Eliminate processes and activities that are likely to endanger the environment; and (e) Utilize the environment and natural resources for the benefit of the people of Kenya. The requirement by of the Constitution of Kenya to ensure sustainable exploitation, management and conservation by way of involving the public and securing equitable sharing of the accruing benefits for all will be addressed during implementation of this management plan.

3.1.2 The Environment Management and Coordination Act, CAP 387

EMCA 1999 revised in 2015 as CAP 387 is an Act of Parliament establishing a legal and institutional framework for the management of the environment in the country. Section 42 has made express provisions on wetlands conservation. In section 42 (1) the Act has provided safeguards against environmental degradation within and outside wetland areas. In addition section 42 (2) of the Act empowers the Minister responsible for environment to declare a lake shore, wetland, coastal zone or river bank to be a protected area and to impose such restrictions as he considers necessary to protect the same. Section 42 (3) of the Act further empowers the Minister to issue general and specific orders, regulations or standards for the management of wetlands including those at the risk of environmental degradation.

Moreover, section 55 (2) and (3) of the Act obliges NEMA, in consultation with the relevant lead agencies, to undertake a survey of the coastal zone, and prepare the state of the Coast Report in every two years, and integrated coastal zone management plan. The Act has also provided for public participation in the development and implementation of policies, plans and processes for the management of the environment at the coast. This management plan will uphold and ensure the achievements of these provisions during implementation.

In an effort to fully operationalise EMCA CAP 387, NEMA has developed a number of subsidiary regulations, most of which have a bearing on the management of Tana delta. They include: Biodiversity Regulations 2007; Waste Management Regulations 2006; Water quality regulations 2006; EIA Regulations 2003 and Wetlands Regulations 1999.

3.1.3 The Wildlife Conservation and Management Act, 2013

The Wildlife Conservation and Management Act, 2013 provides a framework for the protection, conservation, sustainable use and management of wildlife in Kenya. The Act applies to all wildlife resources on public, community and private land, and the country's territorial waters. It authorizes KWS to enter into agreements with other competent Authorities for the protection of wildlife and their habitats. It recognizes the role of various actors in wildlife management which include giving responsibilities to the local communities and land owners in the management of wildlife resources. It offers incentives to promote community participation in conservation. As described earlier in the plan, Tana delta habours rich and diverse wildlife resources. The enforcement of the Act to conserve the wildlife resources in the delta will constitute part of implementation of this management plan.

3.1.4 The Wetlands Policy 2014

The Wetlands Policy 2014 provides a framework for conservation and sustainable use of wetlands and their associated resources in the country. The policy recognizes the importance of wetlands in the country in provision of goods and services such as habitats for flora and fauna and provides for their protection. The role of the public in their protection and management has been well articulated in the framework. The policy further reiterates the need for measures to ensure conservation and sustainable development in wetland areas including development and implementation of wetland management plans. Environmental Impact Assessments and Environmental Audits as provided for by EMCA CAP 387 to safeguard wetlands against degradation is provided for in the policy framework. Implementation of the Tana delta management plan will contribute to realization of the objectives of the wetlands policy.

3.1.5 Forest Policy and Legislation

The draft Forest Policy 2007 and the Forests Act 2005 provide the legal framework for the management of forest resources in the country. The Forests Act provides for the establishment, development, sustainable management, utilization as well as conservation of forest resources for the

socio-economic development of the country and environmental sustainability through the Kenya Forest Service (KFS). The Act requires that all forest be managed through approved management plans and participation of stakeholders. Part IV (45 – 48) of the Forest Act provides for comprehensive community participation in forest management in the country, including mangroves. Tana delta hosts a number of indigenous forests which serve as habitat for wildlife besides supporting socio-economic activities of the area resident communities. Enforcement of the forest policy and related legislative framework during implementation of this management plan will go a long way in ensuring conservation and sustainable use of the forest resources in the delta.

3.1.6 Environmental Policy 2013

The National Environment Policy 2013 seeks to provide a framework for integrated approach to planning and sustainable management of natural resources in the country. It recognizes the various vulnerable ecosystems in the country and proposes various policy measures not only to mainstream sound environmental management practices into all sectors of the society but also recommends strong institutional and governance structures to support the achievement of the policy objectives and goals. Implementation of the environment policy will ensure sustainable management of the environment and natural resources such as Tana delta for national economic growth and improved people's livelihood and well-being. It will also promote and enhance collaboration, synergy, partnerships and participation in the protection and conservation of the environment by all stakeholders.

3.1.7 ICZM Policy 2014

One of the major challenges facing the management of resources at the coast is a governance system based on a sectoral approach, which does not recognize the interconnectedness of ecosystems in resource management. Consequently, the sectoral approach to development planning and management, combined with population pressure and the intensity and complexity of human activities have resulted to the occurrence of resource use conflicts and adverse socio-economic and environmental effects. The Integrated Coastal Zone Management (ICZM) Policy has identified various measures and strategies for implementation to promote coordination and use of integrated approach in conservation and development efforts with a view to fostering sustainable development in the coast region. Implementation of this integrated management plan will contribute to the achievement of the provisions of the ICZM Policy.

3.1.8 The Fisheries Policy and Legislation

The Fisheries Act Cap 378 of 2012 provides the framework for the development, management, exploitation, utilization and conservation of fisheries. The Fisheries policy seeks to enhance the fisheries sector contribution to economic development and livelihood improvement through effective private, public and community partnerships. Among the issues the policy seeks to address in the

fisheries sector include protection of fish breeding areas; addressing unsustainable utilization of fisheries resources, resource use conflicts, inadequate fisheries infrastructure, and development of institutional capacity for effective fisheries management. The policy recognizes the inter-jurisdictional aspects of marine fisheries and has called for collaboration and cooperation in the management of fisheries resources. Tana delta and the adjacent Ungwana bay habours rich fisheries resources that support the livelihood of the local communities and the national economy. Implementation of measures to promote conservation and sustainable use of the fisheries resources in the delta is a major component of this management plan. The Management Plan will contribute to the attainment of the provisions of the fisheries policy and its related legislative framework.

3.1.9 Land Policy Act 2012

This Act mandates the National Land Commission to take appropriate action to protect and maintain public land; protect endangered and or endemic species of flora and fauna, critical habitats or protected areas and to identify ecologically sensitive areas that are within public lands. The Act further requires the Commission to undertake an inventory of all land based natural resources, and reserve public land for any purposes, including environmental protection and conservation. The Act further empowers the Commission to make rules and regulations for the sustainable conservation of land based natural resources. This integrated management plan underscores the importance of Tana delta and the need for sustainable development in the area for the benefit of the current and future generations in line with the provisions of the Land Act.

3.1.10 National Land Policy 2012

The objectives of the National Land Policy are to develop and maintain a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide (i) all citizens, particularly the poor, with the opportunity to access and beneficially occupy and use land (ii) an economically, socially equitable and environmentally sustainable allocation and use of land; and (iii) the efficient, effective and economical operation of the land market. In addition, the policy seeks to design a property structure, which is free from complexities, and accords greater equity of access to land resources. Currently land tenure and ownership in Tana delta is largely government owned and Trust Land, and only a small percentage is under group ranches and private individual ownership (Melita *et al*, 2011). Enforcement of the policy with a view to addressing land tenure and ownership issues to guarantee security and customary entitlements to land by the resident community is crucial for the success in implementation of this management plan.

Table 3.1 Other national policies and laws relevant to management of Tana delta

Water Act 2002	• Water resources use and management including quantity and quality monitoring

Physical Planning Act 1996	• Land use planning taking into consideration environmental concerns and special issues
National Museums and Heritage Act 2006	• Identification, protection, conservation and management of cultural and heritage sites • Biodiversity research and identification of heritage sites
Agriculture Act 1986	• Soil conservation and management • Regulation of use of riparian areas • Control of cultivation, livestock numbers, grazing and clearing of vegetation
Draft Tourism Policy	• Development of the tourism sector • Addressing impacts of tourism related activities on the environment, the economy and socio-cultural aspects
Energy Act 2005	• Development and use of renewable energy • Licensing of oil and gas exploration
County Government Act 2010	• Implementation of specific government policies on environment and natural resources conservation • Development and implementation of county integrated development plan • Cooperation between the National and County Governments in planning and conservation of the environment
The National Land Commission Act	• Controlling land use planning and maintain land information management system • Conduct research related to land and the use of natural resources
Inter-Governmental Relations Act 2012	• Consultation and co-operation between the national and county governments and amongst county governments in establishing mechanisms for resolution of intergovernmental disputes

3.2 Multilateral Environmental Agreements Relevant to Management of Tana delta

Kenya has ratified a number of international agreements, protocols and Conventions that impact on wetlands conservation. They form part of Kenyan laws under article 2 (5) (6) of Constitution of 2010. The key international agreements and conventions that are considered most important for conservation of Tana delta are discussed below. The rest are summarized in table 3.2.

3.2.1 The Nairobi Convention

The Nairobi Convention (NC) provides a framework for development and protection of the coastal and marine resources in the Western Indian Ocean (WIO) region. Kenya is Party to the NC. The Convention provides for ecosystems approach to the management of marine and coastal resources in the WIO region. The approach recognizes the effect of the environment on the resource being exploited and vice versa. This approach ensures that there is a balance between sustainable use and fair and equitable sharing of the benefits arising out of the utilization of marine and coastal resources over time. Implementation of the Tana delta management plan will contribute to realization of the

country's regional obligations on conservation of wetland resources in line with the provisions of the NC.

3.2.2 The Ramsar Convention

The Ramsar Convention, adopted in 1971, provides the framework for national and international cooperation for the conservation and wise use of wetlands and their resources. The Convention covers all aspects of wetland conservation and wise use. It provides for:

i) Designation of wetlands of international importance as Ramsar sites
ii) Promotion of the wise-use of all wetlands in the territory of each country; and
iii) International co-operation with other countries to further the wise-use of wetlands and their resources.

As a contracting party to the Convention, Kenya is required to promote the conservation and wise use of wetlands in line with Article 2(5) (6) of the constitution of Kenya 2010. The Tana Delta was designated as a Ramsar site in 2012 due to unique and diverse range of habitats that include ox-bow lakes, swamps, mangroves, etc. Development and implementation of management plan to ensure conservation and management of an area designated as a Ramsar site is a key requirement by the Ramsar Convention. Development of this integrated Tana delta management plan is in line with this requirement of the Convention.

3.2.3 Convention on Biological Diversity

Research world over has shown that the threat to species and ecosystems has never been as great as it is today. General environmental degradation and in some cases species extinction caused by anthropogenic (human) activities continues at an alarming rate. In appreciation of the value of global biodiversity and the the need to stop and reverse degradation, the Convention on Biological Diversity (CBD) agreed upon at the 1992 United Nations Conference on Environment and Development held in Rio, Brazil. The main objective of CBD is the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources. Its development is a major step forward in the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources. Implementation of the activities outlined in this management plan will lead to restoration and conservation of Tana deltas biodiversity well as promote sustainable use delta resources in line with the CBD objectives.

Table 3.2 Other International legal instruments relevant to management of Tana delta

Convention/Agreement	**Focus Area**
The Convention on Migratory Species (CMS)	Conservation of terrestrial, marine and avian migratory species
Convention on International Trade in Endangered Species of Wild Fauna and Flora(CITES)	Regulation of trade in species which are endangered or which may become endangered if their exploitation is not controlled
United Nations Framework Convention on Climate Change (UNFCCC 1992)	Climate Change mitigation and adaption
United Nations Convention on the Law of the Sea (UNCLOS, 1982)	Provides the legal framework within which all activities in the oceans and seas must be carried out
African Convention on the Conservation of Nature and Natural Resources, 1968 (as revised in 2003).	Natural Resource Conservation
International Convention on Oil Pollution Preparedness, Response and Cooperation (1990)	Oil spills/pollution at Sea

CHAPTER 4: STAKEHOLDER ANALYSIS

Tana Delta, just like many other wetland ecosystems in the country, has many stakeholders with diverse resource-specific interests and stakes, which are often conflicting and competing. It is these competing interests and stakes that often characterise the numerous conflicts resource-use conflicts in the delta. Stakeholder profiling and analysis is a dynamic process due to unprecedented stakeholder entry and exit into and out of the plan area, occasioned by several factors such as programme termination, funding constraints, as well as socio-political and environmental terrains. The list of stakeholders and analysis provided herein is subject to periodic review as new stakeholders and interest emerge over time.

4.1 Stakeholder mapping/identification

There are several stakeholders involved in Tana Delta (Table 4.1).

Table 4.1 Tana Delta Stakeholders

Government institutions	**NGOs**	**Communities &CBOs**	**Private sector**	**Development Partners and academia**
• Ministry of Environment and Natural Resources • Ministry of Water and Irrigation • Ministry of Land, Housing and Urban development • National Land Commission • Ministry of Agriculture, Fisheries and Livestock • Ministry of Mining • Ministry of Sport, Culture and Arts • Ministry of East Africa Affairs, Commerce and Tourism • Ministry of Industrialization and Enterprise Development • Ministry of Labour and Social Services • Ministry of Defense • Ministry of Transport and infrastructure	• Nature Kenya • WWF • Wetlands international • Kenya Wetlands Forum • Kenya Forest Working Group • Tana Pastoralists Forum • CANCO • Kenya Oil and Gas Working Group • TADECO (Tana Delta Conservation Organization) • Wild Living Resources	• Local Communities • BMUs, eg MOA • CFAs, • WRUAs • CBOs such as Mulikani Community Conservation Group, TaFMEN-Kipini and Manufaa Women • Charcoal Producers Associations	• Media • Kipini Botanical and Wildlife Conservancy Trust • Lower Tana Conservation Trust • Salt Works • Oil and Gas developers • Group Ranchers eg Wachu, Hagada, Ida-sa Godana, Konderitu, Kibisu, Giritu, Kitangale,	• UNEP • World Bank (through KCDP, Coast Water Services Board etc) • University of Nairobi

• Ministry of Information and Technology • Ministry of Education • Department of Tourism • Ministry of Energy and petroleum • Ministry of Medical Services • KENGEN • Ministry of Devolution and Planning • Ministry of Interior and coordination of national Government • Ministry of Transport and Infrastructure • The Presidency • Tana River County Government • Lamu County Government • Kenya Meteorological Services • DRSRS • NEMA • TARDA • KFS • CDA • KWS • NMK • KMFRI • KEFRI • Kenya Agriculture and Livestock Research Organization (KALRO) • WRMA • Kenya Water Towers Agency • The Treasury (Ministry of Finance)	• ELCI • Birdlife International • EAWLS • TNC • KENWEB • IUCN • RSPB • Kenya Red Cross Society • Flora and Fauna International		Dalu, Witu-Nyongara and Nairobi among others • Kipini Conservancy	

4.2 Analysis of stakeholder

The listed stakeholders were organized into groups during consultative processes. The groups were guided by a check-list (stakeholder analysis matrix) detailing stakeholder category, interest/stake as well their relative importance and influence on development and implementation of the management plan for the delta. This was conducted during the focus group discussions (FGDs). A

plenary/consensus building session was facilitated to harmonise the feedbacks from the groups. The final results of the analysis are presented in Table 2.

Table 4.2: Stakeholder Analysis Matrix

CATEGORY	STAKEHOLDER	INTEREST	IMPORTANCE	INFLUENCE
Government i. National Government Ministries	Ministry of Environment and Natural Resources	Biodiversity Conservation and sustainable use of natural resources; water use regulation and management;	HIGH	HIGH
	Land , Housing and Urban development	Sustainable use of Land and land based resources; planning & Development; Housing and Urban development	HIGH	HIGH
	Health /Medical Services	Disease prevention, control and treatment	HIGH	LOW
	The Treasury	Climate change financing	HIGH	HIGH
	Interior and coordination of national government (The presidency)	Provision of security, maintenance of law and order & coordination of national government programmes	HIGH	HIGH
	Agriculture, Fisheries and Livestock	Food security and livelihood	HIGH	LOW
	Mining	Mineral exploration, extractions and development	HIGH****	HIGH***
	Transport and infrastructure	Infrastructure development	HIGH	HIGH
	Education	Impart knowledge	HIGH	LOW
	Sport, culture and arts	Promotion of cultural, heritage and youth empowerment	HIGH	LOW
	East Africa affairs, commerce and tourism	Promotion of regional trade and tourism	HIGH	LOW
	Industrialization and enterprise development	Enterprise development	LOW	LOW
	Labour, social security and services	Job creation; social protection	HIGH	LOW
	Information communication and technology	Provision of information resources and ICT development	LOW	HIGH***
	Defense	Territorial/border protection	LOW	LOW
	Foreign affairs	Bilateral and multilateral relationships	LOW	LOW

	Energy and petroleum	Energy production and regulation	HIGH	HIGH***
	Devolution and planning	Coordination of County Governments	LOW	LOW
ii.County Governments	Tana River County Government	Overall Responsibility of the governance of the County	HIGH	HIGH
	Lamu County Government	Overall Responsibility of the governance of the County	HIGH	LOW***
iii. Departments	KMS	Disaster prediction and early warning –resources and livelihood protection	LOW	LOW
	DRSRS	Inventory and mapping of natural resources through aerial survey	LOW	LOW
iv. Agencies	NEMA	Sustainable management of environment and natural resources; pollution abatement and enforcement of laws	HIGH	HIGH
	National Land Commission (NLC)	Management of Land on behalf of the government; resettle programmes, compensation, land adjudication and administration; address historical injustices regarding land	HIGH	HIGH
	KWTA	Management of Kenya's Water Towers	LOW	LOW
	TARDA	Has a jurisdiction of initiating and coordination of implementation of multisectoral development in the Tana catchment areas. Undertaking large scale irrigation in the Tana Delta	HIGH	HIGH
	KFS	Management of forests Increase forest cover Protection of mangrove forests	HIGH	HIGH
	CDA	Is involved in implementation of integrated development projects in the coastal area	LOW	LOW
	KWS	Wildlife conservation and protection. Preservation of ecosystems and biodiversity	HIGH	HIGH
	NMK	Biodiversity conservation; research and identification and preservation of cultural heritage	LOW	LOW
	KMFRI	Sustainable management of Aquatic and semi-terrestrial resources	HIGH	LOW
	KEFRI	Forest Research for enhanced management of forest ecosystems	HIGH	LOW
	KALRO	Agriculture and livestock research	HIGH	LOW

		for enhanced livelihood and agro-related biodiversity		
	KENGEN	Water for energy production (hydropower)	HIGH	HIGH
	WRMA	Water resource management and water use regulation	HIGH	HIGH
Non Governmental Organizations (NGOs)	Nature Kenya	Nature conservation	LOW	HIGH
	WWF	Nature Conservation	LOW	HIGH
	Wetland international	Biodiversity conservation and sustainable deltaic wetland resource use	LOW	HIGH
	Kenya Red Cross Society	Disaster response and humanitarian assistance	HIGH	LOW
	Kenya wetlands forum	Biodiversity conservation and sustainable deltaic wetland resource use	LOW	HIGH
	KFWG	Forest Resources protection and Sustainable use	LOW	HIGH
	Kenya Oil and Gas Working group	Sustainable Natural Resources management/Sustainable Development	LOW	HIGH
	TADECO	Conservation of Tana Delta Resources	LOW****	HIGH****
	CANCO	Nature conservation and sustainable deltaic wetland resource use	LOW	HIGH
	ELCI	Nature conservation and livelihood support	LOW	LOW
	Birdlife International	Nature conservation and livelihood support	LOW	HIGH
	EAWLS	Nature conservation and livelihood support	LOW	HIGH
	TNC	Nature conservation and livelihood support	LOW	HIGH
	FFI	Biodiversity conservation	LOW	LOW
	Lower Tana Conservation Trust	Conservation of Lower Tana NR	LOW	HIGH***
	Tana Pastoralist Forum	Enhance pastoralism and secure grazing areas	LOW	HIGH
Communities and community groups	BMUs, CFAs, WRUAs, CBOs, CPAs	Livelihood support, natural resource management and biodiversity resources	HIGH	LOW
Private Sector	Kipini Botanical and Wildlife Conservancy Trust	Wildlife conservation and protection	LOW	HIGH
	Group Ranchers	Wildlife conservation	LOW	HIGH

	Salt Works	Salt mining	LOW	HIGH
	Oil and Gas Developers	Oil and Gas exploration and development	LOW	HIGH
	Other private developers	Farming (Sugarcane, rice etc)	LOW	HIGH
	Media	Public education and awareness	LOW	HIGH
Development Partners and academia	UNEP	Environment conservation	LOW***	HIGH
	RSPB	Bird life conservation	LOW	LOW****
	World Bank	Community livelihood support and environment conservation	LOW	HIGH
	IUCN	Nature Conservation	LOW	HIGH
	University of Nairobi	Research within the Delta for informed decision-making	LOW	LOW***

4.3 Stakeholder Analysis matrix-The Delphi Diagram

In order to illustrate the relative importance and power influence of the various stakeholders in the Tana Delta, the Delphi matrix provides an excellent stakeholder overview chart and is often used to illustrate analysis of diverse stakeholders in projects and programmes. Using boxes A (high importance, low influential stakeholders), B (high importance and highly influential stakeholders), C (Low importance and low influential stakeholders) and D (low importance but highly influential stakeholders), the relative importance and influence of the Tana Delta stakeholders are provided in Figure 1. The relevance of this is to promote understanding about the importance and power relations that can impede the development and sustainable implementation of the plan, and design mechanisms of bringing on board those that are important and influential for the management plan (development and implementation), especially those in boxes A, B and D.

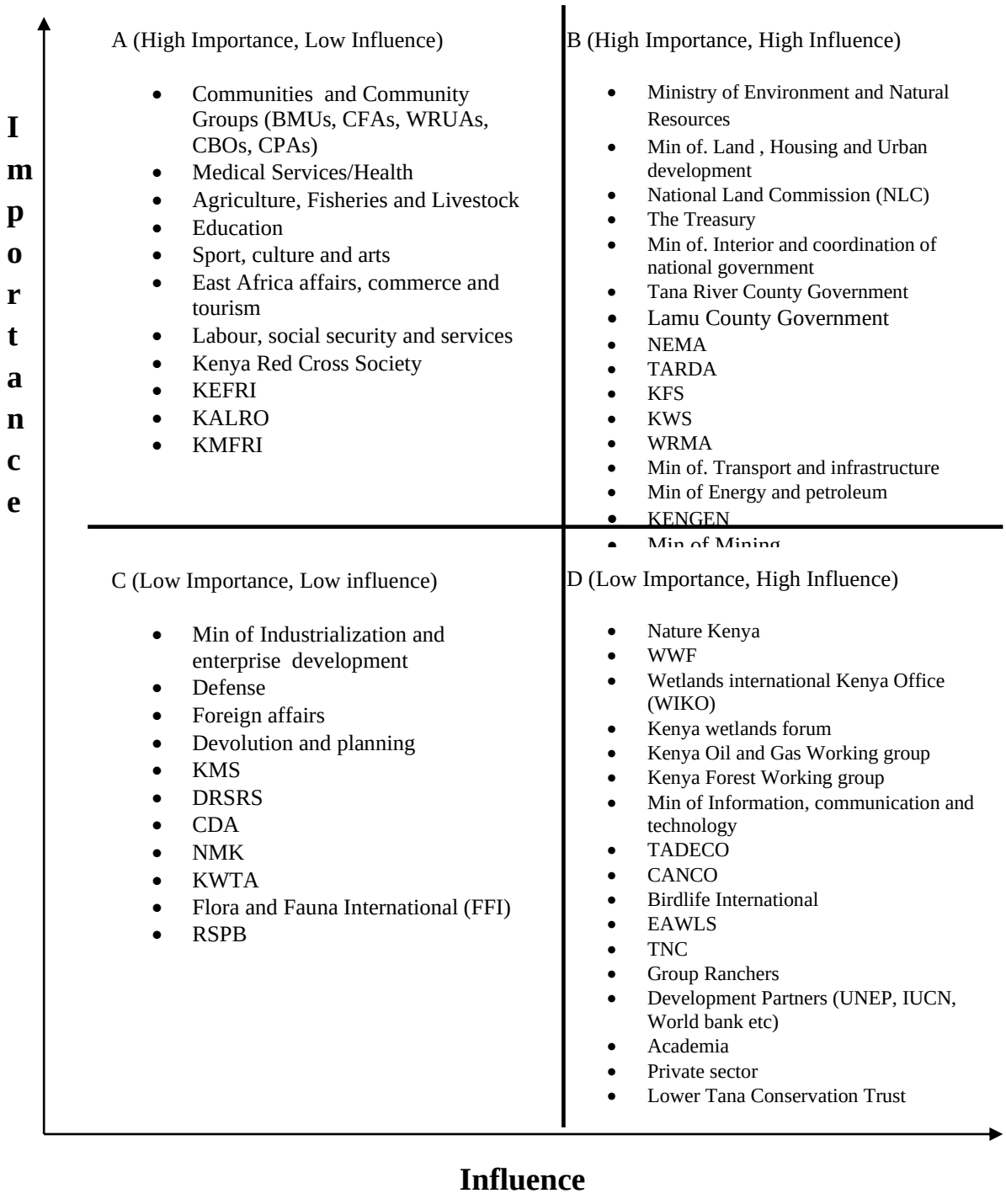

Fig 4.1: The Delphi Chart illustrating Tana Delta Stakeholder Analysis in terms of importance and influence

CHAPTER 5: ISSUES AND THREATS FACING TANA DELTA

Despite the wide recognition of the importance of Tana delta as a key biodiversity hotspot nationally and globally environmental degradation continues unabated. This threatens the ecological processes and economic livelihoods dependent on the delta. This chapter describes the major threats facing the delta.

5.1 Biodiversity loss and habitat degradation

Poverty and high level of illiteracy in Tana Delta have resulted in over-dependence on natural resources which has in turn led to over-exploitation of delta's resources. Over time this has had negative consequences on species abundance, composition and diversity. Examples are the endangered Tana River sisticola, primate species (the Red Colobus and Crested Mangabey) and diminishing fish-stocks in most of the oxbow lakes among other effects (Mbuvi et al. 2012; Mbora & Meikle, 2004). About 98 % of the population in the delta depend on charcoal and wood fuel for cooking. Some sell wood fuel for income. This is causing environmental degradation due to the indiscriminate felling of trees *(*Kenya Integrated Household Budget Survey, 2005/2006).

There exists fishing opportunities in the Tana delta's ox-bow lakes although fish catch is currently declining in some lakes. Issues facing fishing sector include increased fishing effort mainly occasioned by fishers moving into the delta from the neighboring counties of Lamu, Kilifi and and also Kwale. Reduction in fish stocks in the oxbow lakes such as Moa and drying of others such as Shakababo and Kongolola have caused a paradigm shift to the fish dependent communities who are currently practicing agriculture in the riparian areas and dry oxbow lakes. During the dry season, migrant fisher communities in the delta result into unsustainable livelihoods such as uncontrolled felling of trees for charcoal and wood fuel. Use of destructive fishing gears and methods such as beach seines is also a major problem causing a decline fish catches in traditional fish landing areas. This can be attested by the increase in the juvenile's fish catch over the years which fetch little incomes to the fishers as well as destabilize fish populations.

River embankment to create dams has affected flooding regimes in the delta thus accelerating biodiversity degradation in the delta. The numerous patches of riverine forest, woodland and bush lands in the delta are edaphic in origin, and their continued existence depends on critical minimum levels of flooding (Maingi J.K & Marsh S.E, 2006). The flood regime has already been disrupted by five large water impediments (Seven Folks dams) upstream and development of more of such impediments will put more pressure on the flooding regimes. Dykes and other manmade flood control infrastructure in the delta has further disrupted water systems in the delta further complicating biodiversity survival.

Migrant pastoralists, particularly from outside Tana River County, heavily rely on the delta as dry season and drought period fallback grazing grounds. Overgrazing within the flood-plains has resulted to rangeland, riverine and floodplain degradation. Reduction in flooding in many consecutive years has led to permanent settlement of former nomadic communities in the delta.

Invasion of alien species mainly by *Prosopis juliflora* has also caused biodiversity degradation in the delta. Where it occurs *Prosopis Juliflora* tends to suffocate other plants by not allowing the development of native species and the undergrowth. A comprehensive invasive species management strategy needs to be implemented.

Poor farming methods and practices characterized by slash-and-burn agriculture and encroachment on riverbanks and forests have also contributed to biodiversity loss and environmental degradation in the delta. Wildlife migration corridors have been blocked by human settlement in Hurara and other areas resulting in increased cases of human wildlife conflict.

Fig 5.1: Lake Shakababo and Kongolola wetland in Tana delta. Due to changes in river flow and flood regimes overtime these wetlands are mainly dry nowadays. As a result much of the biodiversity e.g. fisheries resources have since been lost and the fishing communities changed their livelihood to agriculture (Source: J. Kamula)

5.2 Water issues

5.2.1 Water volume reduction in the river

Decline in water levels in Tana River and change in flooding regimes have negatively affected Tana delta. The riverine forests, woodland and bush lands in the delta are edaphic in origin, and their continued existence depends on critical minimum levels of flooding. Most of the tree species in these forest are disappearing due to decline in the river flows and flooding regime. The effect has also been felt in the delta's oxbow lakes and the floodplains. The water levels in oxbow lakes such as Lake Moa have continued to decline while lakes such as Shakababo and Kongolola receive water

during the rain season only. These changes have in return negatively affected the livelihood of the communities dependent on fishing. The floodplains which are considered to be of high value for subsistence agriculture, source of reeds for thatching, fresh water and grazing are also experiencing reduced productivity owing to the changes in the flooding regime.

The decline in river flows has largely been blamed on the river embankments upstream. Development of more of such impediments will only put more pressure on the flooding regimes and water flows. There is need to rationalize water use in the entire Tana River basin in order to address the ecological and socio-economic effects associated with changes in water flows and flood regime in the delta. Application of tools such as Environmental Flows among others measures to ensure water is available to meet both ecological and socio-econmic needs in the entire basin is imperative.

5.2.2 Siltation and river diversion

Poor land use practices upstream of Tana delta have largely contributed to increased sediment load in the Tana River. This has had far-reaching ecological and socio-economic consequences to the coastal environment. Discharge of the water loaded with silt has affected coral reefs and sea grass beds in the in Ungwana bay. In the hinterland parts of the delta siltation has led to reduction in the size of the oxbow lakes and brought about changes in the river course which has affected communities living in the affected sections of the river. Lakes such as Lake Bulto, Lake Shakababo, Kongolola and Matomba has completely died due to siltation while others including Lakes Mbililo, Bilisaboka, Samicha and Konemansa have changed to floodplains due to filling of the lakes with silt. These changes have in return negatively affected the livelihood of the communities dependent on fishing as well as led to biodiversity loss.

Changes in the river course at Mnazini, Matomba and Handaraku have affected supply of water to villages originally dependent on the river for water supply. Changes in the river course have also sometimes been accelerated by human activities mainly irrigation farming.

Fig 5.2: The silt laden Tana River at Hola (Source: J. Kamula)

Fig: 5.4 River diversion at Matomba (Source: J. Kamula)

5.2.3 Declining water quality

Increased farming coupled with proliferation of industries and urban centers along the Tana Basin has contributed to pollution of the water resource. Effluent from upstream based tea factories and chemical wastes from mechanized agricultural farms (Mwea, Bura, Hola and Garsen irrigation schemes) are also affecting water quality. Towns and settlements along the river course in the counties of Muranga, Kiambu, Nyeri, Kirinyaga, Embu, Garrisa and Tana River Counties are polluting the river because they lack functional sewerage systems.

5.2.4 Saline water intrusion

Intrusion of sea water has become an issue that threatens the livelihoods of the communities in the delta. It has the potential to render arable areas unsuitable for crop farming especially rice farming and reduced pasture areas. The quality of water for domestic, livestock watering and irrigation is also at stake. Among the places affected are Ozi, Kilelengwani, Chara, Wachu, Oda and Kone Mansa locations. The problem is mainly attributed to the reduction in volume of river water as a result of daming and over abstraction upstream coupled by reduction in rainfall regimes. The rise in sea levels as a result of global warming has also contributed to the problem. The reduced silt load as a result of the reduction in water flow volumes in River Tana is expected to worsen the issue. Continued intrusion will have adverse effect to the socio economics of the communities in the delta as well as the natural resources.

5.3 Land issues

Land-use changes upstream and along the coast have had major impacts on Tana Delta. The main land issues include land tenure issues, encroachment of riparian areas, conflicting land needs between farmers and pastoralist; and large scale developments encroaching on areas traditionally used by the local communities. Unsustainable agricultural practices characterized by slash and burn agriculture and overgrazing are leading to degradation of land resources.

Large tracts of land within the delta have been set aside for large scale agriculture projects and for mining exploration by government. This include the Tana Delta Irrigation Project (TDIP) land owned by TARDA among others. In addition, settlement have taken up some important dry season grazing areas within the delta and communities from outside the pastoral areas have settled in these areas and started crop farming. While the delta provides immense environmental services to the country, developments that do not take the special circumstances of the delta into consideration may lead to the collapse of most of the ecosystem services provided by the delta (Abdirizak Arale Nunow 2011).

5.4 Socio-economic and cultural issues

Increasing population: Tana Delta has an inter-censual growth rate of 3.0% which is higher than the national population growth rate of 2.9%p.a. Such an increase in population has a detrimental effect to the sustainable management of the Tana Delta resources. Many of the communities in the delta rely on natural resources in the delta for their livelihood.

As the population in the delta increases the delta has continued to witness increased settlements. This is mainly driven by the changing lifestyle of the pastoralists who have adopted semi-pastoralism with both sedentary settlements and movement of livestock during the wet season. Traditionally the pastoralists used to be mobile. Today sedentary and pastoral villages are found in many parts of the delta including the grazing areas and flood plains. The increasing settlements coupled with use of the delta as a year round grazing area are altering the ecosystems in the delta.

The population of the Tana Delta will continue to rise over the next four decades unless measures are taken to encourage voluntary family planning and to discourage immigrants to the area. Studies have shown that the delta will not be able to support a population 3 times the size (100,000) by 2050 without destruction of the area's unique habitats and environment. Even doubling of the population, which is expected to occur by 2035, would greatly add to conflicts over diminishing natural resources and rights to land and water (Odhengo *et al*, 2014).

Poverty: Poverty remains a major challenge in the delta. For instance, 76.9% of the total population in Tana River County lives below the poverty line. As a result, the majority of the population is unable to afford basic needs such as food, clothing and shelter. The causes of poverty include unreliable rainfall, high levels of illiteracy and poor crop and animal husbandry. Other causes include poor infrastructure, lack of credit facilities, poor marketing systems, natural disasters such as floods, drought and livestock diseases. Insecurity, unemployment, wildlife menace, and environmental degradation lead to poverty in the county.

Public health concerns: Pollution of water resources from fertilizers and pesticides at the upper catchment of the Tana River has been reported. Deforestation and poor farming practices have also caused siltation and reduced water quality. On waste management, only 28.9 % of the households use pit latrines while the remaining percentage have no proper sanitation methods. As a result sanitation related diseases like cholera and dysentery are common.

Gender inequality and inequity: Gender equality and women empowerment remains a major challenge in Tana River and Lamu Counties. The main gender concerns are related to access to resources, where women are relegated in the periphery of the development agenda. Women are less involved in major decision making processes that concern the environment and livelihood, yet they interact intimately with the natural resources in the delta. Access and control of major resources such as land and livestock is skewed towards the male gender.

5.5 Resource use conflicts

There are two types of conflict associated with the delta: human-wildlife conflict and resource use conflict. Historically, pastoral communities used the delta as a dry season grazing area. At this time, most of the farmers had harvested their crops. During rains and floods, livestock would be removed to higher grounds in the terraces in interior as far as Galana Kulalu ranches, Assa and Kone grazing areas. At the same time, farmers would grow crops on the flooded areas (mainly rice) and therefore incidents of conflicts were avoided. Today, flooding regimes have reduced and so there is livestock movement from the rangelands into the delta. The presence of livestock from outside the delta increases the conflicts between the farmers and pastoralist.

Further, agricultural expansion and intensive grazing in the Tana delta continues to exert pressure on the natural resources in the delta. This has led to overgrazing, human wildlife conflict and human/ human conflict. The changing trends by pastrolists to keeping sheep and goats have adversely impacted on vegetation mainly grass and shrub cover.

Incidences of conflict have been on the rise over the years and have continued to be recorded in the delta. The underlying cause of the conflict is resource scarcity which is linked to increasing demand for the resources by increasing area population of crop farmers, pastoral; and large scale developments. The situation has been made worse by the reduction in water volumes during floods.

5.7 Governance issues

Although there exists relevant legislative framework and several government agencies with varying mandates on management of Tana delta, conservation and development efforts in the delta are largely uncoordinated. As a result development efforts have continued to conflict/clash with conservation interests in the area.

Additionally, government institutions, civil society and the private sector have had little constructive dialogue about the future of the delta. The situation is currently exacerbated by a multitude of large-scale, potentially conflicting development proposals (Odhengo et al, 2014). Other governance issues facing Tana delta include weak institutions; poor enforcement of laws; poor participation by local communities in resource conservation and management; and poor capacity of communities involved in conservation activities.

5.8 Climate change

The Tana Delta already experiences wide fluctuations in climatic conditions including pronounced flooding and droughts. The immediate coastline can receive more than 600 mm of rainfall in a year while 50 km inland rainfall may be less than 300 mm. In these circumstances local people struggle to cope with climatic fluctuations on a seasonal and annual basis. By 2050 it is possible that global warming and rising sea level will have a significant impact on the delta. Due to the rise in sea level saline water intrusion flow approximately 20km inland from the river mouth during spring tides

(Kuria, 2015) with adverse impact on agricultural land and freshwater resources in the lower stretches of the delta. Areas already experiencing effect of saline water intrusion include Dide Waride, Ozi and Chara among others. In the next 40 years a possible increase of 15-25 cm in mean sea level could seriously reduce the scope of farming on those parts of the lower floodplain lying within 20 to 30 km of the coast (Odhengo et al. 2014; Tana River CIDP, 2013).

5.9 External investment

Recent investor interest in the Tana delta has been massive in the form of large scale sugar and Jatropha projects that would change the socio-economic fabric of the delta. Unfortunately, many of these projects undertaken in the delta have had three major failures in common. Firstly, they ignored the hydrological constraints imposed by the River Tana's flood regime. Secondly, they assumed that the land was vacant and ignored the existing rights and occupation of land by local people, and thirdly they ignored the symbiotic relationship which exists between human activity, land use and the natural environment of the delta (Odhengo et al., 2014). In order to promote sustainable development in the delta it is imperative that environmental concerns are mainstreamed in the development plan and programmes for the delta.

CHAPTER 6: VISION, GOAL AND MANAGEMENT OBJECTIVES

6.1 Vision

A sustainably managed Tana delta ecosystem supporting biodiversity conservation and providing ecosystem services for socio-economic development

6.2 Overall goal

Tana delta ecosystem and resources managed sustainably towards ecological integrity and socio-economic development for the present and future generations

6.3 Management objectives

i) To promote conservation and sustainable use of biodiversity resources
ii) To improve water access, quantity and quality in the delta
iii) To promote equitable access, sustainable use and management of land as a resource
iv) To promote sustainable socio-economic development in the delta
v) To improve governance in conservation and management of the delta
vi) To promote climate change mitigation, adaptive capacity and resilience in the delta

6.4 Guiding principles

Implementation of the management plan to achieve the above set vision, goal and management objectives will be guided by the following principles**:**

- ***Wise use principle:*** Due to the significant contribution of the delta to local livelihoods and the national economy the wise use principle will be applied to ensure sustainable use of the delta's resources for posterity
- ***Public participation and inclusive approach:*** An integrated approach that entails involvement of relevant stakeholders and consensus building on matters of planning and decision making will be embraced in planning and implementation of management activities
- ***Adaptive management:*** The best available knowledge, scientific information and data will be applied to manage the delta
- ***Precautionary principle:*** Where information is inadequate for decision making the precautionary principle will apply. Lack of full scientific information should not prevent implementation of measures to mitigate resource degradation
- ***Polluter pays principle:*** Persons who pollute the delta's wetlands should meet the cost of cleaning them up, restoring, rehabilitating and also meet the cost of the pollution to resource users
- ***Ecosystem approach in management:*** Management activities will recognize the relationship and inter-linkage between ecological and socio-economic components of the delta

- ***Principle of collaboration and partnership:*** Collaboration by stakeholders including governments, local community, civil society, private sector and development partners is crucial to achieve the goal and objectives
- ***Equity and access:*** Fairness and equity will be embraced to ensure access to resources by different gender

6.5 Operational objectives

In order to achieve the overall goal and the management objectives, operational objectives have been identified under each management objective. The management plan operational objectives are:

Biodiversity management
a) To promote rehabilitation and restoration of degraded biodiversity sites within the delta
b) To promote sustainable fishing practices
c) To promote wildlife conservation measures in the delta
d) To promote measures to prevent and control introduction and spread of invasive species

Water resources management
a) To ensure adequate water flow regime to meet both environmental and socio-economic needs
b) To ensure equitable flow of water within the river channels
c) To ensure sustainable supply and availability of water
d) To improve solid and effluent management along the River Tana Basin

Land resources management
a) To promote sustainable land use practices
b) To promote implementation of the Tana Delta LUP
c) To address the land tenure system in the delta

Social-economic development
a) To integrate modern and traditional knowledge in the management of Tana delta
b) To promote sustainable economic development and local livelihoods

Improving governance in conservation and management of the delta
a) To enhance institutional capacity for effective management of the delta
b) To enhance communication, education and public participation and awareness
c) To improve knowledge and understanding of Tana delta through research and monitoring
d) To promote conflict management and resolution in the delta

Climate change mitigation and adaptation
a) To promote climate change mitigation measures in the delta
b) To improve the adaptive capacity and resilience to climate change in the delta

CHAPTER 7: MANAGEMENT PROGRAMMES

7. 1 Biodiversity Management programme

Background/Introduction

Tana delta is a global, regional and national biodiversity hot spot. It hosts unique biodiversity some of which is endemic to the area while others are threatened or endangered. Change of land uses has however become rampant in the delta impacting negatively on the delta and its resources. There is urgent need to arrest destruction of forests and conversion of wetlands to agricultural farms. Encroachment of wildlife corridors and habitats, unsustainable utilization of biodiversity resources especially fisheries and prevalence of invasive species also pose major challenges in conservation of the delta's biodiversity.

Management issues and challenges

a) Degraded biodiversity habitats due to slash and burn agriculture; overgrazing; quarrying activities; overexploitation of fisheries and destruction of coral reefs
b) Unsustainable utilization of fisheries resources through use of illegal fishing gears, weak enforcement of fishing regulations, lack of technological fishing and processing capacity
c) Encroachment of wildlife migratory corridors and habitats
d) Poor enforcement and compliance with Wildlife Conservation and Management Act 2013
e) Prevalence of invasive species and lack of enforcement of regulation to prevent and control them

Operational objectives

a) To promote rehabilitation and restoration of degraded biodiversity sites within the delta
b) To promote sustainable fishing practices
c) To promote wildlife conservation measures in the delta
d) To promote measures to prevent and control introduction and spread of invasive species

Table 7.1: Summary of management actions for biodiversity management programme

Management Objective: To promote conservation and sustainable use of biodiversity resources in the delta		
Operational Objective	**Management Actions**	**Outputs/outcomes**
To promote rehabilitation and restoration of degraded biodiversity sites within the delta	Map and rehabilitate degraded habitats (forests, wetlands, coral reefs, etc)	Increased biodiversity cover (forests, wetlands, etc)
	Enforce relevant biodiversity conservation laws and regulations	Improved awareness and compliance with biodiversity regulatory frameworks
	Raise awareness on importance of biodiversity in the delta	Improved awareness on importance of biodiversity in the delta

Outcome: Rehabilitated and restored biodiversity sites	Rehabilitate abandoned mining and quarrying sites in the delta	Abandoned quarrying and mining sites rehabilitated
	Control large developments in critical habitats through EIA and EAs	Large developments in critical habitats controlled
	Develop and implement alternative sources for products derived from critical habitats e.g. charcoal production	Alternative sources for products derived from critical habitats developed
	Empower youth and women to actively get involved in environmental conservation	Youth and women actively involved in conservation activities
To promote sustainable fishing practices *Outcome: Adoption and practice of sustainable fishing practices*	Enforce fisheries laws and regulations	Improved compliance with legal and regulatory requirements
	Education and awareness on sustainable fishing practices	Adoption of best fishing practices and methods
	Train BMUs on sustainable fishing and processing technologies	Improved capacity of BMUs on modern fishing and processing technologies
	Identify and protect fish breeding/spawning grounds	Fish breeding areas identified and protected
	Restock overexploited fisheries in ox-bow lake ecosystems	Increased fisheries stock within degraded ox-bow lakes
	Promote sustainable aquaculture and mariculture	Adoption of aquaculture and mariculture by fishing communities
	• Establish fisheries loaning/credit scheme • Empower fishermen to venture into deep sea fishing • Promote value addition to fisheries products	Improved income to fishermen
To promote wildlife conservation measures in the delta *Outcome: Improved Wildlife conservation*	Establish community conservation/conservancy areas	Community conservancies established
	Map and secure wildlife migratory corridors from encroachment	Migratory corridors mapped and encroachment controlled
	Develop and update inventory for endangered wildlife species	Inventory for endangered wildlife species developed
	Identify and protect habitats for endangered species	Endangered species protected and populations stabilized
	Enforce wildlife conservation and management Act 2013 and regulations	Improved compliance with wildlife regulatory frameworks
	Discourage use of game meat by providing alternative sources of protein	Number of alternative sources of protein established
	Develop and implement human-wildlife conflict resolution mechanisms	Human-wildlife conflict resolution mechanisms implemented

To promote measures to prevent and control introduction of invasive species *Outcome: Invasive species mitigated*	Carry out survey on prevalence of invasive species in the delta	Extent of invasive species problem documented
	Undertake research on socio-economic value of invasive species	Knowledge on positive and negative value of invasive species
	Undertake invasive species control and management activities	Invasive species controlled and managed
	Enforcement of EMCA CAP 387 and other regulations to control introduction and spread of invasive species	Introduction and spread of invasive species controlled
	Encourage economic use of existing invasive species (*Prosopis juliflora)*	Economic uses of existing invasive species explored and implemented

7. 2 Water Management programme

Background/Introduction

Water is the most important resource within the Tana Delta not only in terms of water for socio-economic use but also for life support system that sustains the delta's ecological processes and productivity. River Tana is the main water source with other sources being wetlands and ox-bow lakes. Alteration of the river flow as a result of natural and human causes has however impacted negatively on the socio-economic and ecological processes of the delta over the last 20 years. The flow alterations have been in the form of overall drop in water quantity in the river due to damming and sometimes reduced rainfall amounts upstream; and human induced change of the river course. Key impacts that have resulted from the river flow alterations are: reduced flooding which has resulted in death of several wetlands and associated biodiversity in the delta; reduced agricultural productivity due to reduced flooding; decreased water supply to several villages where the river has changed course; sea/salt-water intrusion leading to reduced freshwater sources mainly in the areas close to the sea; loss of livelihoods especially for fishing communities among others. This management programme aims at putting in place interventions that will result in equitable and sustainable river flows to support the socio-economic as well as the ecological processes of the delta.

Management issues and challenges

a) Reduced flooding which has resulted in death of several wetlands and associated biodiversity in the delta
b) Reduced agricultural productivity due to reduced flooding in several parts of the delta
c) Decreased water supply to several villages where the river has changed course
d) Sea-water intrusion affecting the quality of ground water mainly in the lower part of the delta
e) Loss of livelihoods especially for fishing communities that used to depend on wetlands/lakes that have since died due to lack of flooding e.g. Lake Bulto community

f) Pollution of water resources from both point and non-point pollution sources

Operational objectives

a) To ensure adequate water flow regime that meets both environmental and socio-economic needs
b) To ensure equitable flow of water within the river channels
c) To ensure sustainable supply and availability of water
d) To improve solid and effluent management along the River Tana Basin

Table 7.2: Summary of management actions for Water management programme

Management Objective: To improve water access, quantity and quality in the delta		
Operational Objective	**Management Actions**	**Outputs**
Obj 1: To ensure adequate water flow regime that meets both environmental and socio-economic needs *Outcome:* environmental and socio-economic water needs adequately met	Assess water flow and use in the entire basin including effects of damming	Improved knowledge base on water flow and use in the entire basin
	Develop and implement water allocation plans for Tana basin	Water in the Tana basin equitably allocated for both economic and environmental needs
	Promote use of efficient technology for irrigation projects	Use of efficient technology for irrigation projects adopted in the basin
	Awareness creation to ensure sustainable water abstraction in the basin	Sustainable water abstraction in Tana river basin
	Build stakeholder capacity on use of Environmental Flow Assessment (EFA) as a tool to manage Tana river basin	Stakeholder capacity on application of EFA as a tool to manage Tana river basin built
	Apply EFA as a tool to manage Tana river basin	EFA applied as a tool to manage Tana River basin
Obj2:To ensure equitable flow of water within the river channels *Outcome:* Equitable flow of water	Assess impacts of river course diversion on ecological and socio-economic needs in delta	Impacts of river course diversion on ecological and socio-economic needs in delta established
	Implement recommendations of river diversion assessment report	Recommendations of river diversion assessment report implemented
	Control human induced river diversion in the delta through EIA	Human-induced river diversion in the delta controlled through EIA
Obj 3: To ensure sustainable supply and availability of	Provide alternative water sources to villages affected by	Alternative water sources provided to villages affected by

water *Outcome:* Water security in the delta	river diversion e.g. piping, boreholes	river diversion
	Promote rain water harvesting in area affected by river diversion (roof catchment, etc)	Water harvesting in area affected by river diversion promoted
	Rehabilitate degraded water sources in Tana delta	Degraded water sources rehabilitated
Obj 4:To improve solid and effluent management along River Tana Basin *Outcome:* Improved solid waste management and water quality	Strategic installation of solid waste receptors in urban centers within River Tana riparian area	Improved management of solid waste in urban centers within River Tana riparian area
	Map and designate solid waste dumping sites for urban centers within River Tana riparian area	Designated solid waste dumping sites in urban centers within River Tana riparian area
	Create awareness on sustainable solid waste management in urban centers within riparian zone	Improved awareness on sustainable solid waste management in urban centers within riparian zone
	Enforcement of waste management regulations 2006	Improved compliance with waste management regulations 2006 in urban centers within River Tana riparian zone
	Establish effluent treatment plants in urban centers within River Tana riparian zone	Improved management of effluent in urban centers within River Tana riparian area
	Enhance stakeholder capacity on Municipal Wastewater Management best practices	Improved stakeholder capacity on municipal wastewater management best practices
	Raise public awareness on Water quality regulations 2006	Improved compliance with Water quality regulations 2006 in urban centers within River Tana riparian area
	Undertake regular inspections to enforce water quality regulations in urban centers within River Tana riparian zone	Improved compliance with Water quality regulations 2006 in urban centers within River Tana riparian area
	Promote appropriate agricultural practices in the delta and catchment areas	Reduced soil erosion in the delta
	Establish and strengthen Water Resource Users Associations (WRUAs)	WRUAs actively involved in water conservation activities in the delta

	Undertake water quality and hydrological monitoring in the delta	Improved knowledge and understanding of water quality trends in River Tana basin

7. 3 Land resources management programme

Background/Introduction

Land-use changes in the delta have had major ecological and socio-economic impacts on the delta landscape over the years. Poor land-use practices including overstocking and shifting cultivation have caused increased soil erosion leading to increased sediment load in River Tana. On land tenure, almost all the land in the delta is trust land and majority of the inhabitants do not have titles to their ancestral lands although they may have lived on the same place for generations. Other land use issues include conflicting land needs between farmers and pastoralist; and large scale developments encroaching on fragile ecosystems and areas traditionally used by the local communities. The purpose of this management programme is to promote interventions that will foster sustainable use and management of land as a resource in the delta.

Management issues and challenges

a) Poor land use practices mainly involving overstocking and shifting cultivation
b) Lack of land zonation which has led to competition for land between farmers and pastoralist sometimes resulting to conflict
c) Poor land tenure

Operational objectives

a) To promote sustainable land use practices
b) To promote implementation of the Tana Delta LUP
c) To strengthen land governance in the delta

Table 7.3: Summary of management actions for Land resources management programme

Management Objective: To promote equitable access, sustainable management and use of land as a resource		
Operational Objective	**Management Actions**	**Outputs/outcomes**
To promote sustainable land use and management practices *Outcome:* Sustainable	Building the capacity of local farmers in sustainable farming practices (soil conservation, reforestation, regular soil analysis, etc)	Sustainable land use practices adopted widely in the delta

land use practices in the delta	Adopt and develop grazing block systems and corridors to control livestock overgrazing	Sustainable livestock farming practices in the delta
	Encourage traditional methods of controlling overgrazing in livestock farming e.g shifting livestock to hinterland areas during rainy season	Traditional methods of controlling overgrazing adopted
	Promote livestock keeping as a business; breed improvement	Improved income by pastoralists
	Promote soil and water conservation practices at the community level	soil and water conservation practices at the community level
To promote implementation of the Tana Delta LUP *Outcome: Sustainable use of land as a resource in the delta*	Sensitization and awareness on the Tana Delta Land Use Plan	Sustainable land use practices in the delta
	Implementation of Tana Delta Land Use Plan (including zoning of land use, etc)	• Land use based on zoning of the delta • Reduced number of resource use conflict issues in the delta
	Develop regulations to implement LUP	• Regulations on LUP implementation developed and enforced
To strengthen land governance in the delta *Outcome:* Improved land tenure system	Undertake land adjudication in the delta to promote environmentally friendly use	Improved land ownership and use by the local communities
	Strengthen the capacity of local level governance structures for land management at county level	Effective land resources management in the delta
	Gazette ecologically sensitive areas (ESAs) in the delta	Ecologically sensitive areas (ESAs) in the delta gazetted
	Gazette historical and cultural sites in the delta	Historical and cultural sites in the delta gazetted

7.4 Socio-economic Development Programme

Background/Introduction

As described earlier in chapter 2 Tana delta is immensely valuable to the local communities and the national economy. The socio-economic activities by the local communities dependent on the delta's natural resource – that include livestock keeping; fishing and subsistence farming. Large-scale economic activities mainly entail large scale agriculture projects by the government. The conduct of these socio-economic activities has however not been without negative impact on the environment mainly through encroachment and degradation of key habitats. The socio-economic programme

therefore seeks to promote sustainable use and exploitation of the delta's resources while preserving the ecological integrity of the area.

Management issues and challenges

a) High poverty and illiteracy levels
b) Unsustainable livelihood practices characterised by livestock over-stocking; slash and burn agriculture and charcoal burning
c) Poor and inadequate infrastructure and social amenities
d) Gender inequality and inequity
e) Poor adoption of alternative livelihoods
f) Insecurity and resource use conflict
g) Potential threats from large scale economic development activities

Operational objectives

a) To promote sustainable economic development and local livelihoods
b) To integrate modern and traditional knowledge in the management of Tana delta

Table 7.4: Summary of management actions for Socio-economic development programme

Management objective: To promote equitable and sustainable socio-cultural and economic development		
Operational Objective	**Management Actions**	**Outputs/outcomes**
To promote sustainable economic development and local livelihoods *Outcome:* Sustainable economic development and local livelihoods in the delta	Support implementation of Tana River County development action plans for the delta	Improved socio-economic development in the delta
	Promote best agricultural practices in the delta (Livestock and crop production)	Best agricultural practices widely adopted in the delta
	Diversify livelihood activities e.g. aquaculture/mariculture, bee keeping, ecotourism, etc	Diverse livelihood activities adopted by local communities
	Improve infrastructure to facilitate sustainable use of delta resources	Improved access and use of delta's resources
	Promotion of small scale entrepreneurship activities	Economically empowered communities
	Promote sustainable fishing practices	Improved incomes from better conserved fisheries
Integrate modern and traditional knowledge in the management of Tana delta	Document indigenous knowledge (IK) to assist in environmental planning and management processes	IK documented
	Create a network of champions in IK	Network of IK champions created

Outcome: Indigenous knowledge mainstreamed in development and conservation in the delta	Establish community cultural centers	Community cultural centers established; Enhanced and peaceful co-existence of communities
	Promote Indigenous Community conservation Areas (ICCAs)	ICCAs established
	Promote conservation of sacred sites (Kijos)	Improved sacred sites
	Empower cultural institutions eg Gasa and Matadeda to actively participate in environmental conservation	Cultural institutions empowered and actively participating in environmental conservation

7. 5 Governance improvement programme

Background/Introduction

Ineffective governance is one of the main causes of environmental degradation and unsustainable development in Tana delta. This is largely evidenced by the continued competing interest between conservation and development in the delta. In order to effectively manage the delta there is need to raise awareness on importance of the delta and enhance the capacity and coordinate the work of key agencies involved management of the area. The governance management programme seeks to promote these actions among others with a view to ensuring effective management and sustainable development in the delta.

Management issues and challenges

a) Inadequate institutional capacities in management of the delta
b) Inadequate awareness amongst the public and policy makers on importance of the delta
c) Weak enforcement and poor with environmental regulatory frameworks
d) Inadequate community participation in environmental conservation
e) Conflict and competition for resources
f) Poor knowledge base and understanding of Tana delta
g) Poor coordination of conservation efforts in the delta

Operational objectives

a) To enhance institutional capacity for effective management of the delta
b) To improve knowledge and understanding of Tana delta through research and monitoring
c) To enhance communication, education and public participation and awareness
d) To promote conflict management and resolution in the delta
e) To enhance coordination of conservation efforts in Tana Delta

Table 7.5: Summary of management actions to improve governance

Management objective: To improve governance in conservation and management of the delta		
Management objectives	**Management Actions**	**Outputs/outcomes**
To enhance institutional capacity for effective management of the delta *Outcome 1:* Effective management of delta resources *Outcome 2:* Improved compliance with existing legal frame works	Capacity building for relevant institutions to effectively manage the delta	Trainings for relevant county and national government departments
	Strengthen enforcement of regulatory frameworks relevant for management of the delta	Improved compliance with legal and regulatory requirements
	Conduct civic education on the existing NRM frameworks at National and county government levels	Increased social accountability
	Strengthen regulatory frameworks relevant for management of the delta	Strengthened regulatory frameworks relevant for management of the delta
	Support Tana River County government to enact appropriate environmental laws & regulations	Appropriate environmental laws & regulations enacted
	Facilitate exchange visits and experiential learning by Ramsar site Committee and other stakeholders	Improved skills and knowledge by Ramsar site Committee and other stakeholders on delta management
	Recruit and train voluntary community scouts for monitoring and surveillance	Enhanced enforcement of regulations and management of resources
	Lobby national and county governments to allocate resources for delta management	Improved allocation of financial resources for delta management
	Develop and implement a strategy for resource mobilization	-Availability of financial resources to support conservation and management of the delta -List of potential donors
	Strengthen the capacity of County Wildlife Conservation and Compensation Committee	Reduced human- wildlife conflicts
To improve knowledge and understanding of Tana delta through research and monitoring *Outcome:* Enhanced	Develop and implement research and monitoring activities	Information generated and used for adaptive management
	Establish scientific committee for Tana delta	Scientific committee in place
	Organize regular information and lesson sharing forums on Tana delta	Improved sharing and dissemination of information on Tana delta
	Develop a baseline map for	Baseline map for critical habitats

knowledge base and information management for Tana delta	critical habitats for use in monitoring habitat change	developed
	Conduct inventories and economic valuation of critical habitats in the delta	Inventorying and economic valuation of critical habitats in the delta done
	Undertake participatory and adaptive research	Information generated and used for adaptive management
	Develop an information management system for Tana delta	Tana delta depository developed
	Organize scientific conferences/ exhibitions for information dissemination	Regular scientific conferences/ exhibitions held
To enhance communication, education and public participation and awareness *Outcome:* Increased stakeholder awareness and positive actions towards environment	Conduct education and awareness campaigns on importance of the delta at all levels	-Outreach campaigns on importance of the delta conducted at all levels - public awareness plan for information dissemination
	Produce and disseminate awareness materials (print and electronic)	Awareness materials produced and disseminated
	Strengthen community groups (BMUs, CFAs and WRUAs among others) to champion conservation activities	Skilled and active community groups
	Strengthen networking and lesson sharing between practitioners, academia and policymakers	Improved networking between practitioners, academia and policymakers
	Establish environmental education/resources centre in the Ramsar site	Environmental education/ resource centre established
	Implement an environmental award scheme to recognize best practices in the delta	Best environmental practices appreciated and upscaled
	Develop and implement resource use conflict resolution mechanisms	Conflict resolution mechanisms developed and implemented
To promote conflict management and resolution in the delta *Outcome:* Peaceful co-existence by resource users in the delta	• Map resource use conflict hotspots • Establish/Strengthen the existing peace committee • Facilitate leaders (political, religious, cultural) to foster peace within the delta • Develop conflict early warning	• Conflict hotspots mapped • Conflict resolution mechanisms/committees in place • Improved peace and harmony among resource users • Conflict early warning systems in place

	systems	
To enhance coordination of conservation efforts in Tana Delta *Outcome:* Well coordinated conservation activities	• Establish Tana delta stakeholders coordination forum • Establish and build capacity of County Environment Committees; TDMPIC; Ramsar Site Committee; for effective coordination of conservation activities in the delta	• Functional Tana delta stakeholders forum; County Environment Committee; TDMPIC; and Ramsar Site Committee • Synergy and coordination amongst conservation efforts

7.6 Climate change Mitigation and Adaptation programme

Background/Introduction

Like many other parts of the country climate change is a reality in Tana delta. Research has shown that the delta is nowadays experiencing wide fluctuations in climatic conditions. The effects of the changing climate in the delta include droughts, reduced rainfall amounts, drying of ox-bow lakes, pronounced floods (whenever they occur) and degrading eco-systems. It is predicted that in the next 20 years rainfall amounts in the delta may be more prolonged, erratic, unreliable and consequently will cause more flooding events although this might be counteracted by the building of the proposed High Grand Falls Dam upstream. The prediction has further shown that in the next 40 years a possible rise of 15-25 cm in mean sea level could significantly reduce farming in the lower floodplains of the delta lying within 20 to 30 km of the coast (Bucx et al. 2014). This management programme seeks to promote measures and interventions to mitigate climate change rive related impacts as well as foster the communities' adaptive capacity to the changing environment.

Management issues and challenges

a) Droughts, floods and reduced rainfall amounts affecting agricultural productivity
b) Degrading ecosystems (mainly ox-bow lakes) due to reduced flooding regimes
c) Sea temperature rise affecting fish spawning, corals and other critical ecosystems
d) Sea-water intrusion affecting the quality of both surface and ground water mainly in the lower parts of the delta and main river course

Operational objectives

a) To promote climate change mitigation measures in the delta
b) To improve community adaptive capacity and resilience to climate change in the delta

Table 7.6: Summary of management actions to improve governance

Management Objective: To Promote climate change mitigation, adaptive capacity and resilience in the Delta		
Management objectives	**Management Actions**	**Outputs**
Obj 1:To promote climate change mitigation measures in the Delta Outcome: Reduced vulnerability to effects of climate change	Rehabilitate degraded forests and riverine ecosystems	Rehabilitated degraded sites
	Implement the Climate Change Act 2016; Climate Change Response Strategy; and National Climate Change Action Plan in the delta	• Climate change desks established at the County • Reduced impacts of climate change in the delta • Enhanced adaptation and resilience to climate change
	Enforce laws on riverbank, seashore protection	Improved compliance with riverbank, seashore protection regulatory framework
	Promote vegetation cover through farm forestry among others	Improved vegetation cover in the delta
	Promote adoption of sustainable agricultural practices (e.g. improved animal breeds and drought resistant crops)	Sustainable agricultural practices adopted widely in the delta
Obj 2:To improve the adaptive capacity and resilience to climate change in the Delta Outcome: Enhanced resilience to climate change in the delta	Raise community awareness on climate change	Improved community awareness on climate change in the delta
	Promote climate change adaptation and coping mechanisms e.g. farming of drought resistance crops and livestock	Improved adoption of climate change adaptation and coping mechanisms
	Promote water efficient irrigation and conservation agriculture	Adoption of water efficient irrigation and conservation agriculture
	Promote breeding of animals tolerant to local climatic conditions	Adoption of animal breeds tolerant to local climatic conditions
	Provide alternative water sources to villages far from the river e.g. water pans, boreholes, etc	Availability of fresh water supply to villages far from the river
	Promote rain water harvesting such as roof catchment, etc	Water harvesting adopted widely in the delta

	Rehabilitate degraded water sources e.g. de-silting of dams	Degraded water source rehabilitated
	Establish early warning systems for droughts and floods	Early warning systems established
	Diversify livelihood activities e.g. aquaculture/mariculture, bee keeping, ecotourism, etc	Diverse livelihood activities adopted by local communities
	Promote use of alternative/clean energy e.g. wind, solar, etc	Alternative/clean energy widely adopted in the delta

CHAPTER 8: MANAGEMENT PLAN IMPLEMENTATION FRAMEWORK

Introduction

The Tana delta Management plan provides the framework to foster a more coordinated and integrated approach to management of the delta's resources. Successful implementation of the management plan requires embracing a participatory approach in implementation of activities defined under the various programmes; investing in capacity building; mobilization of adequate resources and building of partnerships with various actors and development partners. Detailed description of the principal mechanisms for implementation of the management plan is provided below.

8.1 Stakeholder involvement and partnerships

Preparation of the management plan was done through a participatory process involving various stakeholders involved in conservation and management of Tana delta. As such, its implementation will be a collective responsibility of the different stakeholders including national government agencies; County governments of Tana River and Lamu; NGOs; private sectors players; academic institutions; experts; local communities and development partners. Development of partnerships amongst these stakeholders as well as cultivation of good political will through engagement of leaders at both national and county level is important for the successful implementation of the management plan.

In light of its mandate to supervise and coordinate environmental programmes in the country, NEMA will take a lead role in implementation of the management plan including stakeholder engagement and coordination. Engagement of stakeholders in the implementation process will be guided by their statutory mandate and capacity. Stakeholders will be involved at all stages of activities preparation and implementation including monitoring and evaluation. The activities implementation matrix elaborated in section 8.7 has identified the stakeholders to be involved in implementation of various activities enumerated therein.

8.2 Coordination of management plan implementation

As described in Section 8.1 NEMA will take a lead role in coordinating implementation of the management plan. The Authority will discharge this function with assistance from a technical committee to be put in place at the inception of implementation of the management plan in liaison with stakeholders. This committee shall be called 'Tana Delta Management Plan Implementation Committee (TDIMPIC)'. Membership for the committee will be drawn from key national government agencies working in the delta; County Governments of Tana River and Lamu; representatives from NGOs; private sector; and local communities. While working and reporting to NEMA, the TDMPIC will provide a mechanism for coordination of activities implementation; and fostering partnerships that promote overall implementation of the management plan. Theme-based committees such as Ramsar Site Committee and Tana delta Scientific Committee will be established

under the TDMPIC to address thematic issues in the management plan. The capacity of NEMA and the TDMPIC will need to be enhanced through training where necessary and allocation of adequate resources to activities related to coordination of the management plan implementation.

8.3 Resource Mobilization

Implementation of the management plan will be financed through mobilization of financial resources at national as well as county government level. As such, the national government agencies as well as the County governments of Tana River and Lamu will be expected to allocate resources for implementation of the management plan through mainstreaming of specific activities into their development plans, annual work plans and budgets. In addition targeted projects involving various partners will also be prepared and submitted to development partners by each of the two levels of government for funding consideration and implementation in priority areas in the delta.

Other critical players including NGOs; private sector; individual experts; and CBOs will also be expected to be important mobilisers of resources to finance activities in the management plan that they consider to be within their spheres of interest. NEMA in liaison with lead agencies and TDMPIC will also consider organizing donor conferences to create awareness and solicit support from development partners to finance implementation of the management plan.

8.3 Capacity building

It is recognised that various actors involved in management and conservation of Tana delta have considerable technical capacities in various disciplines. These capacities, which are found within sectoral government agencies, county governments, NGOs, private sector, research and academic institutions and CBOs will be utilised in implementation of the management plan. It is however recognised that not all disciplines in management of the delta may have adequate capacity and therefore the need for the government and other actors to continue investing in capacity building is imperative. Training shall be undertaken to build capacity at both national and county level departments that will be involved in implementing the management plan. This will be achieved through short course training; refresher courses; seminars and exchange visits among others. It is expected that implementation of the plan may also seek technical support from international research and development partners.

8.5 Implementation Plan

The detailed Implementation Plan is presented in Table 8.1. The matrix has outlined the key activities to be implemented under each management programme. It has also highlighted the activities' expected outputs, performance indicators, actors estimate budget for each activity and timeframe for activity implementation. The Implementation Matrix will be a critical and important tool for:

i) Mobilizing and allocating resources for implementation of specific activities

ii) Informing development of project concepts and proposals
iii) Guiding coordination and monitoring of the plan implementation process
iv) Soliciting collaboration and support from development partners
v) Monitoring progress and evaluating outputs/outcomes of activities implementation
vi) Facilitating mid-term and end-of-plan reviews/evaluations

8.6 Risks and Sustainability

There are potential risks that may affect implementation of the management plan. The main risks are:

- ***Inadequate financial resources:*** Government development priorities always keep on changing depending on the prevailing economic conditions. As such, both national and county governments may not be able to allocate adequate resources for implementation of the management plan due to prioritization of development projects by government
- ***Inadequate capacity:*** Limitations in the capacity of government lead agencies and county government departments may result in poor or lack of implementation of some activities in the management plan especially those activities which require highly specialized skills and technical inputs
- ***Inadequate coordination and cooperation:*** National and county government development projects and programmes in the delta may not mainstream environmental considerations as envisaged in the management plan
- ***Inadequate awareness:*** Failure to sustain the stakeholder buy-in and support cultivated during the management planning process may affect the management plan implementation phase. This does not only apply to government agencies/departments but also NGOs; private sector; CBOs and the local communities
- ***Inadequate political good will:*** Both national and county governments may not adequately facilitate their officers to implement the activities enumerated in the management plan. Improper delegation of responsibilities and failure to involve competent partners may also affect implementation of the management plan
- ***Insecurity:*** Insecurity was a major challenge which affected timely preparation of the management plan. Continued occurrence of insecurity incidents in the delta may affect smooth implementation of the management plan
- ***Extreme Natural Disasters related to climate change:*** Extreme floods and droughts may affect / disrupt management plan implementation programs e.g. control of soil erosion, biodiversity / habitat rehabilitation.

Implementation of the management plan implementation mechanisms described in section 8.1 to 8.4 will help to mitigate the above mentioned risks. These includes ensuring involvement of all relevant stakeholders in implementation of the management plan; investing in capacity building where necessary; mobilization and allocation of adequate resources to activities; coordination and building of partnerships and linkages for technical and financial support.

Table 8.1: Implementation plan/matrix

BIODIVERSITY MANAGEMENT PROGRAMME										
Operational Obj 1: To promote rehabilitation and restoration of degraded biodiversity sites within the delta										
Activity	**Sub-activity**	**Expected Output/outcome**	**Perfomance/ M&E Indicators**	**Actors**	**Budget (KSh)**	**Timeframe**				
						Y 1-2	**Y 2-4**	**Y 5-6**	**Y 7-8**	**Y 9-10**
Map and rehabilitate degraded habitats (forests, wetlands, coral reefs, etc.)	•Mapping of degraded areas •Rehabilitation of degraded areas	Increased biodiversity cover (forests, wetlands, etc.)	• Map on degraded sites • Number of rehabilitated sites • Ha of degraded sites rehabilitated	CGTR, CGL, KWS, KFS, WARMA NEMA, SDF, NGOs, CBOs, Communities	20,000,000	x	x	x	x	x
Enforce relevant biodiversity conservation laws and regulations	•Undertake routine compliance monitoring •Prosecute non-compliant entities/parties •Awareness on environmental laws/regulation	Improved compliance with biodiversity regulations	• Enforcement reports; • Number of prosecution cases • Number of awareness meetings	NEMA, KWS, KFS, CGTR, CGL, WRMA, State Department of Fisheries (SDF); SDI	5,000,000	x	x	x	x	x
Raise awareness on importance of biodiversity in the delta	•Conduct awareness forums •Prepare and disseminate awareness materials •Awareness using	Enhanced awareness on importance of biodiversity in the delta	• Awareness meetings/forums reports • Number of people attending the meetings • Number of TV/Radio programmes aired	CGTR, CGL, KWS, KFS, NMK, NEMA, SDF,NGOs, CBOs, Communities	25,000,000	x	x	x	x	x

	electronic media (TV & radio)									
Rehabilitate abandoned mining and quarrying sites in the delta	Rehabilitate abandoned mining and quarrying sites	Natural ecosystems restored in abandoned quarrying and mining sites	• Number /acreage of mining and quarrying sites rehabilitated	Ministry of Mining; CGTR, CGL, NEMA, KFS, NGOs, CBOs, Communities	6,000,000	x	x	x		
Control developments in critical habitats through EIA	Subject developments to EIA process	Critical habitats well conserved; Controlled developments	Number of EIAs reviewed	NEMA, Lead institutions; CGTR, CGL; NGOs, CBOs, Communities	5,000,000	x	x	x	x	x
Develop and implement alternative sources for products derived from critical habitats e.g. charcoal etc.	-Identify and implement sustainable alternative sources for products from critical habitats	Reduced pressure on critical habitats	Number and type of sustainable alternative sources of products derived from critical habitats successfully developed	Lead institutions; CGTR, CGL, NEMA, NMK, SDF, Research agencies; NGOs, CBOs, Communities	25,000,000	x	x	x	x	x
Operational Obj 2: To promote sustainable fishing practices										
Enforce fisheries laws and regulations	•Undertake routine compliance monitoring •Prosecute non-compliant entities/parties •Awareness on fisheries laws	Improved compliance with fisheries legal and regulatory requirements	• % decrease in use of destructive gear • Enforcement reports; • Number of prosecution cases • Number of illegal fishing gear confiscated	SDF; CGTR, CGL, BMUs, KWS	5,000,000	x	x	x	x	x

	and regulations		• Number of illegal fishers arrested							
Education and awareness on sustainable fishing practices	•Conduct sensitization meetings •Prepare and disseminate awareness materials •Awareness using electronic media (TV & radio)	Adoption of best fishing practices and methods	• % decrease in use of destructive fishing gear/methods • Number of legal fishing gears adopted • Monitoring reports • Number of education & awareness meetings • Number of people reached by awareness efforts	SDF, CGTR, CGL, BMUs, KWS, NGOs, CBOs, NEMA, Communities	15,000,000	x	x	x	x	x
Train BMUs on sustainable fishing and processing technologies	•Conduct trainings on modern/innovative fishing/processing technology •Organise exchange visits for BMUs	Improved capacity of BMUs on modern fishing and processing technologies	• Number of training sessions • Number of exchange visits • Monitoring reports • Number of individuals within BMUs who have adopted the innovations	SDF, CGTR, CGL, BMUs, KWS, NGOs, CBOs, Communities	10,000,000	x	x	x		
Identify and protect fish breeding grounds	•Mapping of fish breeding grounds •Implement fish breeding grounds protection measures	Fish breeding areas mapped and protected	• Maps of fish breeding grounds • Number of fish breeding grounds protected/gazetted • Habitat monitoring reports • Number of CCAs	SDF, CGTR, CGL, BMUs, KEFRI, KMFRI KWS, NGOs, CBOs, Communities	10,000,000	x	x	x	x	x

	•Establish community conserved areas •Develop BMU by-laws for management of fish breeding grounds and CCAs •Develop fisheries specific management plans		established • Number of BMUs who have developed by-laws • Number of management plan developed							
Restock overexploited fisheries ecosystems	• Survey and identify reservoirs that have depleted fish stocks; • Awareness on the depleted fisheries • Restock overexploited fisheries in ox-bow lake ecosystems	Increased fisheries stock within degraded ox-bow lakes	• Number of fingering restocked • Number of reservoirs/lakes restocked • Catch assessment survey reports	SDF, CGTR, CGL, BMUs, KEFRI, KMFRI KWS, NGOs, CBOs, Communities	2,000,000	x	x			
Promote sustainable aquaculture and mariculture	•Identify sites with potential for aquaculture and mariculture	• Diversified sources of fish • Adoption of aquaculture	• Number of farmers/farms successfully practicing aquaculture and	SDF, CGTR, CGL, BMUs, KEFRI, KMFRI KWS, NGOs, CBOs,	30,000,000	x	x	x	x	x

	•Research on appropriate fish species for mari/aqua culture •Undertake pilot aquaculture & mariculture projects	and mariculture in the delta	mariculture	Communities; BMU/fish farmers						
Promote value addition to fisheries products	-Identify and develop potential technologies for value addition -Identification of areas with scope for value addition -Implement value addition measures -Upscale/replicate relevant technologies	• Increased income to fishermen • Quality of new products	• % increase in income per fisherman • Number of technologies • Number/types of products developed	SDF, CGTR, CGL, BMUs, KMFRI KWS, NGOs, CBOs, Private sector	50,000,000	x	x	x	x	x
Operational objective 3: To promote wildlife conservation measures in the delta										
Establish community conservation/conservancy areas	-Stakeholder mobilization and sensitization -Establish conservancies -Develop	Improved conservation status of wildlife	• Number of conservancies established • % population increase in wildlife • Number of management plans	KWS, CGTR, CGL, NEMA, KFS, SDF, NGOs, private sector, CBOs, Communities	30,000,000	x	x	x	x	x

	management plans for the conservancies		developed							
Map and secure wildlife migratory corridors from encroachment	- Map wildlife migratory corridors - Develop and implement measures to secure wildlife corridors from encroachment	Migratory corridors mapped and encroachment controlled	Number of maps developed Number of migratory corridors identified and secured	KWS, CGTR, CGL, NEMA, KFS, NGOs, private sector, CBOs, Communities	15,000,000	x	x	x	x	x
Develop and update inventory of endangered wildlife species	- Prepare inventory for endangered wildlife species - Update inventory for endangered wildlife regularly	Enhanced understanding of endangered wildlife species in the delta	Inventory for endangered wildlife species in Tana delta	KWS, NEMA, KFS, NMK, NKM, SDF, NGOs, Communities	5,000,000	x	x	x	x	x
Identify and protect habitats for endangered species	Mapping, law enforcement and monitoring of habitats for endangered species	Improved health of species and their habitats	Increased populations of endangered species Monitoring reports	KWS, CGTR, CGL, NEMA, KFS, SDF, NMK, NKM, NGOs, Communities	4,000,000	x	x	x	x	x
Enforce wildlife conservation and management Act 2013 and regulations	- Undertake routine compliance monitoring - Prosecute non-compliant	Improved compliance with wildlife regulatory frameworks	% decrease in number of poaching cases and other wildlife crime incidences	KWS, NEMA	5,000,000	x	x	x	x	x

	entities									
Develop and implement human-wildlife conflict resolution mechanisms	•Develop conflict resolution mechanisms •Implement conflict resolution mechanisms	Reduced cases of Human-wildlife conflict	• Human-wildlife conflict resolution mechanisms • % decrease in HWC cases	KWS, CGTR, CGL, SDF, BMUs, NEMA, KFS, NGOs, Communities	10,000,000	x	x	x	x	x
Prevent use of game meat by providing alternative sources of protein	•Document extent of poaching •Create awareness on the risks and consequences of poaching	Reduced cases of poaching	• Number of alternative sources of protein successfully established • Increase game populations	KWS, CGTR, CGL, National Government (Interior), NGOs, Communities	6,000,000	x	x	x	x	x
Operational objective 4: To promote measures to prevent and control introduction of invasive species										
Carry out survey on prevalence of invasive species in the delta	Undertake survey on invasive species in the delta	Enhanced understanding of invasive species in the delta	Number and extent of invasive species documented	KEFRI, KWS, KFS, Communities	2,000,000	x	x			
Undertake research on socio-economic value of invasive species	Undertake research on socio-economic value of invasive species	Knowledge on positive and negative value of invasive species understood	Survey reports	KEFRI, KWS, NMK, CGTR, CGL, NGOs, CBOs, KFS, KEMFRI, Communities	5,000,000	x	x			
Undertake invasive species control and management	Undertake pilot invasive species control	Invasive species controlled and	% decrease in acreage of invasive species	CGTR, CGL, KWS, KFS, SDF, NMK,	15,000,000		x	x	x	x

activities	and management activities	managed		NEMA, NGOs, CBOs, Communities, KEFRI, Communities						
Encourage economic use of existing invasive species (*Prosophis juliflora)*	Explore and implement economic use of existing invasive species (*Prosophis juliflora)*	Economic uses of existing invasive species explored and implemented	• Number of products developed • Implementation reports	CGTR, CGL, KEFRI, KWS, KFS, NGOs, private sector, Communities	12,000,000	x	x	x	x	x
WATER MANAGEMENT PROGRAMME										
Operational objective 1: To ensure adequate water flow regime to meet both environmental and socio-economic needs										
Assess water flow and use in the entire basin including effects of damming	• Determine water flow and use in the entire basin • Disseminate assessment findings	Improved knowledge base on water flow and use in the entire basin	Data on river flow; survey reports; meetings reports	WRMA, Ministry of water, KENGEN, CGTR, CGL, NEMA, TARDA, WRUAs, NGO, private sector, CBOs	5,000,000	x	x			
Develop and implement water allocation plans for Tana basin	• Develop water allocation plans for Tana basin • Implement water allocation	Equitably allocation of water in Tana basin for both economic and environmental needs	Water allocation plans for Tana basin; Reports on implementation of water allocation plans	WRMA, KENGEN, ministry of water, TARDA, CGTR, CGL, NEMA, NGO, private sector,	15,000,000	x	x	x	x	x

	plans			WRUAs, communities						
Promote use of efficient irrigation technology along the Tana basin	• Identify and promote efficient irrigation technologies • Promote use of efficient irrigation technologies	Use of efficient irrigation technology adopted in the basin	Number of entities/ individuals using efficient irrigation technologies Monitoring reports	WRMA, ministry of water, MALF, TARDA, CGTR, CGL, NEMA,NGOs, WRUAs	20,000,000	x	x	x	x	x
Awareness creation on sustainable water abstraction in the basin	• Conduct sensitization meetings • Prepare and disseminate awareness materials • Awareness using electronic media (TV & radio)	Sustainable water abstraction in Tana river basin	Meeting reports; Number of awareness meetings conducted; awareness materials; number of TV and Radio programmes	WRMA, Ministry of water, TARDA, CGTR, CGL, NEMA, KENGEN, NGO, private sector,WRUAs , communities	10,000,000	x	x	x	x	x
Build stakeholder capacity on use of Environmental Flow Assessment (EFA) as a tool to manage Tana river basin	• Assess capacity needs on EFA application • Conduct stakeholder training on EFA	Improved Stakeholder capacity on use of EFA as a tool to manage Tana river basin	Number of people trained on EFA; Training reports;	WRMA, ministry of water, TARDA, CGTR, CGL, KENGEN, NEMA, NGO, private sector, WRUAs	10,000,000	x	x			
Apply EFA as a tool	Apply EFA as	EFA applied as	Number of	WRMA,	5,000,000					

to manage Tana river basin	a tool to manage Tana river basin water resources	a tool to manage Tana River basin water resources	stakeholders using EFA tool; Monitoring reports	Ministry of water, KENGEN, CGTR, CGL, NEMA, NGO, private sector, WRUAs		x	x	x	x	x
Operational objective 2: To ensure equitable flow of water within the river channels										
Assess impacts of river course diversion on ecological and socio-economic needs in delta	• Assess impacts of river course diversion on ecological and socio-economic needs in delta • Disseminate survey findings	Impacts of river course diversion on ecological and socio-economic needs in delta understood	Assessment report; meeting reports	WRMA, Ministry of water, NMK, KENGEN, CGTR, CGL, TARDA, NEMA, NGO, private sector, WRUAs	8,000,000	x	x			
Implement recommendations of river diversion assessment report	Implement recommendations of river diversion assessment report	Recommendations of river diversion assessment report implemented	Number of recommendations implemented; Monitoring reports	WRMA, Ministry of water, KENGEN, CGTR, CGL, NEMA, NGO, private sector, NGOs, WRUAs	15,000,000		x	x	x	x
Control human induced river diversion in the delta through EIA	Control human induced river diversion in the delta through EIA	Human-induced river diversion in the delta controlled through EIA	EIA reports	NEMA, WRMA, CGTR, CGL, Private sector	2,000,000	x	x	x	x	x

Operational objective 3: To ensure sustainable supply and availability of water										
Provide alternative water sources to villages affected by river diversion e.g. piping, boreholes, etc	•Identify and implement alternative water sources to villages affected by river diversion	Alternative water sources provided to villages affected by river diversion	Report on number of households, livestock, industries using alternative sources of water; Number of alternative sources of water provided	Ministry of water, Water companies, CGTR, CGL, private sector, NGOs	30,000,000	x	x	x	x	x
Promote rain water harvesting in areas affected by river diversion (roof catchment, etc)	• Awareness creation on rainwater harvesting • Implement rain water harvesting projects	Water harvesting in area affected by river diversion promoted	Number of awareness meetings on rain water harvesting Reports from awareness meetings Number of households using rain water harvesting technology	Ministry of water, Water companies, CGTR, CGL, private sector, NGOs, CBOs	20,000,000	x	x	x	x	x
Rehabilitate degraded water sources in Tana delta	Rehabilitate degraded water sources in Tana delta	Degraded water sources rehabilitated	Number of degraded water sources rehabilitated	Ministry of water, Water companies, CGTR, CGL, private sector, NGOs, CBOs	15,000,000	x	x			
Operational objective 4: To improve solid and effluent management along River Tana Basin										
Strategic installation of solid waste receptors in urban centers within River Tana riparian area	Install solid waste receptors in urban centers within River Tana riparian area	Improved management of solid waste in urban centers within River Tana riparian area	Number of solid waste receptors installed; monitoring reports	CGTR, CGL, NGOs, CBOs	20,000,000	x	x	x	x	x
Map and designate solid waste dumping	Map and designate solid	Designated solid waste	Designated solid waste dumping sites;	CGTR, CGL, NEMA, NGOs						

sites for urban centers within River Tana riparian area	waste dumping sites for urban centers within River Tana riparian area	dumping sites in urban centers within River Tana riparian area	Number of designated dumping sites		10,000,000	x	x			
Create awareness on sustainable solid waste management in urban centers within riparian zone	• Conduct sensitization meetings • Prepare and disseminate awareness materials • Awareness using electronic media (TV/Radio)	Improved awareness on sustainable solid waste management in urban centers within riparian zone	Awareness meetings reports; Waste management monitoring reports; awareness materials; TV/Radio programmes	NEMA, CGTR, CGL, CBOs, NGOs	15,000,000	x	x	x	x	x
Enforcement of waste management regulations 2006	Enforcement of waste management regulations 2006	Improved compliance with waste management regulations 2006 in urban centers within River Tana riparian zone	Compliance assessment reports; Number of people prosecuted	NEMA, CGL, CGTR	5,000,000	x	x	x	x	x
Support Establishment of effluent treatment plants in urban centers within River Tana riparian zone	Support Establishment of effluent treatment plants in urban centers within River Tana	Improved management of effluent in urban centers within River Tana riparian area	Number of treatment plants established	CGTR, CGL, NEMA,WRMA, NGOs, private sector	40,000,000	x	x	x	x	x

	riparian zone									
Enhance stakeholder capacity on best Municipal Wastewater Management (MWWM) practices (training)	Conduct training on best MWWM practices	Improved stakeholder capacity on best municipal wastewater management practices	Number of stakeholders trained on municipal waste water management practices Number of meetings	CGTR, CGL, NEMA, CSOs, NGOs, private sector	2,000,000	x		x		x
Raise public awareness on Water quality regulations 2006	• Conduct sensitization meetings • Prepare and disseminate awareness materials • Awareness using electronic media (TV/Radio)	Improved compliance with Water quality regulations 2006 in urban centers within River Tana riparian area	Number of awareness meetings; awareness materials on water quality regulations; TV/Radio programmes	NEMA, CGTR, CGL, WRMA, NGOs, Private sector	5,000,000	x	x	x	x	x
Undertake regular inspections to enforce water quality regulations in urban centers within River Tana riparian zone	Enforcement of waste management regulations 2006	Improved compliance with Water quality regulations 2006 in urban centers within River Tana riparian area	Inspection/ Compliance assessment reports	NEMA, CGTR, CGL	5,000,000	x	x	x	x	x
Promote good agricultural practices in the delta and	Promote good agricultural practices in the	Reduced soil erosion and siltation in	Monitoring reports (increased agricultural produce, improved	MoALF, CGTR, CGL, communities,	50,000,000	x	x	x	x	x

catchment areas	delta and catchment areas	Tana river basin and the delta	soil fertility)	NGOs, private sector						
Establish and strengthen Water Resource Users Associations (WRUAs)	Establish and strengthen Water Resource Users Associations (WRUAs)	WRUAs actively involved in water conservation activities in the delta	Number of WRUAs established and strengthened through capacity building; Monitoring reports	WRMA, CGTR, CGL, WRUAs, NGOs, Water companies	10,000,000	x	x	x	x	x
Undertake water quality and hydrological monitoring in the delta	Undertake water quality and hydrological monitoring in the delta	Improved knowledge and understanding of water quality trends in River Tana basin	Water quality monitoring reports	Ministry of water, NMK, WARMA, CGTR, CGL, NEMA, NGOs	10,000,000	x	x	x	x	x
LAND RESOURCES MANAGEMENT PROGRAMME										
Operational objective 1: To promote sustainable land use practices										
Building the capacity of local farmers in best agricultural practices (soil conservation, reforestation, regular soil analysis, etc)	• Undertake capacity needs assessment on sustainable farming practices • Train farmers on best farming practices	Best agriculture practices adopted widely in the delta	Training needs assessment report; Number of farmers trained on sustainable farming practices; monitoring reports	MoALF, CGTR, CGL, NGO, private sectors, Pastoralists, Farmers	20,000,000	x	x	x		
Develop and implement spatial	• Develop spatial plans	Spatial for urban areas	Number of urban areas with spatial	CGTR, CGL, Ministry of						

plans for urban areas to ensure controlled development	for urban areas • Implement spatial plans for urban areas	developed and implemented	plans; implementation reports	Lands; NLC	50,000,000	x	x	x	x	x
Adopt and develop grazing block systems and corridors to control livestock overgrazing	Adopt and develop grazing block systems and corridors to control livestock overgrazing	Sustainable livestock farming practices in the delta	Number of grazing blocks and corridors developed; Monitoring reports	MoALF, CGTR, CGL, NGO, private sectors, Pastoralists	5,000,000	x	x	x	x	x
Mainstream traditional methods of controlling overgrazing in livestock farming	Mainstream traditional methods of controlling overgrazing in livestock farming	Traditional methods of controlling overgrazing adopted	Number of traditional methods applied; Monitoring reports	MoALF, CGTR, CGL, NGO, private sectors, Pastoralists	3,000,000	x	x	x	x	x
Promote livestock keeping as a business	Promote livestock keeping as a business	Improved income by pastoralists	Number of value addition initiatives started; Socio-economic survey reports	MoALF, CGTR, CGL, NGO, private sectors, Pastoralists	5,000,000	x	x	x	x	x
Operational objective 2: To promote implementation of the Tana Delta LUP										
Sensitization and awareness on the Tana Delta Land Use Plan (LUP)	• Conduct sensitization meetings • Prepare and disseminate awareness	Awareness and sensitization on the Tana Delta LUP enhanced	Number of sensitization and awareness meetings held; Meeting reports	Ministry of Lands, CGTR, CGL, Lead institutions, NEMA, communities	3,000,000	x	x			

	materials on LUP			NGOs						
Implementation of Tana Delta Land Use Plan (including zoning of land use, etc)	Undertake land use based on zoning of the delta	Land use based on zoning of the delta done; reduction of resource use conflict issues in the delta	Maps showing the relevant land use zones; Monitoring and progress reports	Ministry of Lands, CGTR, CGL, Lead institutions, NEMA, communities NGOs	10,000,000	x	x	x	x	x
Develop regulations to effect/implement LUP	Support LUP regulation development and gazzettement	LUP implementation regulations	LUP implementation regulations	CGTR, CGL, Ministry of Lands	3,000,000	x	x			
Build capacity of the land agencies; county governments and other stakeholders to implement LUP	Mobilize county governments and other land agencies for capacity building towards effective LU[implementation	Enhanced land agencies and County Governments technical capacity for LUP implementation	• No of capacity building sessions held with technical wing of the county government • No of officers trained on LUP implementation • LUP implementation monitoring reports	CGTR; Ministry of lands; NLC; Development partners; private sector; lead agencies	30,000,000	x	x	x	x	x
Gazette ecologically sensitive areas (ESAs) in the delta	Map and gazette ecologically sensitive areas in the delta	Ecologically sensitive areas in the delta gazetted	• Gazette notice on ESAs in the delta • Gazetted ESAs in delta	NEMA; CGTR; CGL; Lead agencies; NLC; communities	20,000,000	x	x	x		
Operational objective 3: To address the land tenure system in the delta										
Undertake land adjudication in the	Undertake land adjudication in	Improved land ownership and	Number of parcels of land surveyed,	National Land commission,						

delta to promote environmentally friendly use	the delta to promote environmentally friendly use	use by the local communities	adjudicated and title deeds issued	Ministry of Lands, CGTR, CGL	20,000,000	x	x	x		
SOCIO-ECONOMIC DEVELOPMENT PROGRAMME										
Operational Objective 1: To promote sustainable economic development and local livelihoods										
Promote best agricultural practices in the delta (Livestock; fisheries and crop production)	• Organize exhibitions on best practices • Undertake pilot projects on best practices • Education & awareness	Best agricultural practices widely adopted in the delta	• Increased yields • Increased income • Adoption of best agriculture practices	Ministry of Agriculture, TARDA, CGTR, CGL, Communities, CDA, NEMA	50,000,000	x	x	x	x	x
Diversify livelihood activities (e.g aquaculture/ mariculture, bee keeping, ecotourism, etc.	• Undertake study on alternative livelihoods • Implement survey findings	Diverse livelihood activities adopted by local communities	Documentation of alternative livelihoods; Diversified options of livelihoods; Increased income	CGTR, CGL, KENWEB, Communities, Line ministries; NGOs; CBOs	50,000,000	x	x	x	x	x
Improve infrastructure to facilitate sustainable use of delta resources	• Improve roads Roads/bridges • Improve fish Landing sites • Improve animal abattoirs, cattle dips,	Improved access and use of delta's resources	Increased number of all-weather roads, bridges; improve fish landing sites; increased number of processing, storage and facilities; Improve animal abattoirs, cattle dips, etc	KERA, CGTR, CGL, REA, Telecommunication companies, MALF, NGOs,	100,000,000	x	x	x	x	x

	etc • Improve storage and processing facilities									
Promotion of Small and Medium scale entrepreneurship activities	• Survey on potential micro-enterprise activities • Implementation of potential micro-enterprises • Linking micro-enterprises with financial institutions Establishment of a micro-enterprises fund	Economically empowered communities	Documentation of potential micro-enterprises; Number of communities trained in micro-enterprises; Number of enterprises implemented; Number of SACCOs; monitoring reports	Ministry of cooperatives, MOD, CGTR, CGL, NGOs, private sector, Financial institutions, communities	200,000,000	x	x	x	x	x
Promote sustainable fishing practices	• Enforcement of fisheries regulations • Awareness creation on sustainable fisheries • Empower fishermen to access EEZ • Promote fisheries value addition	Improved incomes from better conserved fisheries	Number of fisherfolks using approved fishing gear; Number of fishermen accessing EEZ; awareness reports	SDF, BMUs, CGTR, CGL, KMFRI, NGOS, private sector	100M	x	x	x	x	x

Operational Objective 2: Integrate modern and traditional knowledge in the management of Tana delta										
Document indigenous knowledge (IK) to assist in environmental planning and management processes	• Conduct survey to document IK • Disseminate survey findings	IK documented and disseminated	IK study reports; IK documentaries	KENWEB, NMK, CBOs, NGOs, Communities	5,000,000	x	x			
Establish community cultural centers in the delta	Establish community cultural centers	Community cultural centers established	Number of community cultural center; number of visitors recorded at the centres	NMK; CGTR, CGL, Ministry of National Heritage, communities	10,000,000	x	x			
Promote Indigenous Community conservation Areas (ICCAs)	• Identify and document ICCAs • Promote Sacred sites conservation • Empower cultural institutions (eg Gasa and Matadeda) to actively participate in conservation	Indigenous Community conservation Areas identified and well conserved	Indigenous Community conservation Areas; cultural institutions (e.g Gasa and Matadeda) actively participating in environmental conservation	NMK; CGTR, CGL, Ministry of National Heritage; NGOs; communities	15,000,000	x	x	x	x	x
GOVERNANCE IMPROVEMENT PROGRAMME										
Operational Objective 1: To enhance institutional capacity for effective management of the delta										
Capacity building for relevant	Conduct trainings for	Effective management of	Training reports; No of officers trained	Lead institutions,						

institutions to effectively manage the delta	relevant county and national government departments	delta		NEMA, CGTR, CGL Resource user groups, NGOs. CBOs	35,000,000	x	x	x	x	x
Strengthen enforcement of regulatory frameworks for management of the delta	• Staff deployment • Recruit voluntary community scouts for monitoring/surveillance	• Improved compliance with legal requirements; • Enhanced enforcement of regulations	No of staff deployed; number of voluntary community scouts engaged; co-management frameworks for CCAs	Lead agencies, NEMA, CGTR, CGL, NGOs, Co-management groups (CFAs, BMUs etc.), WRUAS	30,000,000	x	x	x	x	x
Conduct civic education on the existing NRM regulatory frameworks	Conduct civic education on the existing NRM regulatory frameworks	Improved compliance with legal requirements; Increased social accountability	Number of awareness meetings; workshops reports; reduced cases of wildlife/NMR crimes	Lead agencies, NEMA, CGTR, CGL, RAMSAR site Committee, NGOs, CBOs	15,000,000	x	x	x	x	x
Improve resource allocation for Tana delta management	Improve resource allocation for delta management	Improved allocation of financial resources for delta management	Resource allocation plans and budgets; amount of funds allocated for Tana delta initiatives	Line Ministries, NEMA, Lead agencies, CGTR, CGL, NGOs, private sector, Development partners, CBOs	3,000,000	x	x	x	x	x

Develop and implement a strategy for resource mobilization	Develop and implement a strategy for resource mobilization	Availability of financial resources to support conservation and management of the delta	-Resource mobilization strategy document; List of potential donors; -Financial and non-financial resources mobilized; number of initiatives supported by organisations	NEMA, KWS, CGTR, CGL, County Environ Committee, RAMSAR Site Committee, Lead Agencies NGOs	10,000,000	x	x	x	x	x
Establish and build capacity of County Environment Committees; TDMPIC; Ramsar site committee and lead agencies for effective coordination of environ activities in the delta	• Establish County Environment Committees; TDMPIC; Ramsar site committee • Train above committees and lead agencies for effective coordination and management of delta	• Functional County Environment Committees; TDMPIC; Ramsar site committee; • Improved coordination of Tana delta conservation activities	County Environment Committees; TDMPIC; Ramsar site committee; Training reports; Number of committee members trained	NEMA, KWS CGTR, CGL, Lead agencies, NGOs	10,000,000	x	x	x		
Operational Objective 2: To improve knowledge and understanding of Tana delta through research and monitoring										
Establish and operationalise scientific committee for Tana delta	Establish and operationalise scientific committee for Tana delta	A functional scientific committee in place	Tana delta scientific committee; Reports by committee	KWS, KEMFRI, NEMA, NMK, KENWEB, NGOs, Academia, among others	2,000,000	x	x			

Undertake participatory research and monitoring activities for adaptive management	Undertake participatory research and monitoring activities for adaptive management	Adaptive management of Tana delta	Research reports; Monitoring reports	KWS, KEMFRI, KENWEB, scientific committee for Tana delta; NGOs, NMK, Research scientists; Academia	50,000,000	x	x	x	x	x
Develop a baseline map for critical habitats for use in monitoring habitat change	Prepare a baseline map for critical habitats for use in monitoring habitat change	Improved monitoring of habitat changes	Baseline map for critical habitats developed	DRSRS, NEMA, KWS, KFS, CGTR, CGL, NGOs, CBOs	5,000,000	x	x			
Conduct inventories and economic valuation of critical habitats in the delta	Prepare inventories and economic valuation of critical habitats in the delta	Improved knowledge on economic value of critical habitats in the delta	Critical habitats Valuation reports	NEMA, KFS, KWS, NMK, KMFRI, KENWEB, Academia, NGOs, CBOs	25,000,000	x	x			
Develop an information management system for Tana delta	Develop an information management system for Tana delta	A functional information Management System for Tana delta established	Information Management System for Tana delta	Research Institutions KENWEB, RAMSAR Scientific Committee	5,000,000	x	x			
Organize information and lesson sharing forums/scientific conferences on Tana	Organize information and lesson sharing forums/scientif	Improved knowledge base on Tana delta	Workshop/conference reports; monitoring reports	Research Institutions, CGTR, CGL, Lead agencies, NGOs, private	15,000,000	x	x	x	x	x

delta	ic conferences			sector, CBO, Academia						
Operational Objective 3: To enhance communication, education and public participation and awareness										
Conduct education and awareness campaigns on importance of the delta at all levels	• Conduct sensitization forums • Prepare and disseminate awareness materials • Awareness using electronic media • Implement an environmental award scheme to recognize best practices	Improved level of awareness and social accountability in conserving the delta	number of outreach forums; number of people that have received awareness; Awareness reports; awareness materials; TV & Radio programmes organized; policy briefs; environmental award schemes organised	NEMA, Lead agencies, CGTR, CGL, RAMSAR site Committee, NGOs, private sector, CBOs	25,000,000	x	x	x	x	x
Operational Objective 4: To promote conflict management and resolution in the delta										
Develop early warning systems and conflict resolution mechanisms	Develop and implement early warning systems and conflict resolution mechanisms	Peaceful co-existence by communities and resource users	Early warning systems in place; conflict resolution mechanisms in place; monitoring reports	CGTR, CGL, Ministry of Interior, Local leaders, Tana delta committee, Communities/ Elders(Gasa & Matadeda), Law enforcement agencies,	10,000,000	x	x	x	x	x

				NGOs, CBOs						
CLIMATE CHANGE MITIGATION AND ADAPTATION PROGRAMME										
Operational Objective 1: To promote climate change mitigation measures in the Delta										
Rehabilitate degraded forests and riverine ecosystems	• Identify degraded forest sites • Rehabilitate degraded forests and riverine ecosystems	Improved forest and riverine cover	Rehabilitated degraded sites; monitoring reports	CGTR, CGL, KFS, NEMA, KWS, NGOs, private sectors, CBOs	20,000,000	x	x	x	x	x
Implement the National Climate Change (CC) Action Plan and Climate Change strategy at the local level	• Awareness on climate change • Capacity building on CC adaptation • Initiate adaptation projects (water harvesting, use of green energy, etc)	Reduced impacts of climate change in the delta; enhanced adaptation and resilience to climate change	Awareness reports; CC awareness materials; training reports; initiative on CC adaptation; Monitoring reports	Ministry of environment, CGTR, CGL, Lead agencies, NEMA, NGOs, CBOs	25,000,000	x	x	x	x	x
Enforce laws on riverbank, seashore protection (Wetlands Regulations 2007)	• Undertake routine compliance monitoring • Prosecute non-compliant	Improved compliance with wetlands regulations	Inspection/compliance monitoring reports; prosecution cases	NEMA, KFS, WRMA, Ministries of Interior and Lands, CGTR, CGL, NLC	5,000,000	x	x	x	x	x

	entities									
Promote reforestation through farm forestry among others	Undertake farm forestry initiatives	Improved vegetation cover in the delta	Improved vegetation cover in the delta; monitoring reports	KEFRI, KFS, CGTR, CGL, NGOs, CBOs, private sector	15,000,000	x	x	x	x	x
Promote adoption of sustainable agricultural practices (e.g. improved animal breeds and drought resistant crops)	• Awareness on climate smart agriculture • Training on climate smart agriculture • Undertake climate smart agricultural initiatives (e.g. drought resistant crops, etc)	Sustainable agricultural practices adopted widely in the delta	Awareness reports; training reports; climate smart agriculture initiatives; Monitoring reports	Ministry of Agriculture; CGTR, CGL, NGOs, CBOs, private sector	30,000,000	x	x	x	x	x
Operational Objective 2: To improve the adaptive capacity and resilience to climate change in the Delta										
Raise community awareness on climate change	Raise community awareness on climate change	Improved community awareness on climate change in the delta	Awareness reports; awareness materials	Ministry of environment, CGTR, CGL, Lead agencies, NEMA, NDMA, KFS, KWS, CBOs	8,000,000	x	x	x	x	x

Promote farming of drought resistance crops	• Awareness on drought resistance crops • Promote on-farm use of drought resistance crops	Improved adoption of drought resistant crops	Awareness reports; Number of farmers using drought resistant crops; monitoring reports	Ministry of Agriculture; TARDA, DMA, CGTR, CGL, NGOs, CBOs, private sector	15,000,000	x	x	x	x	x
Promote water efficient irrigation and conservation agriculture	Promote water efficient irrigation and conservation agriculture	Adoption of water efficient irrigation and conservation agriculture	water efficient irrigation technologies in use; number of farmers using the technologies, monitoring reports	Ministries of Agriculture and Water; Ministry of water; WRMA; NIB TARDA, CGTR, CGL, NGOs, CBOs, private sector	20,000,000	x	x	x	x	x
Promote breeding of animals tolerant to local climatic conditions	• Awareness on animals tolerant to local climatic conditions • Promote keeping of animals tolerant to local climatic conditions	Adoption of animal breeds tolerant to local climatic conditions	Awareness reports; Number of farmers keeping animals tolerant to local climatic conditions; monitoring reports	Ministry of Agriculture; CGTR, CGL, NDMA, NGOs, CBOs, private sector	5,000,000	x	x	x	x	x

Establishment of modern abattoir for livestock offtake during drought	Construction of a modern abattoir	Reduced livestock losses during drought	Abattoir in place	CGTR CGL, NDMA CDA		x	x			
Provide alternative water sources to villages far from the river e.g. water pans, boreholes, etc	• Identify alternative water sources • Implement alternative water sources to villages far from the river	Availability of fresh water supply to villages far from the river	Alternative water sources implemented; Number of households using alternative water sources; monitoring reports	Ministry of water; water companies; WRMA, CDF, CGTR, CGL, NGOs, CBOs, private sector	50,000,000	x	x	x	x	x
Promote rain water harvesting (roof catchment, etc)	• Awareness on rain water harvesting • Undertake projects on rain water harvesting (water pans, roof catchment,	Water harvesting adopted widely in the delta	Rain water harvesting initiatives; Number of households doing rain water harvesting	Ministry of water; CGTR, CGL, CDF, NGOs, CBOs, private sector	50,000,000	x	x	x	x	x
Rehabilitate degraded water sources e.g. de-silting of dams	Rehabilitate degraded water sources e.g. de-silting of dams	Degraded water source rehabilitated	Rehabilitated water sources; monitoring reports	Ministry of water; water companies; CGTR, CGL, WRMA, CDF, NEMA,NGOs, CBOs, private sector	40,000,000	x	x			
Implement early warning systems for droughts and floods	Implement early warning systems for	Early warning system serving communities in	Early warning systems for droughts and floods	NDMA, KMD, CGTR, CGL, Private sector	10,000,000	x	x			

	droughts and floods	the delta								
Diversify livelihood activities e.g. aquaculture/mariculture, bee keeping, ecotourism, etc	•Awareness on livelihood activities diversification •Undertake livelihood diversification activities	Diverse livelihood activities adopted by local communities	Diverse livelihood activities practiced by communities; monitoring reports	Line ministries; Lead agencies, CDA, CGTR, CGL, NGOs, private sector, CBOs	50,000,000	x	x	x	x	x
Promote use of alternative/clean energy e.g. wind, solar, etc	•Awareness on use of alternative/clean energy •Undertake initiatives on use of clean energy	Use of alternative/clean energy widely adopted in the delta	Clean energy initiatives; Number of households using clean energy; monitoring reports	Ministries of Environment and Energy, CGTR, CGL, Lead agencies, NEMA, NDMA NGOs, CBOs	30,000,000	x	x	x	x	x

CHAPTER 9: MONITORING AND EVALUATION

This chapter presents the Monitoring and Evaluation (M&E) framework to be used to track progress performance and impact of the Tana Delta Wetland Management Plan. M&E would be utilized to collect information and data for effective implementation of the Management Plan and the related programmes and projects' activities.

The chapter also presents performance indicators that encompass environmental and socio-economic conditions that signpost achievement of the expected outputs and outcomes as well as consequential effects and impacts of the Management Plan. The M&E framework will help determine whether or not the imminent programmes and projects are on track and when changes may be needed thus form the basis for modification and of interventions and assessing the quality of activities being undertaken.

The Monitoring and Evaluation framework, among other things, will be utilized to build and information base and identify critical information gaps. It will assist to identify attributes of the resources, threats, mitigation measures, as well as identify the baseline conditions and emerging issues, and human activities that impact on these baseline conditions and guide in budget estimation and allocation.

The effectiveness and sustainability of this Monitoring and Evaluation plan is dependent on the following four conditions;

- Participatory approach in the planning and implementation of this management plan involving and including all stakeholders
- Evidence a strong reliance among partners in implementing and monitoring field activities.
- Timely reporting of feedback to all stakeholders that aid in decision making and adaptive management.

Thorough analysis of performance as required for decision making and development of lessons learnt so as to skew up performance.

Table 9.1: Monitoring and Evaluation Plan

Result Level (Management objectives)	Performance Indicator	Data Source/Means of Verification	Risks and Assumptions
Management Objective 1: To promote conservation and sustainable use of biodiversity resources	• Area that is sustainably managed (rehabilitated, protected areas) for biodiversity and ecosystems • Voluntary compliance and enforcement of patent laws, policies and regulations • Increase in proportion of habitats and species • Biodiversity index for flora and fauna	• Tana Delta Rehabilitation strategic plan • Relevant government resources and agencies and civil societies groups such as BMUs, CFA, WRUA, CWA • Management Effectiveness tracking Tool(METT) scores • Biodiversity Assessment Reports	• Non-compliance by the resources user groups • Emerging developments that affect the social-economic and environmental setting of the Tana Delta • Natural disasters such as extreme floods and droughts
Management Objective 2: To Improve water access, quantity and quality in the delta	• Number of households with adequate, clean and safe water for domestic use • Water allocation efficiency plan developed and operationalized for the sub-catchment areas • budgetary allocation of water services ok • Type of measures undertaken to reduce water pollution • Number of water projects initiated (water pans, shallow wells, piped water, rain water harvesting)	• Tana Delta Water allocation plans records • Tana River County and Lamu County water allocation efficiency plan • National and county government budgets • Water quality and quantity data • Local institutions such as WASREB, WRUAs, local administrative offices	• The Tana River county community felt need is met • There are adequate funds for water infrastructure • Government (National and County governments) priorities are in line with the felt need of the community • Political good will • Rainfall patterns remain good

	• Number of water access routes to watering points e.g. malkas and water pans		
Management Objective 3: To promote equitable, sustainable use and management of land as a resource	• Level of implementation of the land policy • County government spatial plans developed and implemented • Number of good land use practices and technologies adopted • % of compliance with Tana delta multiple Land Use Plan • Management Committee set up to oversee the land patent laws, regulations, practices and developments	• Land resource use report • County government spatial plans • Tana Delta Land Use Plan • Land management committee reports	• Incomplete land legislation e.g. the community land bill • Incomplete county government spatial plans • There is capacity to harness the alternative technological opportunities • Resource users will comply to the multiple LUP • Management have capacity to perform their mandate
Management Objective 4: To promote sustainable socio-economic development in the delta	• Improved well-being of the Tana Delta Community e.g. income level, employment rate, health status etc. • Reduced public resource use conflicts among the local communities • Level of Gender equity(% and representation of women participating in decision making)	• Social-economic development report • Community members response • Human development and poverty (HDP)index • Livelihood assessment • Literacy levels • Mortality and morbidity rates and incidences • Access to social amenities such as health, education • Gender equity reports	• The ecosystem can support and sustain the existing and upcoming developments • All developments are environmental and socially acceptable • Managing community expectations • Community participation and support • Peace and security in the delta • Political stability in the delta

Management Objective 5: To improve governance in conservation and management of the delta	• Type of existing Tana Delta management institutions and operational as well their capacity • Type of existing and or formulated policies, laws and regulations to manage delta • Tana Delta wetland management framework implemented • Participation & representation of all the stakeholders in decision making • Number of awareness campaigns for a held throughout the period • Increased in proportion of community and their level of technical knowhow • Number of stakeholders that utilize the actionable information and skills taught	• Tana Delta management plan monitoring and evaluation reports • Compliance assessment levels with environmental law reports • Awareness campaign records • Community • Resource users awareness survey	• The management institution have adequate capacity to oversee socio-economic development • Mindset of the decision makers in terms of good governance • Uncoordinated efforts of the involved stakeholders • There will be a positive receptiveness from the resource users • Conflict between traditional and modern knowledge may arise
Management Objective 6: To promote climate change mitigation, adaptive capacity and resilience in the delta	• Number, type and diversity of climate change mitigation, adaptive measures promoted in the delta	• Reports on climate change mitigation and adaptive measures implemented • Climate change awareness campaign records • NDMA, CGTR, CGL, KMD, Local community	• There is enough funds and capacity to implement climate change mitigation and adaptive capacity measures in the delta • Resource users have a positive receptivity

Result Level (Operational objectives)	Performance Indicator	Means of Verification	Data Collection Frequency	Risks and assumptions
Management Objective 1: To promote conservation and sustainable use of biodiversity resources				
Operational Objective 1: To promote rehabilitation and restoration of degraded biodiversity sites within the delta	• Acreage of type and diversity of afforestation, reforestation and farm forestry of degraded sites • Increase in proportion of resource users complying to patent laws, regulations and policies	• Institutional annual reports e.g. CFA/BMUs reports • Offense records of the resource associations	• Semi-annually • Continuous	• Resource users are aware and comprehend environmental regulations • Information is accessible to all stakeholders • Sufficient funds for rehabilitation • Adequate knowledge on restoration methods
Operational Objective 2: To promote sustainable fishing practices	• Type of laws enacted and enforced to ensure sustainable fishing • Improved monitoring, control and surveillance to fisheries • Management plans for different fishes operationalized • Number of restocked lakes • Voluntary guidelines for securing sustainable artisanal fishing distributed to fishers • Number and type of illegal fishing gears/methods confiscated/reported	• Research reports from institutions • Monitoring, control and surveillance reports • BMU reports • Frame survey reports • Fisheries management plan documents	• Annually • Continuous • Bi-annual	• There is capacity to perform MCS • Fishers have capacity to fish offshore • There is voluntary compliance to the constitutional laws, regulations and policies • Inadequate funds to operationalize MCS
Operational Objective 3: To	• Number of arrests of law	• Kenya Wildlife	• Semi-annual	• There is a human-

promote wildlife conservation measures in the delta	breakers • Increased incentives for wildlife conservation • Reduced conflict between wildlife and human • Area set aside for wildlife in the Tana Delta • Number of ranches practicing community based natural resource management (CBNRM)	reports • Kenya Wildlife association reports	• Annual	wildlife co-existence and the socio-economic livelihoods • Insufficient financial capacity for monitoring
Operational Objective 4: To promote measures to prevent and control introduction and spread of invasive species	• Number of residents with the knowledge and the skill set on how to utilize the Prosopis juliflora alternative goods and services • Frequency and Number of surveillance, monitoring and control of the invasive species by the Tana Delta Unit • The Tana River County laws on the invasive species operationalized and enforced	• Invasive species surveillance, monitoring and control report • Reports on adoption of alternative uses of invasive species • Invasive species surveillance, monitoring and control report • Tana River County laws on invasive species	• Continuous	The alternative uses are economically viable as well as socially and environmentally There is capacity to enforce the laws as well as the alternative uses of the Prosopis juliflora
Management Objective 2: To improve water access, quantity and quality in the delta				
Operational Objective 1: To ensure adequate water flow regime to meet both environmental and socio-economic needs	• A water allocation plan to meet various environmental and socio-economic needs uses operationalized • A management committee set up to oversee the	• County water management and allocation plan • Management committee report • Water quantity and	• Annually • Quarterly	• The plan will meet all environmental and social-economic needs • There is capacity to implement the

	management plan • E- flow values for the delta • No. of people /villages and stakeholders groups made aware on the assessments on water flow and use in the basin • Established water discharge parameters • Conserved catchment areas	quality reports		plan • The county and national governments work in harmony
Operational Objective 2: To ensure equitable flow of water within the river channels	• Identified Ecological and socio-economic impacts of river course diversion in the delta • Equitable and fair allocation of the E- flow plan • No. of people that understand effects of river diversion in the delta • No of human induced diversions made in a collective manner • Advocacy and lobbying for integrated national development plans • Type of developments along Tana River using its water • Flooding regimes throughout the period monitored and recorded	• Advocacy report • Photographs • Water quality and quantity tests • Floods surveys • E-flow allocation plans • Report of involvement of communities	• Continuous • Semi-annually	• There is a balance among the competing uses and interests of the water. • There will be fair and equitable sharing of the resources by all users of the water resources • Climate change will not severely affect the flow and flooding. • There will be sustainable utilisation of Tana River water
Operational Objective 3: To ensure sustainable supply	• Number of households accessing clean and safe	• Tana Delta Water allocation and	• Quarterly	• County governments(Tana

and availability of water	water for domestic use • Number and types of alternative sources of water adopted by residents i.e. rain, ground and surface waters harvesting, shallow wells • Frequency of service and maintenance of the water infrastructure e.g. piping	efficiency plan		and Lamu) ok will factor this need in the integrated plans budget • There is capacity for maintenance of the water infrastructure • Existence of capacity to utilize alternative water sources
Operational Objective 4: To improve solid and effluent management along the River Tana Basin	• Type of laws within the counties that regulate effluent and solid disposal into the river water • Volume of sediment and siltation into the Tana River water • Number of towns and settlements that install functional sewerage systems to reduce pollution • Volume of agricultural run-off in the water e.g. from TARDA effluents	• Tana River County multipurpose resource use plan County legislation on solid water and effluent management • A siltation strategic/management plan • Sewerage Installation Reports • Water quality tests	• Semi-annually • Quarterly	• The land use systems adopted will conserve water and soil • Rural urban planning will support this objective • Stakeholders are involved in the monitoring and analysis findings of chemicals in water
Management Objective 3: To promote equitable, sustainable use and management of land as a resource				
Operational Objective 1: To promote implementation of the Tana Delta LUP	• Number of community participatory meetings held on the LUP review and recommendations • Number of community	• LUP continuous review meetings reports • Tana Delta LUP committee records	Annually	• The resource users are understand and comprehend of the plan • There is adequate

	representatives in the Tana delta LUP management committee • County government budget for implementation of LUP • Reduced conflict over land resources	• County government budget		funds and capacity to implement the LUP
Operational Objective 2: To promote livelihood and the well-being of the community	• Improved existing livelihoods in the Tana River County • Type and scale of modern technologies complementing the existing technologies • Improved participation and representation of the community in the decision making process of the upcoming developments	Independent surveys from researchers Community Minutes of the participatory meetings and other relevant records	Annually Continuous	• The developments will be socially, economically and environmentally sound • The alternative opportunities to improve the livelihoods exist • Community's mindset
Management Objective 4: To promote sustainable socio-economic development in the delta				
Operational Objective 1: To increase the income level of the community	• Increased use of deltaic resources • Improved capacity to use the opportunities • Increased production and value addition of existing deltaic goods and services • Increased and diversified sources of income by the residents • Human development and poverty	• Tana Delta socio-economic survey • Independent surveys by researchers • Annual returns from various departments • Community • HDP assessment reports	Annually	• There is capacity for the resource users to explore the opportunities to expand, value addition and to increase production

	(HDP)index			
Operational Objective 2: To increase the employment level in the Tana Delta	• Increased number of residents employed in the existing and upcoming sustainable developments • Type and diversity of assets acquisition by the employed residents • Increased opportunities of value addition are created in Tana Delta • Human development and poverty (HDP) index	• Tana Delta Economic survey • Community • HWI and HDP assessment reports	Tana Delta Economic Annually	• Community have the skills to be employed • Community's mindset
Management Objective 5: To improve governance in conservation and management of the delta				
Operational Objective 1: To enhance institutional capacity for effective management of the delta	• Type of institutions set up to govern and manage the delta • Improved capacity of the existing institutions management to oversee their mandate • Improved participation and representativeness in decision making • Type of new and operational laws and regulations on governance and management of the delta	• Institutional reports • Management committee and secretariat reports • Number of trainings and trainees (reports)	• Annually • Continuous	• There is capacity to govern and manage the deltaic resources • There are adequate funds to improve the capacity of the institutions • Stakeholders willingness

Operational Objective 2: To enhance communication, education and public participation and awareness	• Number and type of awareness campaigns held on biodiversity conservation, water resources, land resources, climate change i.e. Radio shows, road shows, celebration of environmental days, etc. • Increased number of residents that demonstrate utilization of the actionable information given to them • Number of school wildlife clubs established and strengthened	• Conservation and sustainable use of delta natural resources awareness survey • Community	Quarterly Annually	• Stakeholder willingness and receptive to awareness campaigns • Availability of funds to conduct awareness activities • Peace and security in the delta
Operational Objective 2: To improve knowledge and understanding of Tana delta through research and monitoring	• Frequency of research and monitoring done in the delta • Number of trainings done to management agencies on understanding of Tana delta	• Research and monitoring reports • Training reports	Quarterly Annually	• Availability of funds to conduct research • Peace and security in the delta
Management Objective 6: **To promote climate change mitigation, adaptive capacity and resilience in the delta**				
Operational Objective 1&2: To promote climate change mitigation, adaptive capacity and resilience in the delta	• Number, type and diversity of climate change mitigation, adaptive measures promoted in the delta	• Reports on climate change mitigation and adaptive measures implemented • Climate change awareness campaign records • NDMA, CGTR, CGL, KMD, community	• Continuous • Annually • Annually	• Availability of funds and capacity to implement climate change mitigation and adaptive capacity measures

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Annex 2: Chronology of the various conservation efforts and development projects initiated in the delta in the past

INITIATVE	DESCRIPTION
Indigenous Systems	• Indigenous communities upheld strong cultural values which ensued sustainable use of the delta's wetland resources • Traditional land use practices successfully maintained the ecological and livelihoods balance for the Delta communities for millennium of years • Despite slowly adapting to modern social and economic practices, they are still religious to their cultural beliefs that guide their lifestyles and livelihoods • Sustainable use of the environmental resources have been part and parcel of traditional value system of the indigenous communities in Tana Delta and the entire Tana River County • The production and livelihood systems are linked to the balance and flow of the river and its flooding patterns or regimes • Pastoralist to graze their livestock herds in the floodplain areas in a system known as transhumance, and the delta has supported dry season grazing • Regular inundation of the Delta always supported flood recession agriculture, fishing, and dry season grazing • The bimodal floods were a natural mechanism in livestock pest control. Grazing stimulates regeneration and growth of palatable grass species. Traditional transhumance pastoralism is regarded as best use amongst the wetland wise use principles • Traditionally indigenous communities preserved the specific delta gallery riverine and floodplain forests and wetlands for specific sacred ritual purposes through the system of council of eldersvnamely the Gassa (Pokomo), and Matadeda (Orma)

Man-made Brooks and Water Channel Diversion	• Both man-made causes and heavy floods have often led to changes in the course of the river within the Tana Delta area • Historical records state that before 1860's the river had two main tributaries/channels. 1. the Tsana Tsawaa which meandered through Ngambwa-Moa-Dida Waride- Kau- Ozi and entered the ocean at Kipini. 2. MtoTana which passed through lake Tiananga at Dumi /Danisa flowing to Ngao- Oda-Shirikisho entered the ocean near Kurawa • Around the 1880s, some settlers together with local communities in Chara area constructed a channel between Shirikisho and Kau villages causing old Mto Tana course to join Tsana Tsawaa channel to Kipini. As such the old Mto Tana was mechanically permanently closed • From 1950s to Present a number of other man-made brooks were developed which interfered with the Tana river course and lives. Eg. Oda, Furaha, Kalota, Matomba, Laini, Hangada
Upstream Hydro-Electricity and Irrigation Schemes	• The upstream projects have had an impact on the downstream areas (Karina Horta 1994, "Troubled Waters: World Bank Disasters Along Kenya's Tana River" Multinational Monitor July/August 1994) • Five (5) hydro-electric dams and reservoirs have been built on the upper reaches of Tana River since the late 1960's. (Masinga, Kamburu, Gitaru, Kindaruma, Kiambere) • The Mutonga/High Grand Falls has been proposed. The Grand Falls scheme would constitute one of the largest dams in Africa • Dam construction influenced downstream flow and physical characteristics, most notably through regulating water flow and decreasing natural flooding regimes • The biannual floods that inundate floodplain and Delta area have drastically decreased since the dams were built. As flooding decreases, human and natural production systems have slowly degenerated (affecting water supply for domestic, urban, agricultural and ecological consumers) • The Grand Falls scheme could be the last stage in complete control of the Tana Waters. • The dam construction would effectively end the bi-annual flooding of Tana, which would cut off most of the floodplain and Delta areas from water, and may lower the local water table.

	• These changes would have major impact on downstream human and natural systems, and would impose significant local, national, and international costs in terms of losses to human, production and biodiversity
Lower Tana Village Irrigation Program 1979 - 1987	• In the 1970's village irrigation schemes were initiated at the Tana delta • It was a pump-fed irrigation rice growing scheme • The beneficiary villages were 5 villages of the lower Tana namely: Mnazini, Wema, Hewani, Ngao, and Oda • The objectives of LTVIP were: 1. Alleviate food shortages and increase self-sufficiency in food production at household level. 2. Increase well-being of local communities • An evaluation of this program criticized it for not having fulfilled its promises as the set objectives. The evaluation stated that LTVIP was neither a success story nor a complete failure • The Mnazini scheme was overun by the new course/channel of Tana river which developed at Mnazinin village due to some water works done by TARDA – Tana Delta Irrigation Project • Wema and Hewani schemes could not expand and were in direct conflict with TARDA-TDIP since both were within the protection dyke of TARDA's polder 1. Ngao & Oda collapsed
Tana River Primate GEF/World Bank Project	• The objective of the US $ 6.2 Million project was to promote conservation of the natural ecological systems of the Tana River National Primate Reserve and of the lower Tana river region, especially TR Red Colobus and TR Crested Mangabey monkeys and the riverine forest habitat • The project was approved for funding in 1991 and began in 1992 • To protect the project area biodiversity, all farming in the reserve was to cease. • The issue of voluntary resettlement was controversial and generated opposition. Proposed areas for resettlement were Danisa/Idsowe, and Kipini-Mchelelo within the Tana Delta. • Funding for possible resettlement activities was not availed

	• Inadequate community participation, inadequate joint-management, and resettlement issues were major challenges to this project. The project remains a case example of failure of World Bank Projects along the Tana river, and is a story of the creation of unnecessary tension and fear that did nothing to foster cooperation amongst stakeholders
Empoldering	• In the early 1980's extensive empoldering schemes for the Delta had been proposed. This would have provided complete flood control in the area. • The demand for food production and self sufficiency in food increased the pressure for the expansion of cropped area in the Delta. A pressure which was hard to resist in the event of what development proponents called frequent food shortages and chronic • Together with upstream irrigation projects the envisaged empoldering scheme (complete flood control) would have altered the entire livelihood, economy, and ecology of the Delta • The emopldering floods control scheme never took off but TARDA through the TDIP attempted to do so in its activities
TARDA/ Tana Delta Irrigation Project 1981 – 1998	• TARDA was established in 1974 to respond to development challenges within the Tana and Athi river bains by harnessing and utilizing the water and other resources in the area • TARDA developed the Masinga multipurpose dam and controlling reservoir for seven forks power stations, storage for irrigation and flood control. • Plans for large scale fully mechanized rice irrigated scheme in the Tana Delta were presented in a feasibility study prepared by Haskoning in 1981-1982 • TARDA set up the TDIP for purpose of cultivation of rice • EIA findings presented by Haskoning et al in 1982 identified major negative impacts on the Delta's environment, including ✓ Alteration of hydrological regime; pre-emption of habitat, and pollution by use of pesticides • In 1985 Ecosystem Ltd was invited by the Dutch Embassy –Kenya to assess the EIA of TDIP and conduct a

	detailed impact assessment of this project • Ecosystem Ltd report was very critical. It found major impact from changing hydrological regime to physical impacts, • The Ecosystem Ltd report was not accepted by TARDA as it had concluded that the TDIP scheme was not feasible on the basis of adverse hydrological and physical impacts. Furthermore, the scheme was financially expensive as rice could be produced much more cheaper in smallholder schemes in the upland areas and not the Delta. • In 1989 another assessment - a pre-construction environmental impact study was done by Nippon Koiei Co. – consulting for TARDA. This study also predicted serious adverse/negative on human and natural resources. For example: ✓ Disruption of pastoralist life style, including displacement ✓ Impact on Orma and Wardei pastoralists as of the 12,000ha TDIP, 9200ha floodplain grassland affected ✓ Encroachment on riverine forests ✓ Pollution by agrochemicals • The study proposed mitigation measures but TARDA never complied. For example, pastoralists were to be compensated, including TARDA developing for pastoralists the underdeveloped ranches such as Wachu. • Plans for TDIP polder 2 and 3, south of Gamba area was recommended not to be effected for implementation • Despite the various findings which were not in support of TDIP, TARDA still went ahead to implement the project • Construction of bunds affected negatively the farming villages of Wema and Hewani and areas of grazing for pastoral communities of Bandi and Gamba • Implementation of the project started in 1991, with the development of Polder 1 (4000ha) starting from the north end at Sailoni village, running along the left bank of the Tana River to Gamba village in the south • TARDA developed the TDIP infrastructure consisting of irrigation canals and drainage facilities, a rubber dam,

	rice mill, and administration building works • The leveling of floodplain led to clearance of bush land and grassland causing displacement of wildlife • The leveling of floodplain also denied the migratory tilapia, catfish and other species of importance to delta fisheries access to sources of seasonal nutrients and vital habitats • TDIP never realized its developmental objectives, and the El-nino of 1997/8 transformed the landscape. The state of the project become deplorable to date (Rice- S.cane trials- maize)
Proposed Tana Delta Wetland Reserve 1982 - 1993	• In 1982 the then Wildlife Conservation and Management Department (todays KWS) proposed that the Tana Delta be set aside as a conservation area. It was not effected • From there on the Delta has always been recommended for protection as a national wetland reserve, particularly in 1992 when Kenya ratified the Ramsar Convention • In early 1992 KWS proposed Tana Delta be gazetted as a wetland national reserve (i.e, to be the first Ramsar site – wetlands of international importance). This never happened until recently. The Delta was overtaken by Lake Nakuru and four others. • In 1992 a study by KWS funded by the Netherlands government had the objective to propose boundaries for Tana Delta wetland reserve and identify actions to strengthen the Delta as a functional reserve • Within the proposed wetland conservation area was a portion land of about 20,000ha allocated to Kon Dertu cattle ranch. In turn the ranch had sub-let about 10000ha of this ranch to a third party who was interested in developing a shrimp/prawn aquaculture farm
Proposed Industrial Shrimps/Prawns Aquaculture 1992 - 2004	• In 1992 a private company – Coastal Aquaculture Ltd "acquired" 10000ha of Tana Delta wetland area (a portion of Kon Dertu ranch) for industrial shrimp farming. • Both the land transaction (between Kon Dertu and Coastal Aquaculture) and the proposed industrial shrimp development generated a heated debate and public outcry. • Local communities and some members of the ranch stated that the land transaction was fraudulent and a

	conspiracy between some officials of the ranch and the developer • Scientists and conservationists viewed the proposed project as a major threat to the ecological health of the delta and well-being and livelihood of the local communities • In response to public concerns and for public interest, President Moi nullified the land allocation through a presidential directive made on July 22, 1993 • The President directed that the entire Tana Delta be protected as a wetland of international importance, and that an environmental assessment and a management plan be drawn in collaboration with the local people of Tana river • TARDA and KWS were appointed to coordinate these activities. TARDA as a regional authority in charge of coordinating development projects in the basin, and KWS, the Ramsar Convention management authority in Kenya • On July 23, 1993 the Commissioner of Lands gave notice (gazette notice number 3590) for compulsory acquisition of the said land by the government • Through a meeting convened by TARDA and KWS in August 12, 1993 a multi-sectoral steering committee was constituted to guide in the implementation of the presidential directive. It was called The Tana Delta Wetlands Steering Committee (TDWSC)
Tana Delta Wetland Steering Committee 1993 - 2004	• The TDWSC approach to the development of the management Plan agreed on four strategies, namely: ✓ Literature Survey ✓ Environmental Assessment Study ✓ Environmental Awareness ✓ Comprehensive Area Management Planning • Literature survey was done • ToR for environmental assessment study were developed and an environmental assessment workshop was held at

	che Delta but the actual study was not done due to lack of funding • Environmental awareness project was implemented by EAWLS with financial support from IUCN (1994 – 1996) • Management Planning did not take place • In October 1997 TDWSC had a Ramsar workshop in Naivasha • In 1998 (October 26 – 30), Kipini Community Conservation Group and EAWLS with funding from KWS marine and wetland training program hosted a workshop in Kipini dubbed "***Defining an Environmental Development Strategy for the Tana Delta and Tenewi Turtle Nesting Beaches***" • In 1999, TDWSC conducted a study "Analysis of the situation on the Ground" to revitalize the campaign • In 2001 TDWSC conducted another study " survey of Critical habitats at the Delta" • In the meantime Coastal Aquaculture had a long protracted court battles with the Kenyan government, including the COMESA court in Lusaka • In 2003 Coastal Aquaculture made an attempt to come back immediately the NARC government came to power. But efforts by Kenya Wetlands Forum and local communities scuttled their efforts
Proposed Tana Sugar Project	• With decreasing government funding, from 2003 TARDA embarked on revenue diversification plan to address the challenges of its mandate. The proposal for Tana Delta Integrated Sugar Project emerged • The proposal to establish sugarcane growing at the Tana Delta created big debate between proponents and opponents • First TARDA and a Spanish irrigation technology company RAESA entered into some joint venture on sugarcane growing in the Tana Delta • TARDA and RAESA established an experimental study plot on polder 1 (between Hewani and Gamba villages) • In 2004/5 TARDA entered into another joint venture agreement with Mat International Ltd to form a Tana Delta Sugar Company with a 45 years lease agreement to grow sugarcane on 18000ha and RAESA to supply the

	irrigation equipment • TARDA and Matt International commissioned a Sudanese company – Kenana Engineering Co. to prepare a feasibility study on 24000ha for sugarcane production • The TARDA – Mat deal never lasted. They parted ways. • Mat International acquired large chunks of land h area between Mnazini village and Sailoni extending to Lamu area of nyangoro-moa-dida waride. A ituation that put TARDA and Mat to conflict and confrontation • In 2005 TARDA entered into another joint venture agreement with Mumias Sugar. The proposed area for development included the Polder 1, 2 and 3 areas extending from Sailoni village in the north to the villages of Handarako and Arithi in the south covering land on about 33000ha • An EIA was done . Public meetings held. The Divide between supporters and opponents was wide • Mumias Sugar and TARDA facilitated learning tours for some selected local leaders to get a buy in for the project. Project never took off.
Biofuel (Jatropha and Castor Oil) Projects	• Biofuel project proposals emerged from 2007 • Bedford biofuel agreement with several ranches • GS4 Company proposed a biofuel (Castor seed) in Wachu ranch • These projects had the political support at both at the national and district levels • EIAs were done but contested • Conservationist campaigned vigorously against • After the EIA studies GS4 never pursued to implement the proposed project • Bedford scaled down its activities, established a trial farm a few year late it abandoned the farm without notice

Oil, Gas and Mining	• Oil and Gas exploration is happening both offshore and onshore Tana delta • Example Block L14 is onshore (Edgo Energy of Qatar), L6 onshore/offshore (FAR energy, Milio, Pancontinental), L7 offshore (Anadarko, Total SA, PPTEP Thailand) • Emerging issues of local benefit and local content, contract secrecy, impact on environment and livelihood systems, eg fisheries, inadequate EIAs etc • **MINING and MINERALS** ✓ Titanium sand on the old sandunes of the delta ✓ Salt mining, Kurawa area
Others	• Nature Kenya and the Office of the Prime Minister (Land use planning Process and documentation (2010-2012) • Lower Tana Conservation Trust/ Tana Delta Ltd – (Biodiversity Conservation Program BCP of CDTF • Mulikani community conservation group • Kenya Wetland Forum (wetland advocacy campaigns) • TaFMEN-Kipini and Manufaa Women (mangrove restoration and turtle conservation) • Tana Pastoralist Forum (climate change and adaptation mechanisms) • Critical Ecosystem Fund and National Museums of Kenya • TADECO • EAWLS (advocacy and awareness) • KENWEB Kenya Wetlands Biodiversity Network (research, documentation and lobbying) • Ecosystem Alliance (Wetlands International, Wild Living, ELCI, Nature Kenya)

	• CANCO/Kenya Oil and Gas Working Group • University of Nairobi • CORDIO/FFI (marine and coastal wetland research) • Kipini Conservancy • KWS . (Tana Delta Ramsar listing and awareness) • NEMA (coordinating the Wetland Policy, EMCA amendment and Development of an Integrated Management plan)