



MAGARINI MANGROVE PARTICIPATORY FOREST MANAGEMENT PLAN

-



APPROVAL PAGE

MAGARINI MANGROVE PARTICIPATORY FOREST MANAGEMENT PLAN (2025- 2030)

Magarini Mangrove Participatory Forest Management Plan (2025-2030) is hereby approved for implementation. Any amendments to this Management Plan shall be effected only through mutual agreement between Kenya Forest Service (KFS) and Magarini Mangrove Community Forest Association (MMCOFA).

This Management Plan shall be the basis for the subsequent Forest Management Agreement (FMA) governing Magarini Mangrove Forest reserve, which will be signed between Kenya Forest Service (KFS) and MMCOFA

A.L. LEMARKOKO, EBS ‘ndc’ (K)
CHIEF CONSERVATOR OF FORESTS

KENYA FOREST SERVICE

Date: -----

PREFACE Magarini Mangrove forests cover approximately 6,000 hectares, and forms part of the larger coastal mangroves, which is estimated to be 61,271Ha according to the National Mangrove Ecosystem Management Plan. Kenya Forest Service (KFS) established under the Forest Conservation and Management Act (FCMA) No. 34 of 2016 is mandated to “*conserve, protect and manage all public forests in accordance with the provisions of this Act*”.

The Magarini Mangrove Participatory Forest Management Plan (PFMP) (2025-2030) was prepared pursuant to the FCMA, 2016; under Section 47 (1) which states that “*Every public forest, nature reserve and provisional forest shall be managed in accordance with a management plan that complies with the requirements prescribed by Regulations made by the Cabinet Secretary.*” This mangrove forest is managed by KFS under Jilore Forest Station Manager within Kilifi County in the Coastal Conservation Area.

Magarini Mangrove Forest is an important ecosystem, particularly to the adjacent community whose culture and livelihood are closely intertwined with the wellbeing of the mangrove forest. In the recent past, the Magarini Forest adjacent communities have been sensitized and have realized the importance of this critical natural resource thus the need for them to be at the forefront in developing a PFMP for this mangrove forest.

Magarini Mangrove PFMP preparation was achieved through an extensive engagement process between the adjacent communities represented by Magarini Community Forest Association, Kenya Forest Service (KFS), Nature Kenya, and other stakeholders working in the area who formed the Local Planning Team (LPT). The LPT participated in data collection through literature reviews in focus group discussions, biophysical mangrove forest assessment, social economic survey data obtained from households adjacent to the mangrove forest, and participatory resource mapping. The LPT together with key stakeholders were also involved in drafting and validation of the PFMP. This plan describes all the existing and potential resources found in Magarini mangrove forest and the socio-economic status of the Forest Adjacent community. The vision of Magarini CFA is

Swahili Version

Kuwa Mwongozo bora katika mwambao wa pwani Kwa utunzaji wa raslimali za msitu wa mkoko, bayo anuai na kuinua kiuchumi jamii zinazoishi karibu na msitu wa mkoko.

Giriama Translation

“Kukala mulongozo mudzo kahiza mwambao wa pwani kwa kutsunza ushaha wa tsaka ra mikoko, hamwenga na zhumbe virizhoko kwa kunula akalatsi kiutsumi”. This plan was developed with technical support from Kenya Forest Service and financial support from Nature Kenya. Considering that the ecosystem consists of mangrove forests, water, wildlife and other important resources, it is important to create linkage and collaborate in the management and conservation between and among key stakeholders.

It is my sincere trust that more cooperation and partnerships in the implementation of the Magarini Mangrove PFMP (2025-2030) by all stakeholders will strengthen and support our resolve to conserve, protect, restore, and find a sustainable balance between environmental integrity and socio-economic wellbeing of our people.

A.L. LEMARKOKO, EBS ‘ndc’ (K)
CHIEF CONSERVATOR OF FORESTS
KENYA FOREST SERVICE

FOREWORD

Nature Kenya, the East African Natural History society is the oldest conservation organization in East Africa having been established in 1909. Our agenda of “connecting nature and people” has remained unchanged for the 115 years of our existence. We have endeavored, sometimes in extremely difficult circumstances, to drive the conservation agenda to the community, government agencies and civil society groups.

Nature Kenya was involved in the piloting of Participatory Forest Management (PFM) which coincidentally happened in Arabuko Sokoke Forest Reserve in the late 1990s. We contributed in material and human capital to make the pilot a success which helped to shape the PFM part of the Forest Act 2005 and the subsequent Forest Conservation and Management Act 2016.

The PFM process has evolved overtime but the basic principles have remained unchanged: the need for effective forest resource management and the communities’ need to take a fraction of the responsibility for management and derive sustainable benefit from their effort. Involving forest adjacent communities in managing resources near them obviously brings in a sense of ownership and responsibility that reduce resource abuse by the community and ease the burden of protection from the government.

PFM is one of the most progressive processes of natural resource management in the 21st Century. Magarini Mangrove Community Forest Association has understood PFM and has sought help to develop this PFMP. We congratulate their effort but most importantly hope they will successfully implement this PFMP and ultimately contribute to making Magarini Mangrove Forest a better place for biodiversity conservation and generation of economic payback to the adjacent community.

DR. PAUL MATIKU

EXECUTIVE DIRECTOR

NATURE KENYA (THE EAST AFRICA NATURAL HISTORY)

ACKNOWLEDGEMENTS

The information in this PFMP was obtained through wide consultations with various stakeholders within the wider Magarini Mangrove Forest. The role played by the Magarini Mangrove CFA and forest adjacent community in availing themselves for consultative meetings and making direct contributions to developing this PFMP is highly appreciated.

	We wish to thank Kenya Forest Service led by Chief Conservator of Forest A.L.Lemmarkoko EBS,'ndc' (K) for the leadership and for providing an invaluable team of experts from KFS headquarters led by Ms Caroline Busuru (Head forest Management Plans) for her professional guidance and Ms Joan Atibo together with Mr. Santos Ingosi for technical inputs and training on PFMP. We are indebted to Bryson Busolo KFS (Surveyor) for the preparation of the required maps in this plan. We appreciate the Regional Forest Conservator Mr. James Mburu for support during the validation stage We appreciate the County Forest Conservator Mr. Elvis Fondo's leadership and support during the process. We are grateful to Mr. William Ochi, Jilore Forest Station Manager for his technical input, effective coordination, timely submission of the required information, and tirelessly working with the team to provide guidance and valuable insights during the development of the PFMP.
	We acknowledge the critical role played by KEFRI in the development of this PMFP. The socioeconomic team led by Dr. Mbuvi, Ms. Sylvia Mwalewa, Dr. Josephine Musyoki and Ms. Rose Mwangangi provided the detailed socioeconomic status of the Magarini Mangrove Adjacent Community While a team led by Dr. Chemuku Wekesa, Ms. Gladys Ruto, Ms. Veronica provided the much-needed forest assessment report to develop this PFMP
	We acknowledge the active involvement of the County government of Kilifi through the relevant departments. Special Thanks to Linet Zabibu from the department of environment, Depline Mtana from the Directorate of blue economy, and William Iha from the directorate of tourism.

	We acknowledge the Financial and technical support offered by Nature Kenya through the BENGU project funded by German government Federal Ministry For Economic Cooperation and Development. Special regards to Paul Gacheru the Project Manager and Francis Kagama, the coast regional coordinator for coordinating the whole process and activities. Stephen Kioko, Justice Baya, and Eric Kanudu, Nature Kenya Project Officers were instrumental in the entire process.
	We acknowledge Mwangome and Erastus Kithi from Community Based Environmental Conservation (COBEC) for participating and actively contributing to the drafting process
	Kenya Association of Manufacturers liaison officers in the Salt Manufacturing sector led by Ann Mureithi were instrumental in Drafting this PFMP
	We acknowledge Charo Ngumbao, the Chairman of Arabuko Sokoke Adjacent Dwellers Association for his rich knowledge and guidance through the entire steps of the process.
	Ibrahim Barisa, the chairman of Magarini Mangrove CFA on behalf of the CFA do hereby acknowledge the full participation, devotions and contribution of my team toward the development of the PFMP. We appreciate the role played by the forest adjacent communities in availing themselves in Barazas and consultative meetings, and for actively taking part in the socio-economic and ecological surveys which provided useful information used in the preparation of this plan.

We wish to acknowledge the local administration led by the Deputy County commissioner, Assistant County commissioner for Gongoni, Chiefs, and assistant chiefs for their vital role especially in the mobilization of communities during barazas. Special thanks to Joshua, Assistant County Commissioner Gongoni, Sheni, Senior Assistant Chief Ngomeni, Emily Reuben, Assistant Chief Kibaoni, and Angore, Assistant Chief Kanagoni.

IBRAHIM BARISA

CHAIRMAN, MAGARINI MANGROVE CFA (MMCFA)

ACRONYMS and ABBREVIATIONS

AGMs	Annual General Meetings
ASFADA	Arabuko Sokoke Forest Adjacent Dwellers' Association
BMUs	Beach Management Units
CDC	County Development Committee
CDTF	Community Development Trust Fund
CFA	Community Forest Association
CGK	County Government of Kilifi
CIDP	County Integrated Development Plan
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
COBEC	Community Based Environmental Conservation
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
ESIA	Environment and Social Impact Assessment
FAC	Forest Adjacent Communities
FLMC	Forest Local Management Committee
FMA	Forest Management Agreement
GK	Government of Kenya
GPS	Global Positioning System
ICT	Information and Communications Technology
IGAs	Income Generating Activities
IUCN	International Union for Conservation of Nature
KEFRI	Kenya Forest Research Institute
CAMFED	Kenya Marine Fisheries and Socio- Economic Development
KMFRI	Kenya Marine Fisheries Research Institute

KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
LPT	Local Planning Team
M&E	Monitoring and Evaluation
MAWASCO	Malindi Water and Sewerage Company
MEAs	Multilateral Environmental Agreements
MMCFA	Magarini Mangrove Community Forest Associations
MOLPP	Ministry of Lands and Physical Planning
NCCRS	National Climate Change Response Strategy
NEMA	National Environment Management Authority
NGAO	National Government Administration Officers
NGO	Non-Governmental Organization
NK	Nature Kenya
NLC	National Land Commission
NMK	National Museums of Kenya
PFM	Participatory Forest Management
PFMP	Participatory Forest Management Plan
SARICODO	Sabaki River Conservation and Development Organization
SDGs	Sustainable Development Goals
TRA	Tourism Regulatory Authority
UNCCD	United Nation Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
VDFCC	Village Development and Forest Conservation Committee
WRA	Water Resources Authority
WRUA	Water Resource Users Association
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

Magarini Mangrove Forest found in Kilifi County, plays a very important role in the conservation of biodiversity and support of livelihood for the adjacent communities. Mangrove forests in Magarini cover approximately 6000 hectares consisting of nine mangrove species which provide a variety of forest wood products to the adjacent coastal communities such as use for firewood, as poles, for roofing and canoe building among other uses and ecosystem services. The development of this Participatory Forest Management Plan (PFMP) provides an official avenue for community participation in the management and sustainable utilization of forest resources. The PFMP is a pre-requisite for negotiating and signing a Forest Management Agreement (FMA) between KFS and Magarini Mangrove Community Forest Association. (MMCFA).

Magarini PFMP (2025-2030) was prepared through consultative stakeholder deliberation with various stakeholders. Magarini representatives constituted a Local Planning Team (LPT). In addition, several key stakeholders including, KFS, KEFRI, NGAO, COBEC and County Government of Kilifi, were actively involved in the PFMP process. Magarini PFMP process was facilitated by KFS with funding from Nature Kenya

Despite the benefits that the Magarini mangrove forest offers for biodiversity and community livelihood, there are still challenges in managing these ecosystems due to inadequate resources and capacity. The PFMP is designed to address some of these challenges. The objective of the Magarini PFMP is captured in Magarini vision

Swahili Version

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Giriama Translation

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The aim of the PFMP is to provide a framework to support participation in the management of Magarini mangrove forest for the benefit of nature and to enhance the socio-economic well-being of the adjacent communities.

The plan highlights the legislation and policies under which mangrove forest management in Kenya is embedded in chapter four.

Chapter five describes the management programmes. It consists of nine (9) management programmes that describe the strategies, activities, and timelines to be taken within the timeframe of this PFMP. (1) Mangrove Forest and biodiversity Conservation management Programme that addresses conservation, rehabilitation of degraded sites. (2) Community Participation and Development Programme promotes awareness of forest adjacent communities on the forest resources and implementing conservation and management activities that involve communities. (3) Water Resources Management Programme addresses the issues affecting the community on water. (4) Wildlife and Eco-tourism Management Programme addresses on how to develop potential ecotourism sites and management of the existing ones. (5) Fisheries and Marine Management Programme addresses restoration of fish, and encourage the community to invest in sustainable fish farming. (6) Protection and Security, (7) Human Resource Management (8)Infrastructure and Equipment, , Programme maps out the needed work force for implementation of the planned activities and infrastructure equipment to support conservation and management of Magarini Forest and (9) Research and Education Programme addresses ways to bridge the gap between data and research needs.

Implementation of Magarini PFMP in chapter six will take into consideration financial management of the plan, resource mobilization, address how revenue will be generated, address cross-cutting issues such as gender, climate change etc. as well as take into consideration monitoring and evaluation and environmental impact assessment activities. A Forest Level Management Committee (FLMC) consisting of representatives from the KFS, CFA, County Government of Kilifi and other lead stakeholders in the area will support the implementation of this PFMP.

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CHAPTER ONE:

INTRODUCTION

1.1 Background

Forests are vast land areas covered with trees, shrubs, and other woody plants. They are one of the most important types of ecosystems on Earth on the terrestrial biomes, providing a wide range of benefits to both the environment and humans. Forests are critical for maintaining the health of the planet and its inhabitants. They provide essential services such as carbon sequestration, biodiversity conservation, water regulation, soil conservation, economic benefits, and cultural values. It is important to protect and conserve forests to ensure their continued benefits for future generations. There are terrestrial and mangrove forests in Kenya, each with distinct characteristics and geographical distribution.

1.2 Justification of the Plan

The conservation and management of forests in Kenya is a responsibility of every citizen. The constitution of Kenya, Chapter 5, Part 2 Article 69, provides for public participation in the management, protection and conservation of the environment. The Forest Conservation and Management Act No 34 of 2016 section 8(b) articulates that Kenya Forest Service (KFS) shall ensure preparation of management plans for all public forests, Section 48 (I) recognizes the important role of forest adjacent communities (FAC) in conservation and management of forest resources through their community forest associations (CFAs).

Following the registration of the Magarini Mangrove Community Forest Association, it is a requirement to have a Participatory Forest Management Plan (PFMP) put in place in compliance with the Forest Conservation and Management Act, 2016 and for ease of management of Magarini Mangrove forest. The PFMP will provide a platform for implementation of income generating activities such as ecotourism, fishing, fuelwood collection, mangrove tree nurseries, bee keeping, sports and culture, salt making and herbal medicine. Further, the PFMP will govern a sustainable use of forest resources as required by the Forest Conservation and Management Act, 2016.

There are a number of challenges that have been identified by the community in mangrove forests such as Land issues, illegal fishing issues, biodiversity loss, livelihoods, Illegal cutting of

mangrove, salt manufacture related challenges, restoration issues, human wildlife conflicts, pollution and siltation, security issues, fuelwood issues, invasive species and access issues. The PFMP will offer a platform to address such challenges resulting from mangrove forest resources utilization. In addition, the PFMP will assist in bringing all the stakeholders working in mangrove forests together in efforts to ensure a collaborative approach in conservation of the mangrove forests and improvement of livelihoods.

1.3: Approach to Plan Development

Magarini Mangrove PFMP development process was an intensive consultative process comprising of a series of meetings, barazas and workshops. The plan was funded fully by the Bengo Project through Nature Kenya via the office of the County Forest Conservator, Kilifi County. The management plan process kicked off with sensitization barazas that were held from 22nd to 24th August 2023



Plates 1: Community awareness meeting at Marereni Chief's office

This was followed by a scoping workshop that was held on 13th -15 December 2023 at Arabuko Jamii Villas. It was attended by various stakeholders who comprised of representatives from Magarini Mangrove CFA, KEFRI, Nature Kenya, KFS, KWS, Fisheries Department, COBEC, ASFADA, and Salt firms represented by the sector office , National Government Administration Officers (NGAO), County Government of Kilifi, and individual members of the community. The

area covered by this management plan was identified as the area under the Magarini mangroves as well as the forest adjacent community living within a 5km radius of the forest. The development of this management plan was funded by Nature Kenya and facilitated by KFS.



Plates 2: Magarini Mangrove CFA during scoping workshop at Arabuko Jamii Villas

Later KFS in partnership with Nature Kenya held a zero draft workshop with the Local Planning Team (LPT), on 12th to 16th February 2024 at Premier Hotel in Malindi . They carried out an in-depth analysis of issues affecting conservation and management of Magarini mangrove CFA. The forum noted that there was need to develop a zero draft to ensure that challenges affecting the mangrove forests and the adjacent community are addressed effectively and the community benefits are derived as provided by the law



Plates 3: Zero draft development at Premier Cottages-Malindi

On 10th of July 2024, Ms. Joan trained the LPT on resource identification. She noted Magarini Mangrove CFA had both existing and potential resources that required to be identified. Participants were divided into two groups where through focused group discussion they identified available resources. Some of the resources identified include, the rich mangrove forest, channels, sand dunes etc



Plates 4: LPT Having focused group discussions on resource identification

Later they presented their work and prepared an field action plan for field survey



Plates 5: Presentation of the resources identified

Resource survey was conducted from 11th to 12th July 2024. The area of focus was from Kurawa to Sabaki River Estuary. Some of the resources that were identified and mapped are shown in the plate 6 below



Plates 6: Resources mapped

From 29th to 31st July, 2024, the LPT had an opportunity to go through the plan filling in the gaps that had been identified. The draft 1 preparation and presentation was held at Arabuko Jamii Villas



Plates 7: LPT members during draft 1 preparation and presentation workshop at Arabuko Jamii Villas

This was followed by a validation workshop that was held at Catholic institute Malindi on the 1st of August 2024.



Plates 8: Group photo of participants during validation workshop

1.3 Title and duration of the plan

This plan shall be referred to as “Magarini Mangrove Participatory Forest Management Plan (2025-2030).” The PFMP will cover a period of 5 years starting from 2025 to 2030, starting on the date of approval by KFS. The implementation of the plan will be guided by a Forest Management Agreement (FMA) negotiated and signed between KFS and Magarini Mangrove Community Forest Association.

1.4 Funding of the plan

Nature Kenya together with WWF-K was funded by GIZ Germany for a project titled “Sustainable use of Mangroves in Western Indian Ocean”. The GIZ Germany project's funding is instrumental in setting the foundation for the sustainable management of the Magarini. One of the outputs of the project is the development of Magarini Mangrove Participatory Forest Management Plan (PFMP). The financial resources allocated by GIZ Germany covered all aspects of the plan’s development including comprehensive activities, consultation and deliberations. The funding facilitated extensive engagement with the community adjacent to the

mangrove forest, government agencies, and other key stakeholders' involvement throughout the PFMP development phases.

1.5 Amendment/revision of the plan

This plan is intended to be dynamic and flexible. Strategies will be changed in response to emerging issues and new information to ensure practicality and sustainability. Revision and amendments to the plan will be carried out in conformity with the plan vision, objectives and stipulated time frame.

The PFMP will be reviewed at the end of the 5-year plan period but the activities in the Programmes will be revised as they are implemented. Lessons learnt will be the basis of the plan's review led by KFS and CFA in conjunction with other relevant stakeholders. The review process would also take cognizance of emerging issues and new stakeholders related to ecosystem management in Kilifi County. Any amendments and revision should also take cognizance of new developments, reviews and adjustments in national, regional and international laws, treaties and conventions.

CHAPTER TWO: DESCRIPTION OF THE FOREST

2.1 Geographical location

Magarini Mangrove Forest lies north of Malindi town in Magarini sub-county in Kilifi County in Sabaki, Magarini, Gongoni and Adu Wards. The forest stretches from (3°09'51"; 40°08'23") to the South and (2°43'22"; 40°10'51") to the North. The forest station under which Magarini Mangrove Forest lies is in Jilore station, which is 41.7km Southwest from Sabaki River estuary. The forest comprises of two segments, a segment found at the river Sabaki estuary and the larger segment stretching from Ngomeni to Kadzuhoni, Jambiani, Kinyaule, Mto wa Mawe, Muyu wa Kae, Kadzuyuni extending to Kurawa -Kanagoni. This represents a linear coverage of 50.60% of the 135.34 km of the coastline and stretches about 57 Km along the coastline from Sabaki River Estuary to Kanagoni-Kurawa.

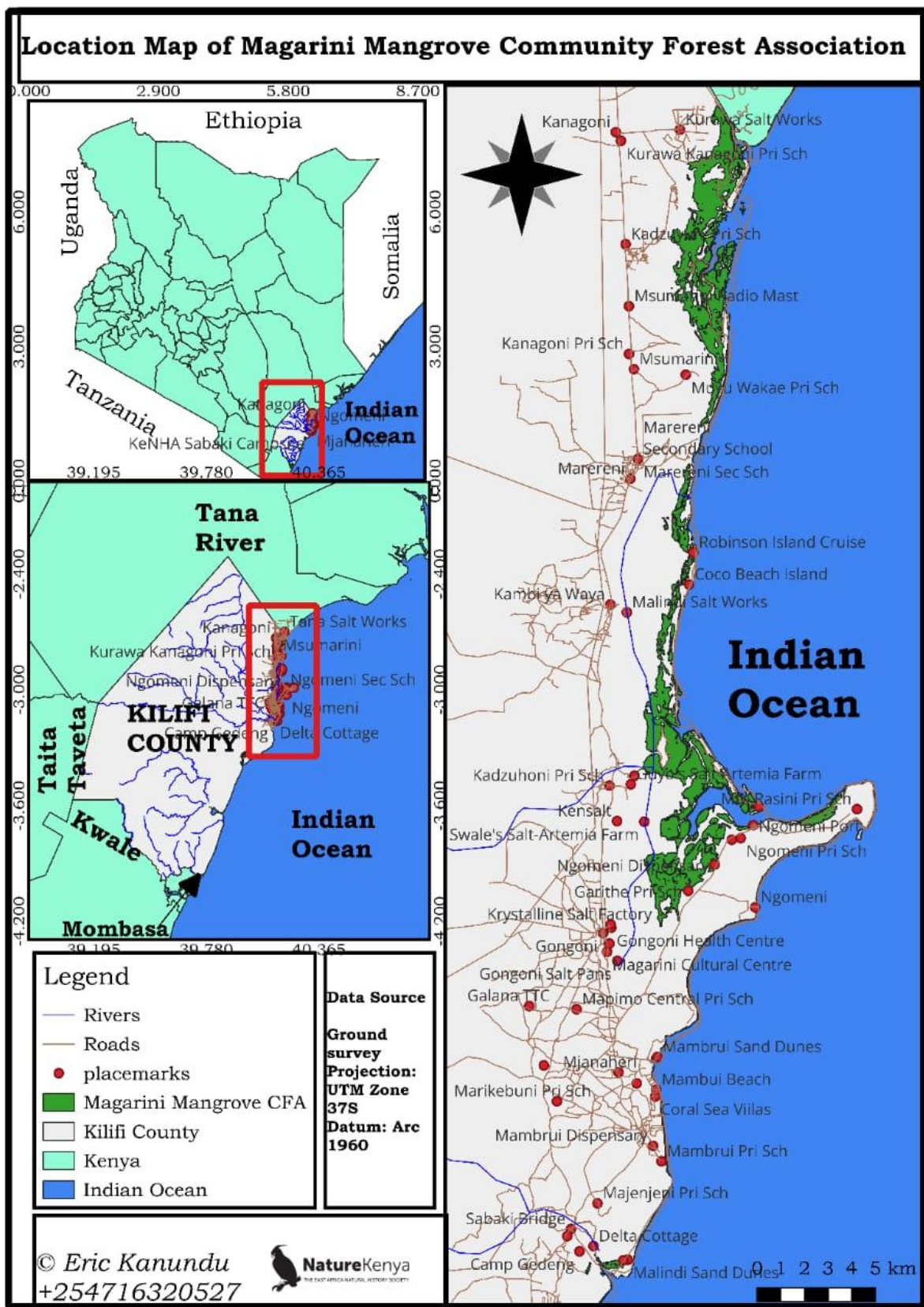


Figure 1:Location Map of Magarini Mangrove

2.2 Legal and administrative status

Mangroves were declared a government forest reserve by the proclamation No.44 of 30th April 1932 and later by legal Notice no.174 of 20th May 1964. Under this “gazette Notification for Mangrove Forest in Kenya” all land between high water and low water marks (ordinary spring tides) are described as mangrove areas.

The responsibility to manage Mangrove Forest is bestowed upon the Kenya Forest Service. Jilore Forest Station Manager manages Magarini Mangrove Forest under the Kilifi County Forest Conservator’s Office within the Coast Region Forest Conservancy.

The forest currently is one block known as Ngomeni administrative with 3 beats namely; Ngomeni, Marereni and Gongoni.

The exact hectare of these beats is not known since no real survey has been carried out to determine their sizes

Magarini CFA proposes additional beats at Sabaki, Kinyaole, Muyu wa Kae, Kadzuyuni and Kurawa for ease of management of the block.

Table 1: Administrative Units of Magarini Mangrove Forest

S/NO	FOREST BLOCK	Beat Boundary	BEAT	Remarks
1	NGOMENI	Sabaki River estuary	Sabaki	Proposed
2		Rasi – Kimaru	Ngomeni	Existing
3		Jambiani-Robinson Island Cruise	Kinyaole	Proposed
4		Robinson island Cruise – Muyu wakae A	Marereni	Existing
5		Kimaru-Jambiani	Gongoni	Existing
6		Muyu wa Kae A – Kithungu	Muyu wa Kae	Proposed
7		Kithungu – Bwana Said	Kadzuyuni	Proposed
8		Bwana Said-Bompwani	Kurawa/Kanagoni	Proposed

2.3 Biophysical description of the forest

2.3.1 Topography and altitude

Kilifi County has 4 major topographical features: the Coastal Plain, the Foot plateau, the Coastal Range, and the Nyika plateau. The Magarini Mangrove Forest is within the Coastal Plain. Magarini Mangrove Forest lies West of Indian ocean at an altitude of 0-5 meters above sea level. This area is characterized by a diverse topography that includes a mix of landforms, vegetation, and water bodies. Here is a detailed description of the topography of the Magarini Mangrove Ecosystem.

2.3.2 Climate

Magarini Sub-County experiences a tropical climate, typical of coastal regions in Kenya. The area enjoys relatively consistent temperatures throughout the year, with average highs ranging from 28 to 32 degrees Celsius (82 to 90 degrees Fahrenheit) and lows between 22 and 25 degrees Celsius. The region's climate is characterized by two distinct rainy seasons: the long rains from March to May and the short rains from October to December. These rains are vital for agriculture, supporting the cultivation of crops such as maize, coconuts, and cashew nuts. However, like many coastal areas, Magarini is also prone to occasional droughts, which can have significant impacts on local communities and agriculture. Overall, the climate of Magarini Sub-County is conducive to agricultural activities while also presenting challenges that residents navigate through resilient adaptation strategies.

2.3.3. Geology and Soils

Magarini Sub-County is situated within the larger Kilifi County, known for its diverse geology and soils. The region's geology is primarily composed of sedimentary rocks, including limestone and sandstone formations, which have been shaped by millions of years of geological processes. These formations contribute to the unique landscape of the area, featuring both coastal plains and low hills. The geology of Magarini Sub-County plays a significant role in shaping land use and agricultural practices in the region.

In terms of soils, Magarini Sub-County exhibits a variety of soil types, influenced by factors such as topography, parent material, and climate. Along the coastal areas, sandy soils are prevalent, which are well-drained but generally low in fertility. Inland, alluvial soils can be found along river valleys, offering better fertility and moisture retention, suitable for agriculture.

Generally, mangrove soil is saline and thus not ideal for agriculture. The major soil type found in mangrove areas in Kenya is Kaolinitic and montmorillonitic. The soil was developed from marine alluvial deposits dating from Jurassic to Pleistocene age. North of Kilifi where Magarini lies is mostly montmorillonitic (Braun, H. M. (1980). Kenya Soil Survey. Republic of Kenya 23p). The specific soil types in Magarini Sub County, include:

- a) **Ferralsols:** These are deep, well-drained soils that are rich in iron and aluminum oxides. They are typically found in areas with a tropical climate and are suitable for agriculture.
- b) **Acrisols:** Acrisols are clay-rich soils that are common in tropical regions. They are moderately fertile and have good water retention properties, making them suitable for agriculture.
- c) **Vertisols:** Vertisols are clay-rich soils that have a high content of swelling clay minerals. They exhibit significant volume changes with wetting and drying cycles and are found in areas with distinct wet and dry seasons.
- d) **Nitisols:** Nitisols are deep, well-drained soils that are rich in nutrients and organic matter. They are commonly found in areas with a tropical climate and are suitable for agriculture.
- e) **Arenosols:** Arenosols are sandy soils that have low fertility and poor water retention properties. They are often found in coastal areas and may require additional inputs for agriculture.

These soil types play a crucial role in determining the agricultural potential and land use practices in Magarini Sub County, Kilifi County, Kenya.

2.3.4 Hydrology

Rivers draining into the Magarini mangrove forest exhibit a high degree of seasonal variability. Key Water Bodies in the area are categorized as follows:

- a) **Mangrove Creeks:** The Magarini Mangrove Ecosystem is criss-crossed by numerous mangrove creeks, which are small, brackish water channels that flow through the mangrove forests. These creeks play a vital role in the movement of nutrients, sediments, and organisms within the ecosystem.
- b) **Lagoons:** Lagoons are shallow, enclosed bodies of water that are connected to the sea. In the Magarini Mangrove Ecosystem, lagoons serve as important breeding and feeding grounds for various marine species, including fish, crabs, and birds.
- c) **Rivers:** Several rivers flow through the Magarini Mangrove Ecosystem. Sabaki River is the only permanent river draining into the Indian ocean with several other seasonal

streams at Gongoni (Kwa Katoli), Kadzuhoni (mkondo wa simiti), Kibaoni, Kambi ya Waya (River Angore), Marereni (River Baleesa), Msumarini, Kadzuyuni, Kanagoni. These rivers contribute freshwater to the coastal ecosystem and support a variety of aquatic life, including fish, crustaceans, and mollusks.

Table 2: Status of Hydrology in Magarini

Area	Main rivers	Seasonal rivers	Swamps	Wells	Boreholes	Sub-location
	River Sabaki		Kwa hanga Kibokoni	Mjana-heri Timboni		Magarini Location Mambrui sublocation
		kanagoni				Marereni Location Kurawa sublocation
		Msumarini				Marereni Location Msumarini sublocation
		Baleesa				Marereni Location Marereni sublocation
		Angore (Kambi ya waya)				Marereni Location Marereni Sublocation
		Kadzuhoni				Gongoni/Fundi-Issa Gongoni Sublocation
Ngomeni		Kwa Katoli				Gongoni Location Gongoni sub-location
				Kasima Kacharifu	Kwa Kanairi Kwa Kutsamirwa Kwa Sub-Chief	Gongoni Loc Ngomeni Sub loc
		Kibaoni				Fundi-Issa Location Kibaoni Sub-loc
		Kadzuyuni				Marereni Loc Msumarini Sub-loc

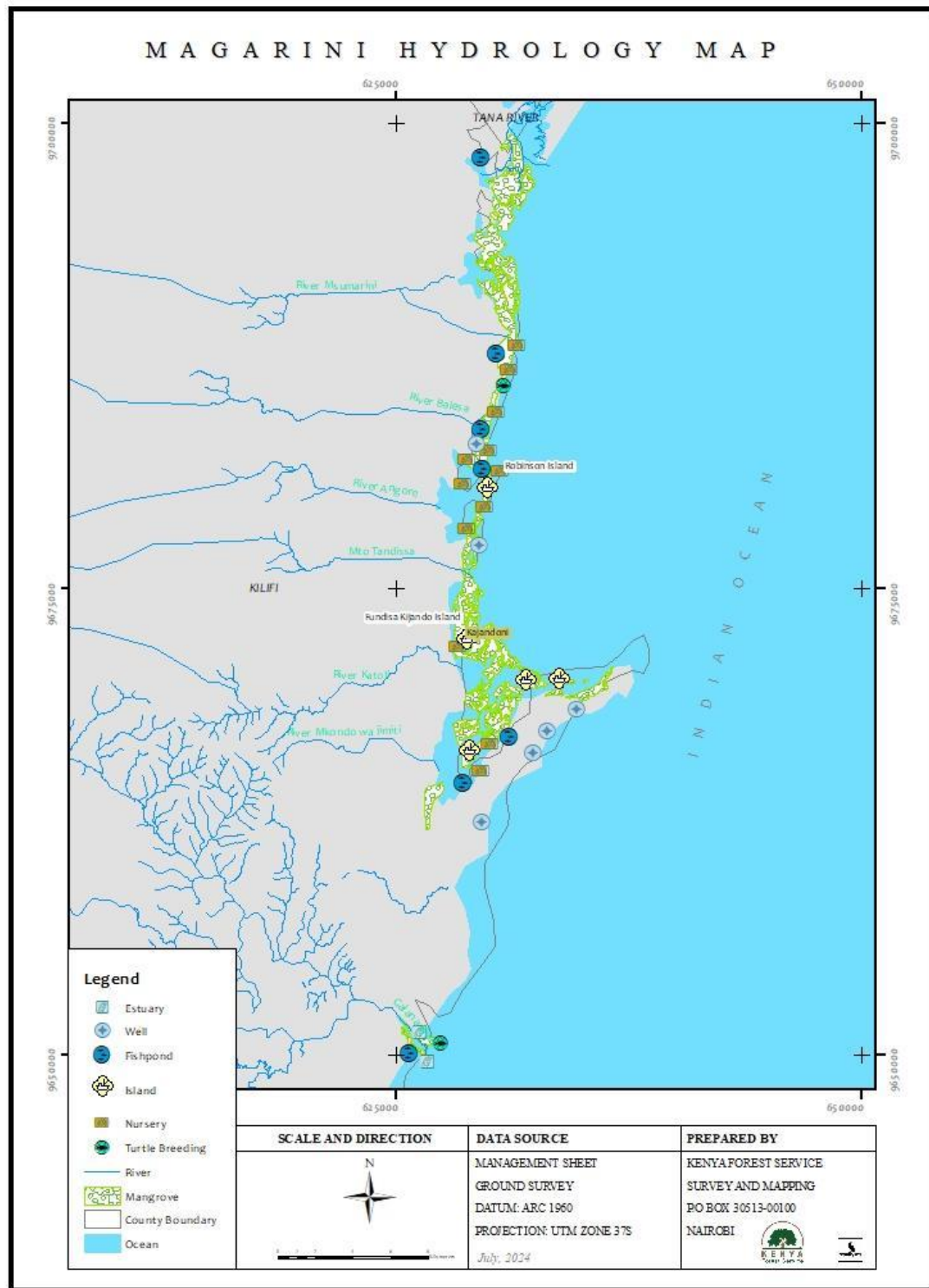


Figure 2: Magarini Hydrology Map

2.4 Biodiversity Description

2.4.1 Flora

Mangrove Forests: The Magarini Mangrove Ecosystem is predominantly composed of mangrove forests. These forests are characterized by salt-tolerant trees and shrubs, such as *Rhizophora mucronata* (Mkoko), *Bruguiera gymnorhiza* (Muia), *Lumnitzera racemosa* (Kikandaa), *Ceriops tagal* (Mkandaa), *Heritiera littoralis* (Msikundazi), *Avicennia marina* (Mchu), *Xylocarpus granatum* (Mkomafi), *Sonneratia alba* (Mlilana), *Xylocarpus moluccensis* (Mkomafi dume). These mangroves play a crucial role in stabilizing the coastal ecosystem, preventing soil erosion, and providing habitats for various flora and fauna.

Salt Marshes: In addition to mangrove forests, the Magarini Mangrove Ecosystem also features salt marshes. These low-lying, saline wetlands are typically found in coastal areas. Salt marshes are characterized by halophytic vegetation, such as *Spartina* grasses, which can tolerate high levels of salinity.

Beaches and Dunes: The coastal region of the Magarini Mangrove Ecosystem includes sandy beaches and dunes. The forces of wind, waves, and tides shape these landforms, and they provide essential nesting sites for sea turtles and other coastal species.

2.4.2 Fauna

Sykes monkey (Kima), Vervet monkey (Tsalu), Olive baboon, Hare (Tsongula),

2.5 Other Resources

2.5.1 Non-wood forest products

Important non-wood forest products are also found within Magarini mangrove Forest. They include honey, herbal medicine and fodder, all of which play a significant role in supporting local livelihood.

2.5.2 Fisheries Resources

Magarini Mangrove Forest is an important fishery resource such as Crabs, Prawns, Oyster and other small fish. Some of the fish species in the mangrove area are

- a) **Mangrove rivulus (*Kryptolebias marmoratus*):** This small fish is capable of surviving in both fresh and saltwater environments, making it well-suited to life in the brackish waters of mangrove forests. It can tolerate a wide range of environmental conditions and is an important part of the food chain in mangrove ecosystems.

- b) **Mudskippers (*Periophthalmus spp.*):** Mudskippers are a type of fish that have adapted to living in the intertidal zone, where they spend time both in water and on land. They have specialized pectoral fins that they use to “walk” on land and breathe air through their skin and mouth lining when exposed to air. Mudskippers are important predators in mangrove ecosystems, feeding on small crustaceans, insects, and worms.
- c) **Barramundi (*Lates calcarifer*):** This popular sport fish is known for its fighting ability and delicious taste. Barramundi are able to tolerate a wide range of salinity levels, making them common in mangrove forests. They are opportunistic predators that feed on smaller fish, crustaceans, and mollusks.
- d) **Threadfin bass (*Epinephelus bleekeri*):** Threadfin bass are a type of grouper that are commonly found in mangrove forests. They are ambush predators that feed on smaller fish and crustaceans. Threadfin bass are important both commercially and recreationally, as they are prized for their firm, white flesh.
- e) **Milkfish (*Chanos chanos*)-Mkizi :** Milkfish are a type of tropical fish that are widely cultured for food. They are able to tolerate a wide range of environmental conditions and are often found in mangrove forests. Milkfish are omnivorous, feeding on both plants and small animals.



Plates 9: Milk fish

- f) **Spotted scat (*Scatophagus argus*):** Spotted scat is a type of tropical fish that are commonly found in mangrove forests. They are omnivorous, feeding on both plants and small animals. Spotted scat are an important part of the food chain in mangrove ecosystems, serving as both predators
- g) Other Common fish found in mangrove ecosystem.

Table 3: Other common fish found the mangrove ecosystem

Local Name	English Name	Scientific Name
Chaa	Pouter	<i>Cephalopholis argus</i> .
Tuku	Sky emperor	<i>Acanthurus berda</i>
Tazanda	Red Snapper	<i>Lutjanus sanguineus</i>
Tewa	Rock cod	<i>Epinephelus macrospilus</i>
Kamba	Prawns	<i>Peneaus spp.</i>
Kaa	crabs	<i>Scylla serrata</i> .
Mkizi	Mullet/cattle fish	<i>Mugil cephalus</i>
Kerenge	Toothed shad	<i>Pellona ditchella</i>
Kamba mawe	Ornate spiny lobster	<i>Panulirus spp.</i>
Mwatiko	Milkfish	<i>Chanos Chanos</i>

2.5.3 Eco-tourism

Magarini mangrove forest has a huge potential for ecotourism activities ranging from boardwalks, bird watching, Canoe ride, seafood's, and cultural activities.

Table 4: Tourists attraction sites in Magarini mangrove forest

Attraction site	Form of attraction	Existing or potential utilization
Sabaki Estuary	Bird watching, BoardWalk, Sand dunes hiking, river mouth, scenic view, wildlife	Existing
Garithe	Eco camp, Sea food, wildlife, boardwalk	Potential
Rasi	breathing stone	Potential
Ngomeni (Fungu la Baniani)	Sea food, wildlife and boat ride	Potential
Muyu wa Kae	Cultural site	Potential
Kinyaole	Boat ride, Swimming, Turtle, boardwalk, wildlife	Potential
Mto wa Mawe	Turtle breeding site, corals, beach, wildlife,	Potential
Moi	Zip line, boardwalk, Hippo viewing, Estuary Viewing, Eco Camp, Restaurant,	Potential

2.6 Infrastructure and Equipment

Magarini Mangrove Forest Association currently does not have an office, but has land where the office can be constructed. KFS does not have their land but there is a lot of government land where offices can be constructed. The same applies to equipment and tools of trade that are lacking in both KFS and CFA.

2.6.1 Infrastructure for forest station and CFA

The Magarini Mangrove Forest is vast, stretching from Sabaki to Kurawa Kanagoni. This stretch is served by the Malindi – Lamu road but does not have proper designated access roads to the mangrove forest. For effective and efficient management of the forest, there is an obvious need for supportive infrastructure both for the CFA and the KFS. Table 2.5 contains the envisaged kind and number of infrastructures for the two bodies.

Table 5: Infrastructure for Magarini Mangrove KFS and CFA

Type of infrastructure/Equipment	Site	Existing or Potential utilization	Remarks/Action Required
CFA Office	Marereni	Potential	Construction
KFS Station	Kibaoni	potential	Construction
KFS outpost	Ngomeni	Potential	Construction
	Marereni	Potential	Construction
	Kurawa/Kanagoni	Potential	Construction
Access Roads Check the gazetted roads. If need be to be increased		Potential	Talk to Salt Manufacturer for Access
	Mangrove boundary road on the outer edge	Potential	Construction

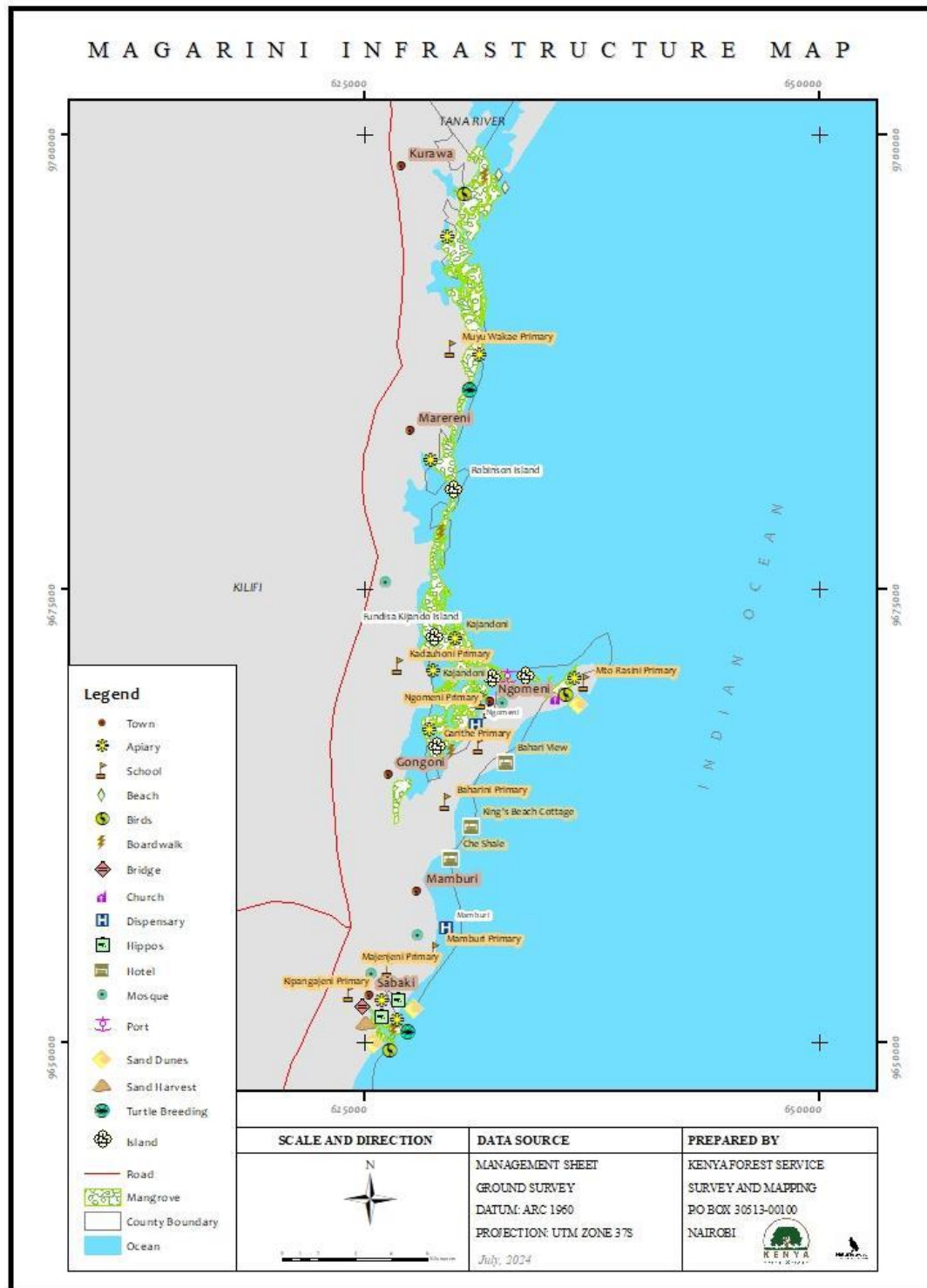


Figure 3: Infrastructure Map

2.6.2 Equipment and tools

To accompany the infrastructure, there are required equipment and tools for diverse functions in the office and field. These will enable both the KFS forest station, the CFA and other stakeholders to effectively carry out forest management functions as stipulated in this plan.

Tables 2.6 and 2.7 contain lists of proposed sets of equipment and tools for the forest station and CFA respectively.

Table 6: Equipment for Proposed Magarini Mangrove Forest station (KFS) and CFA

Description	No. In stock	Remarks on status	Requirements (No)
KFS			
Patrol motor boats	0	Purchase	1
Motor bikes	0	Purchase	3
Desktop computer	0	Purchase	2
Laptop	0	Purchase	2
Printer	0	Purchase	1
Wifi connectivity	0	Purchase	1
Projector	0	Purchase	1
Public address system	0	Purchase	1
Motor vehicle	0	purchase	1
CFA			
Patrol motor boats	0	Purchase	1
Motor bikes	0	Purchase	8
Desktop computer	0	Purchase	2
Laptop	0	Purchase	2
Printer	0	Purchase	1
Wifi connectivity	0	Purchase	1
Projector	0	Purchase	1
Motor vehicle	0	purchase	1

2.7 Human resource

The human resource requirement for the envisaged Magarini Mangrove Forest Station is represented in table 7 below

Table 7: Human Resource for Proposed Magarini Mangrove Station

Title	Current strength	Optimum strength	Variance
Forest station manager	nil	1	1
Assistant Forest station manager	nil	2	2
Forest rangers	nil	20	20
Driver	nil	2	2
Record management assistant /C. O	nil	1	1
Tree Nursery Attendants	nil	10	10
Nursery manager	nil	1	1
Office assistant	nil	1	1
Supplies assistant	nil	1	1
Accounts assistant	nil	1	1
Total		33	33

2.8 Salt Manufacturing in Magarini

Salt harvesting in the Magarini area of Kilifi County, Kenya, has a long history that dates back to traditional practices where local communities utilized natural salt deposits for their dietary and economic needs. Historically, coastal communities relied on salt not only for food preservation but also as a trade commodity. The proximity to the Indian Ocean provided easy access to seawater, which was evaporated using traditional methods to produce salt.

The commercialization of salt harvesting began in earnest in the late 20th century, particularly during the 1980s and 1990s. This period saw the establishment of several commercial salt production companies that capitalized on the region's favorable climatic conditions for solar evaporation. The introduction of industrial-scale operations marked a significant shift from

small-scale, community-based harvesting to large-scale production aimed at both local consumption and export.

Status of salt manufacturing in Magarini

There are six (6) salt manufacturing companies with a combined acreage of 5469 hectares. The firm are spread out from Mjanaheri in Magarini Location to the southwest, to Ngomeni in the southeast to Kurawa in Merereni location to the north at the boundary of Kilifi and Tana River Counties covering a linear distance of 41km, Most of the Magarini Mangroves occur in a strip of land sandwiched between salt farms and the ocean, with a huge part of the mangrove forest occurring in “private” land belonging to the salt firms.

Challenges of salt manufacturing to the environment

Despite efforts to regulate the industry through environmental audits and recommendations from governmental bodies like NEMA (National Environment Management Authority), challenges persist.

Key challenges include

- a) Salt mining operations have been linked to significant alterations in local water resources. The construction of dykes and salt pans can block or divert rivers, leading to reduced freshwater availability for both human consumption and agricultural use. This diversion exacerbates salinization of freshwater sources, making them unsuitable for drinking and irrigation purposes.
- b) Salt mining operations often generate waste products that can lead to pollution if not managed properly. Poor waste disposal practices can result in contamination of nearby water bodies with brine solutions head to habitat destruction killing mangroves and marine organisms including fishes
- c) Salt harvesting contributes to biodiversity loss. The alteration of natural habitats affects various species’ survival rates, particularly those dependent on mangrove ecosystems or freshwater environments.
- d) Salt firms have blockaded the access to the mangrove areas limiting monitoring and other conservation activities for the mangrove forest

2.9 History of the Magarini Mangrove ecosystem

Ecosystem is a system of environment where both living and non-living interact and function as a unit. The geological history of the Magarini mangrove ecosystem can be traced back to the late Miocene epoch, around 5-7 million years ago. During this period, the East African Rift System evolved, resulting in the formation of the Kenya Coastal Basin. This basin's sedimentary deposits created a suitable environment for mangrove colonization along the coastal strip.

The Holocene period, which began approximately 11,700 years ago, saw significant sea-level changes that influenced mangrove distribution in the Magarini region. As sea levels rose due to melting glaciers, mangroves expanded their range inland, establishing the current intertidal zone where they now thrive. The Magarini Mangrove has undergone Major changes. The mangroves have been threatened by conversion pressure from salt works, aquaculture, and human settlement. This has impacted the ecosystem, where fish have reduced; bird's species have reduced etc.

Human settlement history

Human settlement in the Magarini area dates back to at least the 1st century AD, with archaeological evidence suggesting the presence of Bantu-speaking communities. These early settlers likely utilized mangrove resources for various purposes, including construction materials, fuelwood, and medicine.

The original tribes of Sabaki, Mambrui and Ngomeni areas were the Waata. Waata were hunters and gatherers, beekeepers and potters. This tribe used to move from one place to another in search of wild animals to hunt. In the process of moving to new places, other tribes moved into the area and settled in the 1930s. These new tribes are Mijikendas (Giriama -40%, Chonyi- 10%, Kauma -15%, Kambe-10%, Jibana- 10%, Duruma-5) and other tribes (Kikuyus, Kambas, Luhyas)-5%. They settled in the area to cultivate cowpeas, simsim, cassava, maize and many other crops.

The original inhabitants of the Gongoni who started settling around the 1940s were the Mijikenda who mainly included the following sub-tribes- (Giriama, Kauma, Wakambe, and Jibana) and they were estimated to form about 75% of all the tribes settling in the area currently. The Chonyi people began settling in the area around the 1960s during the construction of the Mombasa – Malindi highways. The construction also created a lot of migration of the Eastern people to Gongoni and Ngomeni areas. The Kamba people started settling in the area between 1970s and 1985 but in few numbers (1%) while in 2000, the Kikuyus and Meru people started to

do business in Malindi and some (5%) bought land and settled in the area. Between 2015 and 2016, Other immigrants in the area include Maasai, majority of whom came to work as security guards and a few are settled from Tanzania and other tribes including Luhya's, Luo's and some other tribes from Tanzania. As at today, Gongoni consists of diverse communities with the Kamba people being the largest population followed by the Giriama communities. The population settlement density along the road is very high unlike in the interior part.

Over time, human activities intensified in the region due to population growth and technological advancements. The 19th and 20th centuries saw increased exploitation of mangrove forests for charcoal production, agriculture, and infrastructure development. These activities led to significant degradation and loss of mangrove habitats in the Magarini ecosystem.

In recent decades, however, there has been growing awareness of the importance of conserving mangrove ecosystems for their ecological, economic, and cultural values. Various local and national initiatives have been implemented to promote sustainable management practices and restore degraded mangrove areas in the Magarini region. These efforts reflect a broader global trend towards recognizing the vital role that mangroves play in maintaining healthy coastal ecosystems and supporting human well-being.

2.10 History of CFA

After witnessing rampant destruction of the mangrove forest, a process of development of a CFA was initiated in 2012 through a community initiative. Local communities organized themselves into various user groups namely fishermen, fishmongers, Firewood, and tree nursery establishers.

Community groups from Muyu wa Kaye, Kadzuyuni, Upendo support group, Kinyaule and Omega Comedian from Marereni came together to form a community-based organization called MUKUKO, this being an initiative for COBEC through a Grant from Community Development Trust Fund (CDTF). This later resulted into the formation of four Village Development and Forest Conservation Committee (VDFCC) who later merged to form the CFA in 2015. The four Village Development and Forest Conservation Committees (VDFCC), which were majorly from Ngomeni, Kibaoni, Marereni, and Kurawa Kanagoni. Each VDFCC had 15 Members making 60 initial members of CFA.

COBEC and KFS provided support in the registration of the CFA in 2015, however after registration, they lacked guidance on the next stages in the development of the forest management plan (PFMP) and Forest management agreements (FMA).

Due to the lack of information on CFA management, it was deregistered by the Registrar of Society for failure to submit annual returns, not submitting the annual audited members register, and not reporting the election of the executive as per the constitution.

Through the support of Nature Kenya, The CFA has managed to follow up with the Registrar of Society and filed returns on May 20th 2024, and currently, the CFA is legally operational with its validity confirmed.

Through the assistance of Nature Kenya, The CFA was re-registered in 2023 October and currently the CFA has a membership of 947 registered members with a functional executive and Management committee.

Table 8: Magarini Mangrove Forest user groups

Name of user group	Activity/interest	Membership		Name of contact person	Contact
		Male	Female		
Ecotourism	Boardwalk, Eco Camp, Zip line, Restaurant, Bird Watching, Estuary viewing, Wildlife viewing, Breathing rock.	116	31	Benson F. Kadenge	0791979141
Tree nursery	Establishment of mangrove nurseries, mangrove restoration	70	291	Birya K. Guva	0790476626
Bee keeping	Honey production, wax production	68	51	Michael C. Kaingu	0712366274
Fuel wood	Fuel wood collection	9	119	Patience H. Chitole	702826616
Herbal	Herbal medicine, Mudding), <i>Xylocarpus moluccensis</i> (Mkomafi dume). Tie and dye	1	14	Patricia N. Kahindi	0757477231
Sports and culture	Tag of war, Zip line, canoe racing, shrines	4	1	Jimmy M. Mweta	0745388039
Fishing	Mariculture, fish farming, Fishing, artemia farming	124	37	Juma D. Shehe	0715255134
Salt making	Salt making, CSR activities	4 SALT COMPANIES		Anne Muriithi	0720356806

2.11 Organization Structure of the CFA

Magarini Mangrove CFA is born of seven resource user rights each with dozens of user groups spread over ten geographical zones. Each of these zones consists of a number of villages. In each of these zones, resource users have elected their grassroot representatives. These grassroot user groups representatives from the 10 zones have elected one representative to the CFA management committee. From the same 10 zone user group representative, the CFA executive committee is elected to be part of the CFA management committee. The management committee is the highest decision-making organ of the CFA while the executive committee oversees the daily operations of the CFA.

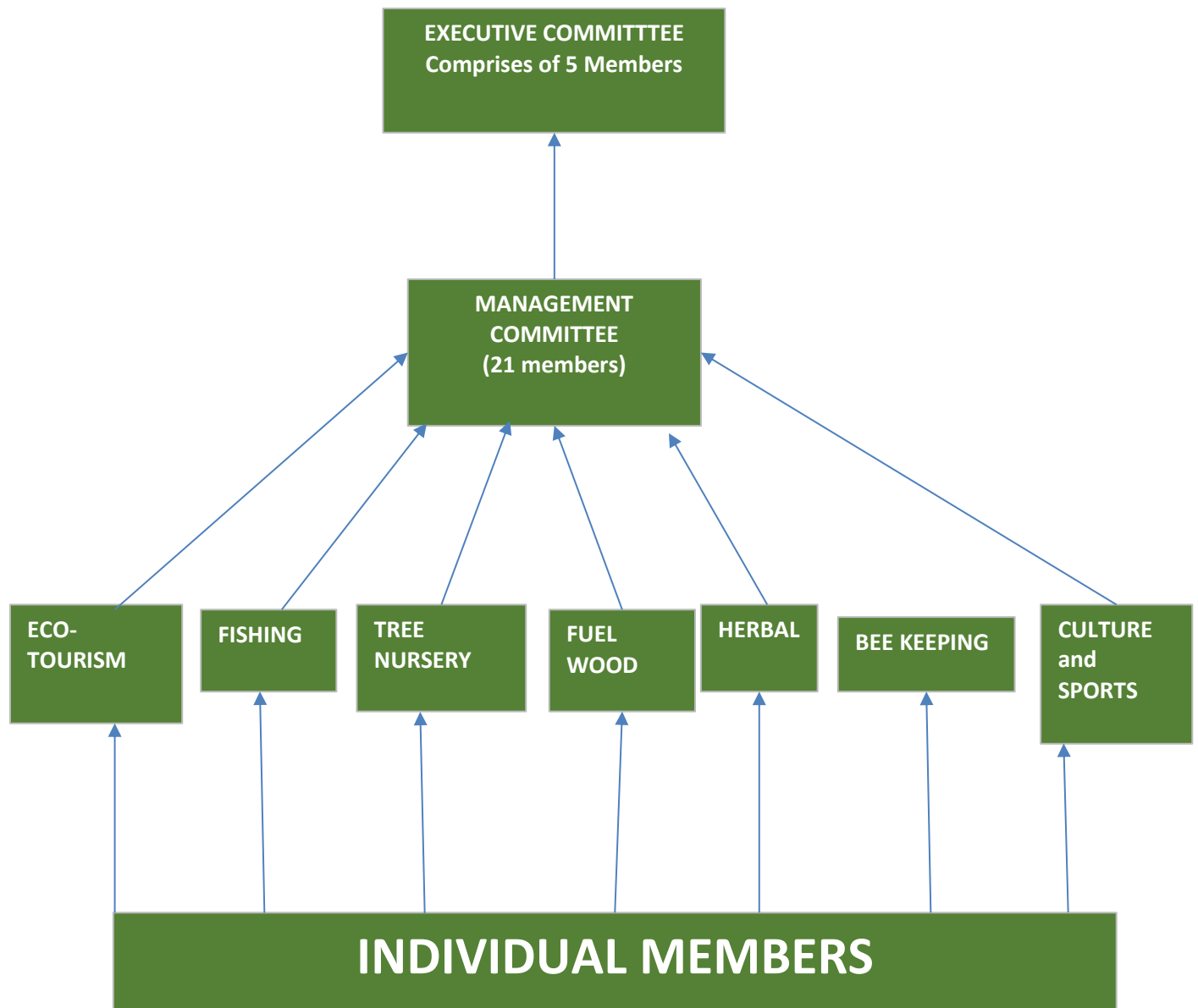


Figure 4: Magarini CFA Organizational Structure

CHAPTER THREE:

SOCIO-ECONOMIC AND NATURAL RESOURCES

3.1 Overview

The Magarini Mangrove Forest is located on the eastern side of Magarini Sub-County, along the coast of the Indian Ocean. The land surrounding the mangrove forest is predominantly occupied by salt firms. However, there are several villages in close proximity to the forest, including Moi, Majenjeni, the Sabaki River Estuary, Ngomeni, Garithe, Kadzuhoni, Jambiani, Kinyaule, Mto wa Mawe, Muyu wa Kaye, Kadzuyuni, and Kanagoni. A total of 313 questionnaires were administered

3.1.1 Population of the forest adjacent communities

Magarini mangrove is surrounded by 5 administrative locations and 6 sub locations that are within 5km from the perimeter of the forest.

Table 9: Population of Magarini Mangrove Adjacent Sub-locations

Population of Magarini Mangrove Adjacent Sub-locations						
Location	Sub-location	Total Population	male	female	Total Household	Population Density
Gongoni	Ngomeni	8,657	4,349	4,308	1,512	277
	Gongoni	21,200	10,233	10,967	4,136	300
Fundi Issa	Marereni	28,107	13,577	14,530	5,098	110
	Fundi Issa	11,186	5,490	5,696	1,798	88
Magarini	Mambrui	23,952	11,641	12,311	4,270	552
Malindi	Sabaki	24,219	12,301	11,918	4,951	718
Total		117,321	57,591	59,730	21,765	341

3.1.2 Age and Gender

A total of 313 households were interviewed from communities adjacent to mangrove forest which included Mambrui, Ngomeni, Sabaki, Kurawa, Gongoni, Kanagoni and Marereni. The total population for the adjacent communities to the mangrove forest is 258,452. The gender representation for the Magarini division is 57,591 for males and 59,730 for females. The largest number of respondents was aged between 51-60 years while the smallest was between 20-30 years (see Table 3.1)

Table 10: Age distribution of household heads

Age	Magarini division (n=313) % of Respondents
20_30	3.9
31_40	12.5
41_50	27.3
51_60	28.6
>60	27.7
Total	100

3.1.3 Marital Status

In Magarini, the majority of individuals surveyed were married (71%) widows (13.7%), singles (11.1%), widowers (2.9%), and divorced (1.3%). Magarini has a high number of married individuals, showing that marriage is a common social institution in the area. However, there are variations in the distribution of other marital statuses. Understanding these variations could be crucial for Non-Governmental Organizations, policymakers and social scientists in designing targeted interventions and support systems for different marital statuses within these communities. Additionally, it highlights the importance of region-specific approaches to addressing social issues related to marriage and family dynamics (Table 11).

Table 11: Distribution of Marital Status of Household heads

Marital status	Magarini division % (n=313)
Single	11.1
Married	71.0
Widow	13.7
Widower	2.9
Divorced	1.3
Total	100.0

3.1.4 Religion of the Magarini Mangrove Forest Adjacent Community

The communities living adjacent to the Magarini Mangrove Forest exhibit diversity in religious affiliation, with 68% being christians, Muslims (18%), Atheists (10%), and the rest (4%) belonging to other religious or spiritual traditions.

3.1.5 Ethnicity

The communities adjacent to the mangrove forest comprise several ethnic groups. The largest indigenous ethnic group is Mijikenda comprising nine sub-tribes namely; Giriama, Digo, Rabai, Duruma, Kauma, Chonyi, Kambe, Ribe, and Jibana. Other ethnic groups include Taita, Taveta, Pokomo, Bajuni, Orma, Swahili, Aweir, Watha, Indians, Arabs and Europeans respectively (County Government of Kilifi, 2023).

3.1.6 Education Level

The socio-economic survey results provided a comprehensive overview of the education status of households in Magarini. About 49.4% of the households indicated to have attained primary school education, while 26.6% were not educated (No formal education) in the area (Table 12). Smaller percentage of 8.7% had attained tertiary education level and 3.2% at university level. The prevalence of no formal education is a concern as it may indicate limited access to educational opportunities or systemic challenges hindering educational attainment. This underscores the importance of primary education as a foundational level of literacy and numeracy for individuals. However, there remains a gap in access to higher levels of education, as indicated by the smaller percentages of household heads with secondary, tertiary, and university education.

Table 12: Education Level distribution of Household heads in the Magarini Mangrove Area

Education status of household head	% (n=313)
No formal education	26.6
Primary	49.4
Secondary	12.2
Tertiary	8.7
University	3.2
Total	100.0

3.1.7 Vocational Training

The enrollment in all vocational training institutes within Magarini. The total of 1,142 students was enrolled in various departments comprising of 536 boys and 606 girls (See table 13 below)

Table 13: Enrolment in Vocational Training Centers in the Magarini Mangrove Landscape

S/NO	WARD	VTC	ENROLMENT		TOTAL
			BOYS	GIRLS	
1	GONGONI	MAPIMO	372	278	650
2		MWABA	31	35	66
3		KAMBI YA WAYA	65	81	146
4	ADU	MSUMARINI	37	93	130
5	SABAKI	MILALANI	31	119	150
	GRAND TOTAL		536	606	1,142

3.2 Land ownership and use

In Magarini sub-county (Table 14), land is owned privately (53.3%), inheritance/family(31.6%), squatter (5.9%), rented (5.9%),borrowed(1.8%) and leasehold (1.5%).

Table 14: Land ownership and access in Magarini Mangrove Landscape

Land ownership	% (n=272)
Private/ Individual	53.30
Family	31.60
Leasehold	1.50
Borrowed	1.80
Rented	5.90
Squatter	5.90

The land ownership patterns in Magarini Sub-County reflect a diverse array of tenure systems, each with unique socio-economic and cultural implications. The majority of land, 53.3%, is under private ownership, signifying a strong shift towards formalized property rights. This system likely promotes economic security and provides opportunities for investment and access to credit. However, it may also underscore disparities in land access, with wealthier individuals potentially consolidating significant portions of land, leaving others marginalized.

Inheritance and family ownership account for 31.6% of land tenure, indicating the persistence of traditional systems of land distribution. This form of ownership plays a critical role in preserving familial wealth and ensuring continuity of land use over generations. However, the tendency for

land fragmentation under inheritance systems can reduce its economic viability, particularly in agricultural contexts where larger parcels are often more productive.

Squatters occupy 5.9% of the land, reflecting unresolved tenure issues and socio-economic vulnerabilities. This could stem from historical inequities in land allocation, population pressures, or challenges in formalizing land rights. Squatting often leads to tensions over land use and limits development and investment in affected areas.

A similar proportion of the population, 5.9%, relies on rented land, which provides an avenue for landless individuals to engage in agricultural and other livelihood activities. While this demonstrates a functional land market, it may also indicate inequities, with ownership concentrated in the hands of a few. Borrowed land, making up 1.8% of the total, is often an informal arrangement based on trust within communities. This system, while accessible, lacks security of tenure, discouraging long-term investment in the land.

Leasehold arrangements account for only 1.5% of land tenure in Magarini, suggesting limited formal leasing activities, often tied to institutional or commercial purposes. This small percentage may indicate low levels of government-regulated or large-scale commercial land use in the area.

Overall, addressing the needs of squatters and those relying on borrowed or rented land could reduce vulnerabilities and foster more equitable access to resources. Policies should aim to balance traditional practices, such as inheritance, with the need for sustainable land use and economic viability. Encouraging secure tenure systems can also enhance investments and productivity, contributing to the region's socio-economic development. Recognizing the cultural dimensions of land ownership and addressing inequities will be essential for promoting long-term stability and growth in the area

It was noted that land uses by the Magarini Mangrove Forest Adjacent Community were homesteads/settlements with an average of 0.81 acres, cropland with 2.87 acres, grazing land with 2.11 acres and woodlot with 2.95 acres of land (Table 15).

Table 15: Land use types in Magarini Mangrove Landscape

Sub-County	Land use type/category	Land size owned	Land size accessed (Lease/rent/borrowed)
------------	------------------------	-----------------	--

Magarini	Homestead	0.81	1.85
	Cropland	2.87	1.88
	Grazing land	2.11	2.25
	Private woodlot	2.95	-

The land use patterns in Magarini Sub-County reveal important trends regarding ownership and access. For homesteads, households own an average of 0.81 hectares, but access a larger 1.85 hectares, indicating a need to rent, borrow, or lease additional land for expanding residential purposes. In cropland, the average owned size is 2.87 hectares, reflecting the significance of agriculture for livelihoods. However, households access an additional 1.88 hectares, likely to boost food production or compensate for limited land ownership. For grazing land, the owned land size averages 2.11 hectares, while accessed land is slightly larger at 2.25 hectares, suggesting reliance on external grazing areas to meet livestock needs. This could reflect communal practices or seasonal constraints. In private woodlots, households own 2.95 hectares on average, showing considerable investment in forestry activities such as timber, fuelwood, or conservation. Notably, no accessed land is reported for woodlots, indicating that such land use requires ownership for long-term management. This highlights the need for equitable land access and sustainable management to support livelihoods in the region

3.3 Local Economic Activities

In Magarini, farming appears to be the predominant occupation, accounting for 37.1% of households, followed by fishing at 13.5%, and business at 15.7% out of the 313 households. It's evident that agriculture-related activities such as farming, fishing, and coconut tapping are significant sources of livelihood in this area (Table 16).

Table 16: Household heads main occupation

Main Household head occupation	% (n=313)
Makuti Selling	2.8
Farming	37.1
Fishing	13.5
Business	15.7
Receptionist	.0
None	1.6
Tailoring	1.6
Masonry	2.8
Charcoal selling	3.1

Community nursing	.3
Coconut Tapper	1.6
Casual Jobs	9.7
Teaching	1.9
Employed	5.7
Tree Nursery	.3
Carpenter	2.2
Captain	.0
Forest Scouts	0
Total	100

Magarini Sub-County highlights a diverse range of income-generating practices, with farming (37.1%) being the dominant activity. This reflects the agricultural dependence common across Kilifi County, where farming is a primary source of livelihood due to fertile lands and favourable climatic conditions for subsistence and cash crop production (Kilifi County Government, 2018). Fishing (13.5%) emerges as another significant activity, particularly in coastal regions like Magarini. Fishing is similarly prevalent in Kilifi County, where proximity to the Indian Ocean provides opportunities for artisanal and commercial fishing, supporting local economies. However, challenges such as overfishing and limited infrastructure may constrain growth in this sector (Kilifi County Government, 2018). Makuti selling (2.8%) and charcoal selling (3.1%) reflect reliance on natural resources, typical in Kilifi County, where such activities supplement household incomes. While makuti (palm thatch) is derived from coconut palms, a common resource in the region, charcoal selling poses environmental concerns due to deforestation and land degradation (Kilifi County Government, 2018). Other activities, including business (15.7%) and casual jobs (9.7%), demonstrate diversification in livelihoods as households seek alternative incomes in trade and labour markets. Notably, formal employment options such as teaching (1.9%), community nursing (0.3%), and tree nursery work (0.3%) are limited, which aligns with broader Kilifi County trends where access to formal employment remains low (Kilifi County Government, 2018). Lower participation in specialized trades like tailoring (1.6%), masonry (2.8%), carpentry (2.2%), and coconut tapping (1.6%) indicates that traditional skills and artisanal work remain underutilized. . Limited formal employment and reliance on casual labour highlight economic vulnerabilities, calling for interventions to promote skill development, diversify livelihoods, and sustainably manage natural resources (Kilifi County Government, 2018).

3.2.1. Household Expenses

The communities adjacent to the Magarini Mangrove Forest have various expenses, with the highest being on food, which is a basic necessity. Other significant expenses include healthcare, education, livestock, and agricultural inputs.

3.2.2 Position of Authority

In the communities adjacent to the Magarini Mangrove Forest, the position of authority is influenced by both traditional and contemporary dynamics. Traditionally, men have held prominent roles in activities that require significant physical labor, such as land preparation and forest clearing, as well as in fishing and eco-tourism. Women, on the other hand, have significant influence in agricultural activities such as crop harvesting and fish traders.

3.3 General Crop Production Activities

3.3.1 Range of Crops grown

The main food crops included maize, cowpeas, green grams, and cassava, while the main cash crops were coconuts, cashew nuts, sisal, mangoes, and pineapple. The LPT agreed that the main crops grown in Magarini were Maize, cowpeas, green gram and watermelon. However, they disagreed that they did not grow sisal and pineapples in the 5KM radius from the mangrove forest.

3.3.2 Purpose of crops grown

Most of the crops grown in Magarini are for subsistence use. However, some are sold in local markets such as coconuts, cashew nuts and mangoes.

3.3.3 Livestock rearing

According to the Kilifi County Integrated Development Plan (CIDP) 2023-2027, the county had approximately 366,375 heads of cattle, 489,945 goats, 184,620 sheep, and 113,535 pigs in the year 2017 (Kilifi County Government, 2018). However, this data does not provide a breakdown of the number of livestock in each division of the county. In the Magarini division, the main livestock include cattle (Zebu), goats, sheep, poultry and bees. Most of the livestock are indigenous breeds. In summary, livestock keeping in Magarini, can be a sustainable and profitable economic activity for farmers. By focusing on animal nutrition, breeding and genetics,

animal welfare, and market access, farmers can contribute to the local economy and provide essential livestock products for the community.

3.3.5 Grazing Resources

The community engages in open grazing of their cattle without regard to land ownership boundaries. The LPT suggested that the community should adopt zero grazing and reduce the number of cattle per household. They advised the community to rear improved breeds. To reduce open grazing, the communities were advised by LPT to practice growing fodder crops.

Water Resources

The water resources utilized by the community encompass tap water, wells, swamps, water pans, and seasonal rivers. This practice often leads to conflicts between cattle grazers and farmers in the region. The LPT suggested construction of water troughs at specified points.

3.4 Fisheries resources.

Magarini sub-county is one of the seven sub-counties in Kilifi, constituting 4 BMUs namely Kichwa cha Kati, Ngomeni, Gongoni and Marereni Bmu and 24 landing sites. Fishing and fish related enterprises are among the main economic activities in the area, consisting of fishers, fish traders, boat owners and others. There are 1259 registered fishers, 879 fish traders and 174 vessels exploiting the marine resource.

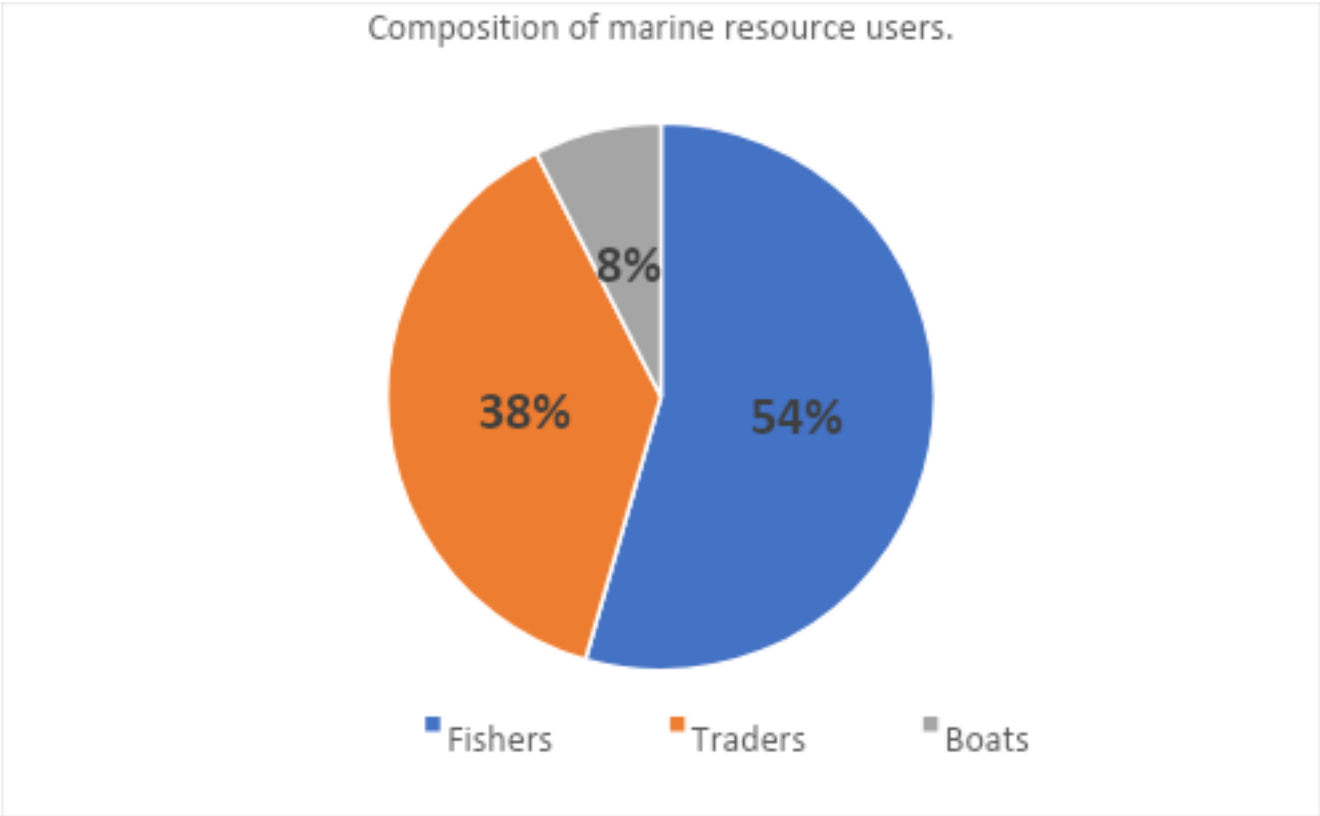


Figure 5: Fish Production and Value FY 2022/2023

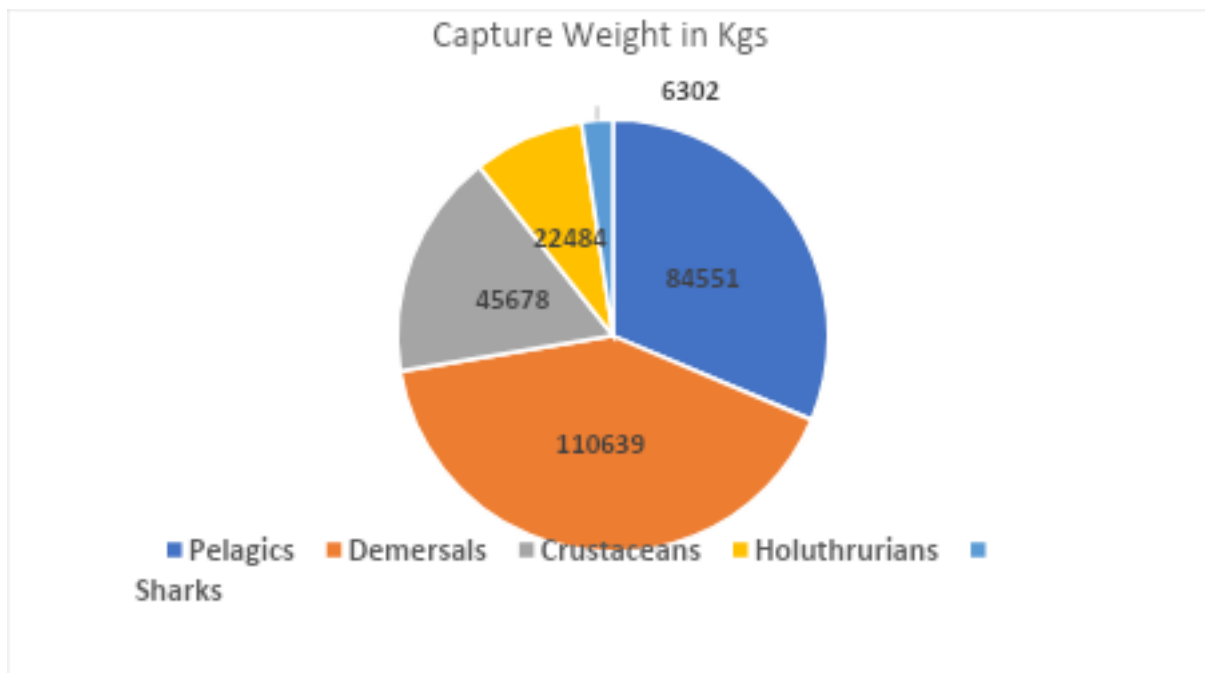


Figure 6: Distribution of fish catch based on taxa

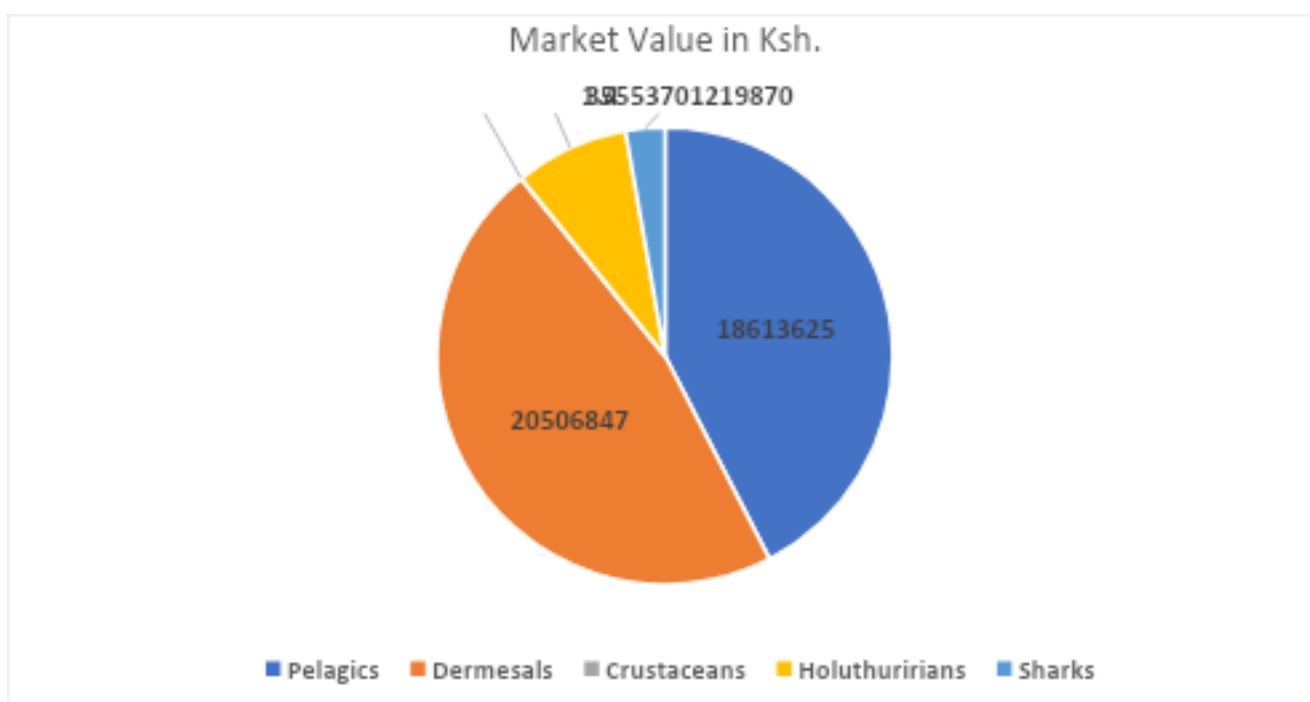


Figure 7: Market value of fish taxa

3.4 Interaction between local community and forest

Most forest adjacent communities have regular interactions with the mangrove forest. These interactions may be beneficial or detrimental to the forest. Demand for forest goods and services drive the interactions; and this management plan is focused on controlling the nature, extent and duration of the interactions for the good of the forest and the people.

3.4.1 Resources obtained from the forest

The data provided offers insights into livelihood activities directly dependent on the adjacent Mangrove Forest in Magarini (Table 17). In Magarini Sub- County, fishing emerges as the primary livelihood activity directly reliant on the Mangrove Forest, with 22.7% of households engaged in this occupation. The proximity to the Mangrove Forest likely provides abundant fishing grounds, supporting a significant portion of the local population. Other livelihood activities linked to the Mangrove Forest include beekeeping, eco-tourism, the sale of forest products, and charcoal production. These activities demonstrate the multifaceted role of the Mangrove Forest in supporting local livelihoods, not only as a source of direct income but also through ecosystem services such as tourism and the sale of forest products.

Table 17: Community Activities dependent on Mangroves

Sub-County	Livelihood activities dependent on Mangrove Forest	Frequency	Percentage
Magarini	Fishing	65	22.7
	Bee keeping	21	7.3
	Eco-Tourism	13	4.5
	Firewood	11	3.8
	Sale of forest products	38	13.3
	Farming	21	7.3
	Poultry	2	0.7
	Mangrove Nursery	3	1
	Charcoal	17	5.9
	Medicinal Herbs	5	1.7

Salt harvesting	1	0.3
Tree Planting	1	0.3
Nursery	5	1.7
Livestock	8	2.8
Total	286	100

3.4.2 Human Wildlife Conflicts

Sabaki River is home to many hippos who come out at night in search of food. There have been cases of invasion in farms by Hippos and attacks on fishermen. In Marereni and Rasi, monkeys residing in the mangrove forests are destroying mangrove nurseries and invading homesteads.

3.5 Forest resources

The results showed the types of natural resources available in Magarin which included mangrove forests (69.3%), ocean (35.1%) and rivers (23.3%), sand dunes (12.8%) and fish (9.9%) further construction sand (8.9%) and land (7.7%). Moreover, lower utilization was seen in salt quarries (3.2%), beehives (2.9%), and quarries (2.9%), which provide localized benefits, particularly for income diversification. Resources such as wildlife (2.2%), mines (1.6%), and birds (0.6%) contribute marginally, reflecting either limited exploitation or conservation efforts. Lastly, water pans (0.3%), timber (0.3%), and beaches (0.3%) are the least utilized resources, possibly due to limited availability or economic significance. These results showed the need for sustainable management of both highly utilized and underutilized natural resources (Table 18).

Table 18: Natural Resources in the Magarini Mangrove Landscape

Natural resource	Frequency (n)	(%) based on sample size, (313)
Mangrove forest	217	69.3
Ocean	110	35.1
River	73	23.3
Sand dunes	40	12.8
Fish	31	9.9
Construction sand	28	8.9
Land	24	7.7

Natural resource	Frequency (n)	(%) based on sample size, (313)
Salt quarries	10	3.2
Bee hives	9	2.9
Quarries	9	2.9
Wildlife	7	2.2
Mines	5	1.6
Birds	2	0.6
Water pans	1	0.3
Timber	1	0.3
Beach	1	0.3

The results revealed a strong reliance on **mangrove forests** (69.3%), reflecting their importance for coastal protection, wood harvesting, and supporting marine life. This pattern is consistent with Kilifi County, where mangroves play a critical role in local livelihoods and ecosystems (Kilifi County Government, 2018). Similarly, the **ocean** (35.1%) and **rivers** (23.3%) are key resources, highlighting the significance of fishing and water use, mirroring Kilifi County's dependence on marine and freshwater resources for fishing, irrigation, and household needs. **Sand dunes** (12.8%) and **construction sand** (8.9%) underscore the growing demand for extractive resources driven by infrastructure development, as also seen in Kilifi County. However, overexploitation raises concerns about erosion and environmental degradation (UNEP, 2020). **Fish** (9.9%) remains vital for food security and livelihoods, although challenges like overfishing limit its full potential. Less-utilized resources, such as **wildlife** (2.2%), **mines** (1.6%), and **birds** (0.6%), suggest limited exploitation or conservation efforts. Resources like **water pans** (0.3%) and **timber** (0.3%) appear underdeveloped, while beaches, a significant asset for tourism in Kilifi County, remain minimally utilized in this area (Kilifi County Government, 2018).

The most preferred resource was indicated as the oceans and the mangroves. The main resources were summarized in Table 19 below.

Table 19: Natural Resources in the Magarini Mangrove landscape

No.	Natural Resource	Remarks
1.	Land	The land in the area has no title deeds, the land does not belong to them but belongs to Arabs and Indians thus majority of the local area squatters

		• The land document available are allotment letters • Farming is done on the upper side across the highway where the soils are a bit better and not saline and where locals have enough land compared to the lower side of the highway where soils are saline and the land is small. • Locals practice farming mainly for domestic use. They grow maize, watermelon, cowpeas, among many others. • Note that the implementation of project in the area should be carefully looked into and take the required steps
2.	Sand beaches and sand dunes	• Sand dunes is used as source on income through quarrying in the area • Ecotourism (beach walks, restaurants and others) • The open quarries require to be rehabilitated hence posing danger to the environment • Proper laws need to be enforced to guide harvesting of sand in the area
3.	River (Sabaki River, Belesa River Freshwater rivers (Kambi ya Waya and rivers which are seasonal)	• The area has a River Sabaki as the permanent River Sabaki. The adjacent community use it for: ○ Fishing (fishes have drastically reduced due to overfishing, pollution from farming activities) ○ Drinking ○ Irrigation (Farming)
4.	Indian Ocean	• Fishing • Salt production (jua kali and factory) • Eco-tourism Note that all tourists are expected to pay some charges to access the site (Sabaki estuary)
5.	Mangrove Forest	• An important habitat for a variety of terrestrial and aquatic animals, many of which are species of economic importance such as shrimps (<i>Penaeus</i>), crabs (<i>Scylla</i> and <i>Uca</i>), Oysters (<i>Crassostrea</i>), birds, monkeys and many marine fish species • The dominant mangrove species includes; <i>Rhizophora mucronata</i>, <i>Ceriops tagal</i>, <i>Bruguiera gymnorhiza</i>, <i>Sonneratia alba</i>, <i>Xylocarpus granatum</i>, <i>Xylocarpus moluccensis</i>, <i>Avicennia marina</i>, <i>Lumnitzera racemosa</i> • From the survey it was clearly indicated that an

		extensive area of mangrove forests had been cleared to pave way for the establishment of the salt lagoons/ponds. • It is used for t is used for : ○ Furniture making (beds, doors, chairs etc) ○ Fencing (posts) ○ Herbal medicine e.g Mkomafi spp is used to treat mshipa, high blood pressure and diarrhea ○ Firewood ○ Dye making particularly the Mwiya spp ○ Building materials (the poles) • Mangrove forest is faced with illegal harvesting that has led to its degradation but various stakeholders are involved in the Mangrove restoration activities
6.	Wells/boreholes	• Used for drinking by human and livestock

3.5.1 Forest composition and species distribution

The mangrove formations of Sabaki – Kurawa intertidal zone comprised of mainly *Ceriops tagal*, *Rhizophora mucronata*, *Avicennia marina* and few *Sonneratia alba*, *Bruguiera gymnorrhiza* and *Xylocarpus granatum* in mixed stands with dominant species. The average stocking density of the mangroves in Sabaki – Kurawa intertidal zone is 4,987.5 stems/ha which is slightly higher than reported stem density of 3,227 stems/ ha in the national mangrove ecosystem management plan (GoK, 2017). At mangrove formation level, Ngomeni had the highest stocking density of 1,767 stems/ha followed by Kurawa (1,533 stems/ha), Marereni (1,029 stems/ha) with Sabaki having the least density with 658 stems/ha as shown in Table 20. The mean height varied between 3.83 4 m and 5.14 m while the mean diameter was highest in Sabaki (8.62cm) and lowest in Kurawa (5.04cm) as shown in Table 20.

Table 20: Stocking density of mangroves in Magarini Mangrove Forest

Site	Mean DBH (cm)	Mean height (m)	Density (stems/ha)
Kurawa	5.04	4.16	1533.33

Marereni	5.81	3.83	1029.167
Ngomeni	6.15	3.87	1766.67
Sabaki	8.62	5.14	658.33
Overall mean	6.4025	4.25	1246.87

3.5.2 Stocking density of traded mangrove products

The stocking density of Pau was highest with 2,338 stems/ha followed by Fito (1,367 stems/ha) Mazio (729 stems/ha), Nguzov (279 stems/ha), Boriti (158 stems/ha) and Banaa (117 stems/ha) as outlined in Table 21.

Table 21:Mangrove potential extractable products with stem densities

Products	Mean stems/ha
Fito < 4.0 cm	1,367
Pau (4.1 – 6.0 cm)	2,338
Mazio (6.1 – 9.0 cm)	729
Boriti (9.1 – 13.0 cm)	158
Nguzo (13.1 -20 cm)	279
Banaa (20.1 – 35 cm)	117
Total	4,987.5

3.6.2 Status of degradation (cut stems, sizes and species) and regeneration

The potential extraction rates manifested in the density of cut stumps. The average density of stumps in the assessed sites is 409.38 stumps/ha. Kurawa had the highest cut stump density of 1045 stumps/ha followed by Marereni and Ngomeni. Sabaki had the lowest stumps/ha with 166 stumps/ha as shown in Table 22.

Table 22: Density of Live and Cut stems In Magarini Mangrove Forest

Site	Average Live stems/ha	Average cut stems/ha
Kurawa	1533.33	1,045.83
Marereni	1029.167	254.17
Ngomeni	1766.67	170.83

Sabaki	658.33	166.67
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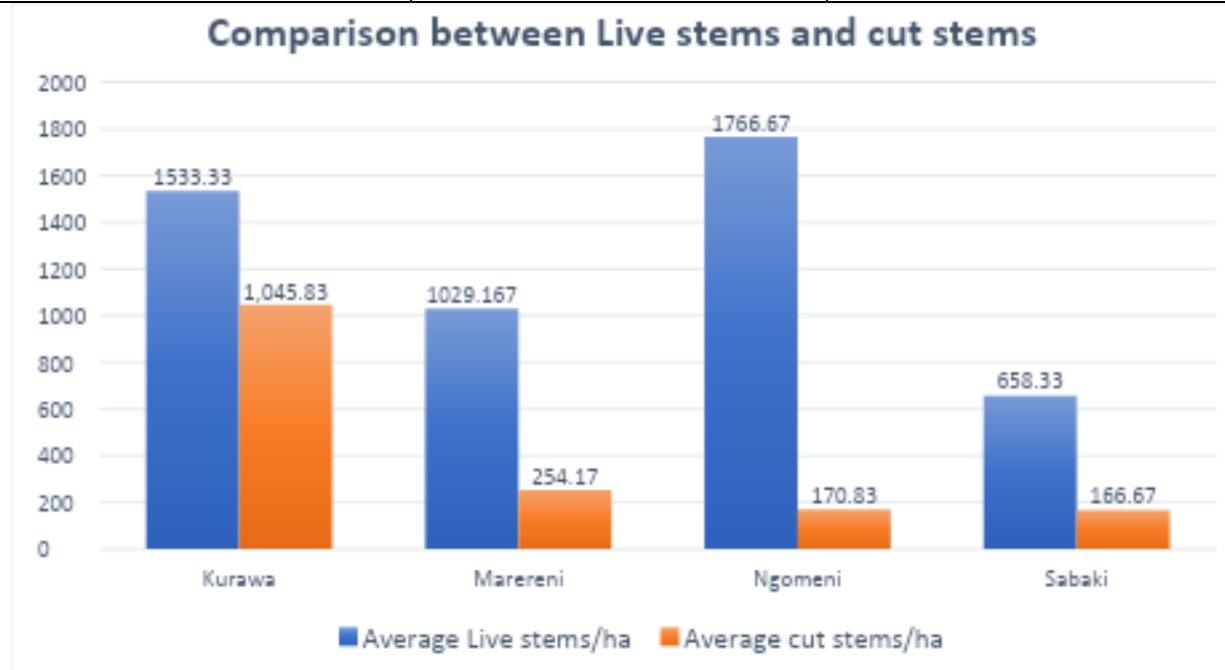


Figure 8: Live and cut stems: A comparison per forest site

3.5.4: Regeneration rate of the Magarini Mangroves Forest

The average density of saplings in the assessed site was 134,305 seedlings/ha. Sabaki had the highest number of 128,194 seedlings/ha followed by Marereni and Kurawa and Ngomeni and the average density of saplings in the assessed site was 4,676 saplings/ha. Kurawa had the highest number of saplings/ha followed by Ngomeni with Marereni having the least as shown in Table 23.

Table 23: Density of Seedlings and Sampling in the Magarini Mangrove Forest

Site	Mean seedlings/ha	Mean saplings density/ha
Kurawa	1713	1,898
Marereni	3,102	463
Ngomeni	1,230	1806
Sabaki	128,194	509

On-farm tree propagation

The current tree species grown in Magarin are *Casuarina equisetifolia* , *Gmelina aborea*, *Eucalyptus spp* (Bluegum), and *Azadrachta indica* (Neem) which provide immediate benefits such as timber, fuelwood, and erosion control. However, their ecological drawbacks, such as invasiveness and high water demands, highlight the need to prioritize indigenous species like *Tamarindus indica*, *Adanisonia digitata* (Baobab), *Melicia excelsa* (Mvule), *Terminalia spinosa* (Mwanga), and *Afzelia quanzensis* (Mbambakofi). These native trees are better suited to the region's climate, promote biodiversity, improve soil fertility, and support sustainable livelihoods through timber, fruit, and cultural uses. On-farm tree growing in Magarini plays a critical role in complementing and reducing pressure on mangrove forests, which are heavily relied upon for wood, fuel, and coastal protection. Mangroves are vital ecosystems that prevent coastal erosion, support fisheries, and sequester carbon, but their overexploitation threatens their sustainability. Growing trees on farms provides alternative sources of firewood, wood and timber, alleviating pressure on mangroves while improving soil health, offering shade, and diversifying household income. By integrating indigenous trees into farms, communities can benefit from sustainable wood production, fruit harvests, and improved land productivity while preserving the ecological integrity of the mangrove forests. This approach balances resource use, supports environmental conservation, and strengthens local livelihoods.

Energy Situation

The LPT discussed and agreed that most of the communities use fuelwood for subsistence and commercial use. They practice charcoal production. Most of this firewood come from driftwood and the entire mangrove forest

Participation in Organization

The CFA has 948 members but there is need of awareness to the local community of the existence of Magarini Mangrove CFA.

Challenges in conservation

1. Illegal Logging
2. Threats by loggers/Insecurity
3. Illegal Charcoal Production
4. Livestock grazing in the mangrove forest
5. Conflicting policies and laws that govern natural resource management

6. Lack of political goodwill
7. Dumping/solid waste management
8. Encroachment on forest land
9. Wildfires
10. Unsustainable fishing practices

Remedies to improve forest conservation

1. Recruit, train and facilitate community scouts
2. Create awareness
3. Inclusion of community participation in conservation activities
4. Improve and Support income generating activities
5. Encourage on-farm tree growing
6. Community Led Total Sanitation
7. Strengthening user groups

3.6 Stakeholder Analysis

3.3.1 Stakeholder Identification and Mapping

There are various stakeholders with interest in the Magarini mangrove forest. Their contribution in activities related to conservation and management has not had a noticeable impact to date. This is partly due to inadequate stakeholder consultation and participation in the conservation and management of the mangrove forest.

3.3.2 Range of Stakeholders

The stakeholders of Magarini mangrove forest are defined as those individuals, groups and institutions who are directly affected by decisions made on the utilization, management and conservation of the Mangrove Forest and whose aspirations and activities affect the objectives of conservation of the area. The stakeholders range from the managing institutions, non-governmental organizations. The stakeholders currently identified to be directly or indirectly involved in activities within the Magarini mangroves are listed in the table below.

It is a tabular description of key stakeholders, their status roles and responsibilities in the implementation of PFMP. These stakeholders have the mandate, duty or interest in the implementation process.

Table 24: Stakeholder Profiles and Responsibility

Category	Stakeholder	Possible Roles & Responsibilities	Influence	Importance
Government Agencies	KFS	Support governance and management of resources at the Magarini mangroves. Undertaking education, awareness & extension services Enforcement of laws	High	High
	KEFRI	Coordinate mangrove forest research activities and initiatives Encourage integration of research finding	High	High
	KWS	To provide technical advice on management of wildlife in the Magarini mangroves. Minimize human wildlife conflicts Ensure flourishing biodiversity	High	High
	WRA	Ensure protection of ground and underground water -Formation of water resource users' association (WRUAs) -Undertake education & awareness on water conservation	High	High
	NEMA	Monitoring and advisory of Sustainable management of environment and natural resources Enforcement of environmental laws Environmental Impact Assessment	High	High
	NLC	Assign ownership and use of accreted land Address land tenure	High	High
	NGAO	Enforce environmental regulation on the ground Provide enabling environment for implementation of Management Plan	Low	High

	County Directorate of Fisheries	Fisheries development Control of overfishing and illegal fishing Boost the governance and management of resources of the Mangrove forest	High	High
	TRA	Tourism regulation, licensing and certification	Low	High
	NECC	Enforcement of environmental laws and policies. Monitoring of pollution.	Low	High
	MOLPP	Land administration	Low	High
County Government	CGK	Overall responsible for the governance of the county Implementation of the plan	High	High
Non state Actors	Nature Kenya	-Development of proposals for funding -Capacity building -Publicity and Advocacy Provide capacity building Develop eco-tourism infrastructure to improve tourism	Low	High
	A Rocha Kenya	-Research activities on bird life -Environmental education Improve livelihoods of the community	Low	High
	BMUs	Ensure proper management of fisheries resources	Low	High
	MMCFA	- Co-managers of Magarini mangrove forest - Create awareness in the community and stakeholders on the importance of mangrove forest - Marketing of non-wood products from the mangrove forest - Promoting of livelihood of the conservation groups		

	COBEC	• Environmental Education and awareness • Improve livelihoods of community • Restoration of degraded areas	High	High
	EDEN RESTORATION	• Restoration of degraded areas	Low	High
	GRIOT	• Restoration of degraded area	Low	Low
Business entity	Salt firms	• Support conservation activities • Environmentally friendly salt production • Social corporate responsibility	Moderate	High
	Tourism hotels	• Support conservation activities	low	low

CHAPTER FOUR: PLANNING CONSIDERATIONS

An effective plan needs to be anchored on existing policies and legal frameworks in the jurisdiction where it is to be implemented. The Magarini PFMP has been developed within the international, national and regional legal landscape that is described hereunder. Together with the legal mechanisms, the plan has its rationale, description of the issues to be addressed, vision, mission and objectives; all aligned to the envisaged outcome of the plan and its implementation.

Policy and Legal Frameworks that Support Mangrove Management Planning Process

Mangroves, like other natural resources, are threatened by both anthropogenic and natural processes. This calls for active management to sustain the resources and the benefits that accrue from it. There are legal and policy frameworks under which the planning process is anchored, ranging from international conventions cascading to national and to county level. The following is a snippet of the relevant frameworks

4.1 National and County Legal Framework

4.1.1 The Constitution of Kenya, 2010

Being the supreme law of the country, the Constitution has made various provisions for sustainable management of natural resources, forests and wildlife included. Under the rights and fundamental freedom, Article 42 provides for the right to a clean, healthy environment and its protection for present and future generations. Article, 61 (e) sound conservation and protection of ecologically sensitive areas;

Article 69 provides for sustainable utilization, management and conservation of natural resources, attainment of a minimum forest cover of 10% as well as the protection of biological diversity. This Plan upholds these obligations through its programmes.

4.1.2 Environmental Management and Co-ordination (Amendment) Act, 2015

Environmental Management and Coordination Act, 2015 plays a supervisory role over all the environmental related legislation in the country. It provides legal and institutional frameworks and procedures for management of the environment as well as modalities for conflict resolution. The Plan is well guided by the provisions of the Act in its preparation and implementation of programmes, as well as in monitoring environmental impacts.

EMCA is a framework law for environmental management in Kenya. It confers statutory rights to a clean and healthy environment in Kenya. Section 43 (1) of EMCA promotes the prescription of measures by NEMA, for co-management of critical habitats within or around a lake basin; wetland, forest or coastal zone and that such measures shall take into consideration the interests of the community resident therein. In consultation with the lead agencies, NEMA is mandated to exercise general supervision and coordination over all matters relating to the environment and working together with other agencies to prescribe measures for attainment of 10% tree cover. The Act provides for environmental protection through;

- Environmental impact assessment
- Environmental audit and monitoring
- Environmental restoration orders, conservation orders and easements.

This Act will be relevant to undertaking activities requiring Environment Impact Assessment (EIA) and Environmental Audits.

4.1.3 The Forest Conservation and Management Act No.34 of 2016

Forest Conservation and Management Act, was enacted in 2016 to give effect to Article 69 of the Constitution with regard to forest resources; to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country and for connected purposes.

The Act repealed the Forests Act, 2005 and has attempted to use various forest management terminologies in a much clearer way. For the first time it has defined a forest as *“land which is declared or registered as a forest, or woody land which is declared or registered as a forest, or woody vegetation growing in close proximity in an area of over 0.5 of a hectare including a forest in the process of establishment, woodlands, thickets”*.

Further, the Act has defined "community" as a *“clearly defined group of users of forest land identified on the basis of ethnicity, culture or similar community of interests as provided under Article 63 of the Constitution”*. A “forest management plan”; is defined as a *“written document establishing direction and goals for the management, conservation and utilization of a specific forest land area”*;

Participatory Forest Management planning (PFMP) is discussed in Section 47 (1) and 48 (4). The Section 47 (1) stipulates that *“Every public forest, nature reserve and provisional forest shall be managed in accordance with the Act”*. Section 48 (4) stipulates *“Where the Service grants*

permission in accordance with this section, it may impose such conditions as it may deem fit including the development of a forest management plan in accordance with this Act". It is therefore in accordance with this Act that Magarini CFA was actively involved and developed Magarini PFMP.

4.1.4 The Wildlife Conservation and Management Act, 2013

Kenya's wildlife policy is embodied in the Sessional Paper No. 3 of 1975 entitled "A Statement on Future Wildlife Management Policy in Kenya. The key elements of this Policy relevant to Magarini Mangrove Forest may be summarized as follows:

- It identified the primary goal of wildlife conservation as the optimization of returns from wildlife defined broadly to include aesthetic, cultural, scientific and economic gains, taking into account the income from other land uses;
- It pointed out the need to identify and implement compatible land uses and fair distribution of benefits derived from wildlife including from both non-consumptive and consumptive uses of wildlife;
- It underscored the need for an integrated approach to wildlife conservation and management in order to minimize human–wildlife conflicts; and,

There are diverse fauna and flora in Magarini Mangrove Forest that need to be conserved. The Wildlife Act, 2013 provides for the protection, conservation, sustainable use and management of wildlife in Kenya and for connected purposes.

Section 48 of the Act prohibits the carrying out of any activity, which negatively affects the survival of endangered, vulnerable and nearly threatened and protected species. The Act stipulates that a genuine victim of human-wildlife conflict has a right to seek compensation. In Magarini Mangrove Forest, one can seek compensation from animals like, Hippopotamus. Owners of crops, property or livestock destroyed by wildlife get awarded the value; those not satisfied may appeal to the National Environment Tribunal or Environment and Land Court. The loss of life, injury or property damage must be reported to the nearest KWS office within 48 hours. Making a false report to the committee regarding a human wildlife conflict compensation claim is illegal. The Act provides for the establishment of Community Wildlife Association (CWA) to ensure participation of the local community in the conservation and management of

ecosystem. The Plan outlines activities, which are aimed at promoting preservation of habitats and biodiversity.

4.1.5 Water Act, 2016

The Water Act, 2016 provides for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes.

The Act lays out a mechanism for development of a national water resources management strategy, for the protection, management, use, development, conservation and control of water resources. The strategy devolves the authority over the conservation of water catchment areas to local stakeholders to manage them in collaboration with the Water Resources Authority (WRA) established under the Act.

The strength of this Act is endeavored to promote participatory forest management in water catchment and sub-catchment areas. This is achieved through the devolution of roles and responsibilities to the stakeholders namely; Water based institutions, WRA, Water Resource Users Associations (WRUAs), Water Services Board and Water Regulatory Boards.

4.1.6 Tourism Act, No 14 of 2011

This Act provides guidelines, regulations and incentives on carrying out tourism enterprises. This management plan will abide with the provisions of this act in implementation of its proposals for ecotourism enterprise in Magarini Mangrove Forest.

Section four of the Act established the Tourism Regulatory Authority whose functions are outlined under section 7(1) which include:

- Formulate guidelines and prescribe measures for sustainable tourism throughout the country;
- Regulate tourism activities and services countrywide, in accordance with the national tourism strategy;
- Register, license and grade all sustainable tourism and tourist-related activities and services including cottages and private residences engaged in guest house services;
- Develop and implement, in consultation with relevant stakeholders, criteria for standardization and classification of tourism facilities and services;

- Monitor and assess tourist activities and services to enhance continuous improvement and adherence to sound principles and practices of sustainable tourism;

4.1.7 Climate Change (Amended) Act No 9 of 2023

The Act establishes a National Climate Change Response Strategy (NCCRS) for handling climate change aspects such as weather information release and advice to resource managers and community, investment in carbon business including; Reducing Emissions from Deforestation and Degradation plus (REDD+). Agriculture intensification is one of the adaptation strategies promoted by NCCRS. Some of the agriculture adaptation measures in NCCRS are provision of downscaled weather information and farm inputs.

Section 24 (1) of the Act allows for public participation when developing strategies, laws and policies relating to climate change. Article 24 (2) states that public consultations are undertaken in a manner that ensures the public contribution makes an impact on the threshold of decision-making. Magarini PFMP preparation and implementation mainstreams climate change responses into development planning, decision making and implementation of all activities earmarked hereto and has to take into account the building of resilience and enhancement of adaptive capacity to the impacts of climate change.

4.1.8 Energy Act, No. 12 of 2019

The Act promotes the development and use of renewable energy including providing an enabling framework for efficient and sustainable production, distribution and marketing of biomass and other forms of renewable energy. Section 75 (2) (c) of this Act promotes the use of fast maturing trees for energy production including bio-fuels and the establishment of commercial woodlot plantations. Through this Act, support should be given to the FAC to supplement their efforts through provision of seedlings, varieties of fast-growing trees and training. It also promotes the development and exploitation of renewable energy sources through harnessing opportunities offered under Clean Development Mechanisms which include, but not limited to, carbon credit trading under Section 75 (2) (g).

4.1.9 Agriculture, Livestock, Fisheries, Food Authority Act, 2013

These agricultural laws enacted in 2013 removed the old Agriculture Act, and covers Agriculture, Livestock, Fisheries, Food Authority Act, 2013, Kenya Agricultural and Livestock Research Act and the Crop Act 2012.

The legislation seeks preservation of soil fertility, promotion and maintenance of developed agricultural land in accordance with the rules of husbandry. Under the Act the Cabinet Secretary of Agriculture can issue land preservation orders to landowners which may prohibit clearing of vegetation or the grazing of livestock in vulnerable ecosystems that require afforestation of land to reclaim areas threatened with degradation or demand the use of farming techniques compatible with conservation requirements. The Act is very critical especially during land preparations of the farms neighboring Magarini Forest. The Act will be put in considerations when determining the grazing capacity of the forest.

Fisheries Management and Development Act 2016, Cap 378

The Fisheries Act of Kenya, which was enacted in 2011, primarily focuses on the management and conservation of fishery resources. While it does not specifically address mangrove forest management in detail, it recognizes the importance of coastal ecosystems, including mangroves, as critical habitats for various fish species and other marine life. The act emphasizes sustainable practices that protect these ecosystems to ensure the long-term viability of fisheries.

4.1.10 The Societies Act, Cap 108 2012

The Act makes provision for the registration and control of societies and to repeal the societies act. The plan provides for the participatory aspect by the community living in the area adjacent to the forest. It is a requirement that the community forms an association and, in this regard, the Registrar of Societies registered Magarini Community Forest Association after adhering to the provisions of the Societies` Act. The CFA will sign a Forest Management Agreement to enhance implementation of this plan.

4.1.11 The Land Act, 2012 (Revised Edition, 2016)

The Act brings about amendments to the Land Act, 2012, Land Registration Act, 2012 and the National Land Commission Act, 2012. These Acts are amended to give effect to Articles 68(c), i, and 67 (2) (e) of the Constitution and to provide for the sustainable and productive management

of land resources. The National Land Commission established under Article 67 of the Constitution is tasked with the management of public land on behalf of the National and County governments (Section 8). Section 12 provides that public land within forests and wildlife reserves, mangroves and wetlands or their buffer zones as well as environmentally sensitive areas will not be allocated, for purposes of conservation. Section 19 (2) provides for the conservation of land based natural resources by requiring the commission to prescribe rules and regulations that may contain;

- Measures to protect critical ecosystems and habitats;
- Incentives for communities and individuals to invest in income generating natural resource conservation programmes;
- Measures to facilitate the access, use and co-management of forests, water and other resources by communities who have customary rights to these resources;
- Procedures for the registration of natural resources in an appropriate register;
- Procedures on the involvement of stakeholders in the management and utilization of land-based natural resources; and
- Measures to ensure benefit sharing to the affected communities.

Land is an emotive issue in Magarini as it is in every high potential area in Kenya and if not handled with care, can lead to conflicts. The Kilifi County Land management board coordinates with elders and national government officers to address any conflict that could arise.

4.1.12 The County Government Act, 2012

The Act gives effect to the objectives and principles of devolution as set out in the Constitution; The Act also promotes the following principles of citizen participation:

- timely access to information;
- Access to process of formulating and implementing policies, laws and regulations; and,
- Protection and promotion of the interests and rights of minorities, marginalized groups and communities and their access to relevant information (Section 87).

The County Government of Kilifi, through the County Governments Act Section 108 that provides for the drafting of County Integrated Development Plans (CIDP), which outline a county's development goals, covering a period of five years.

4.1.13 Other legal legislations

Table 25: other legal legislations

Agriculture (Farm Forestry) Rules, 2009	This provides guidance on development and practice of farm forestry activities in Kenya with an aim to preserve and sustain the environment in combating climate change and global warming. Since the area under the Plan extends to private farmlands, it envisions promoting farm forestry so as to sustainably exploit forest produce and reduce exploitation pressure on forests, while contributing to the national objective of obtaining at least 10% forest cover.
The National Government Co-ordination Act, No. 1 of 2013	The Act establishes an administrative and institutional framework for co-ordination of National government functions at the National and County levels. The key role of the staff of the Ministry of Interior is to enforce law and order and disseminate National Government policies. In the conservation and management of forests; the ministry has been useful in promoting participatory forest management through community and sensitization barazas. This Act is also useful when dealing with demarcation and alignment of forest boundaries, dispute resolution outside gazetted forests and use of resources on public land for local community development.
Physical Planning Act of 2012, Cap 286	The Act provides for the preparation and implementation of physical development plans. Sections 4 and 5 (36) of the Act provide for protection of the environment and that development should be in harmony with environmental considerations
Crops Act, No. 13 of 2013	Seeks to promote and maintain stable agriculture, to provide conservation of the soil and its fertility and to stimulate development of agricultural land in accordance with the accepted practices of good land management and good husbandry.
Public Benefits Organizations Act of 2013	It provides an administrative and regulatory framework within which public benefit organizations can conduct their affairs and connected purposes. In the Plan, CFA and its affiliate user groups fall under the jurisdiction of this Act.

4.2 Multilateral Environmental Agreements (MEAs)

The Government of Kenya is a signatory to various international treaties and conventions on conservation of fauna and flora, and fragile ecosystems, which require the signatories to integrate the same in the management of the ecosystem within their jurisdiction. These treaties include the Convention on Biological Diversity (CBD) and the Forest Principles; convention on international trade in endangered species of flora and fauna (CITES), Ramsar Convention and intergovernmental authority on development (IGAD)

4.2.1 Sustainable Development Goals (SDGs)

Sustainable Development Goals (SDGs) are a proposed set of targets relating to future international development. The 17 goals by a UN General Assembly's Open Working Group replaced the MDGs on expiry at the end of 2015. This plan addresses the following goals:

- Goal 1. End poverty in all its forms everywhere.

- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- Goal 6; Clean Water and Sanitation that ensures availability and management of water and sanitation for all,
- Goal 7: Ensure access to affordable, sustainable, and reliable modern energy services for all.
- Sustainable consumption and production patterns (SDG 12); every year, the world loses about a third of all the food it produces. To feed the world sustainably, producers need to grow more food while reducing negative impacts on the environment such as soil, water and nutrient loss, greenhouse gases emissions and degradation of ecosystems.
- Goal 13: Take urgent action to combat climate change and its impacts’, and
- Goal 15: Life on Land ‘Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

The goals can be achieved through the implementation of the PFMP.

4.2.2 The Convention on International Trade in Endangered Species of Flora and Fauna (CITES)

The Convention regulates the international trade in wild plants and animals that are at risk of extinction as a result of trade. The convention seeks to control trade not only in live species, but also in dead specimen and their derivatives. CITES identifies the species that it protects and classifies them into three categories. Those that are currently at risk of extinction, those that probably may be at the risk of extinction if the trade in them is unregulated and finally those that member states have listed since they are under managed and require the co-operation of other states in order to succeed. Kenya ratified the Convention in 1978 and it was domesticated in the Wildlife (Conservation and Management) Act. The Act prohibits the importation of any trophy, or un-manufactured ivory or rhinoceros’ horn. One possible outcome of the Convention is the protection and preservation of endangered and threatened mangrove tree species in such as *Avicinnia marina* (Mstwi), *Xylocarpus granatum* (Mkomafi), *Xylocarpus mollucensis* (Mkomafi

dume), *Bruguiera gymnorhiza* (Mwia), *Sonneratia Alba* (Mlilana) in Magarini Mangrove Forest and endangered animals such as Green turtle

4.2.3 United Nations Framework Convention for Climate Change (UNFCCC), 1992

The objective of this convention was to establish methods to minimize global warming and in particular the emission of green-house gases. The UNFCCC requires that all parties stabilize greenhouse gases concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner. Magarini PFMP addresses this convention through conservation of the forest and rehabilitation of degraded areas, which serve as important carbon sinks to minimize greenhouse gases in the atmosphere. REDD+ is a proposed mechanism under the UNFCCC to slow the loss of forest in order to mitigate against climate change and address rural poverty and preserve biodiversity. It embraces all the degraded areas in natural forests and promotes conservation of trees of special concern. REDD+ provides an opportunity for the stakeholders of Magarini forest to ensure that the natural forest remain standing and continue to serve as natural sinks and as the lungs of the world. This will ensure natural forests, which sustain livelihoods, and provide essential ecological services are sustainably managed.

4.2.4 Convention on Biological Diversity (CBD)

The objective of Convention on Biological Diversity (CBD) is to ensure that all forms of biodiversity are conserved. This includes the sustainable use of its components and the fair and equitable distribution of its benefits emanating from utilization of the genetic resources by appropriate transfer of relevant technologies, taking into account all rights over these resources. The CBD's principle gives rights to people to exploit their own resources pursuant to existing environmental policies; and responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or areas beyond the limits of national jurisdiction. It also promotes both *in-situ* and *ex-situ* conservation of the components of biological diversity. Magarini Mangrove Forest is endowed with diverse species of plants and animals, some which are endemic. The plan, therefore, endeavors to conserve, sustainably use and manage the resources therein for intergenerational equity.

4.2.5 Global Forest Goals

The UN Strategic plan for Forests (2017-2030) features six Global Forest Goals to be achieved by 2030, which are voluntary and universal. The strategic plan was adopted by the UN Forum on Forests to provide a global framework for actions at all levels to sustainably manage all types of forests and trees outside protected areas and halt deforestation and degradation. The Global Forest Goals are; -

- Reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation and contribute to the global effort of addressing climate change.
- Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest dependent people.
- Increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests.
- Mobilize significantly increased, new and additional financial resources from all sources for the implementation of sustainable forest management and strengthen scientific and technical cooperation and partnerships.
- Promote governance frameworks to implement sustainable forest management, including through the UN Forest Instrument, and enhance the contribution of forests to the 2030 Agenda.
- Enhance cooperation, coordination, coherence and synergies on forest-related issues at all levels, including within the UN System and across collaborative partnership on forests member organizations, as well as across sectors and relevant stakeholders.

All these goals have been reflected in the various management programmes of Magarini PFMP and thus have a correlation on what shall be done in the forest. Therefore, the implementation of the various activities outlined in the PFMP will directly contribute to the success of the Global Forest Goals.

4.2.6 Other Multilateral Environmental Agreement

Kenya has ratified a number of international agreements, protocols and Conventions that impact on wetlands and forest conservation. The key international agreements and conventions that are considered for forest conservation and wetlands conservation are summarized below.

Table 26: International Conventions Supporting Magarini Mangrove Forest Planning Process

Convention/Agreement	Relevance to Magarini mangrove Ecosystems
Nairobi convention for the protection, management and development of Marine and Coastal environment of western Indian ocean region (1990)	Conservation of coastal and marine Ecosystems including river basin
African Forest Landscape Restoration Initiative (AFRI100)	This aims at restoring One hundred Million hectares of Deforested and degraded land in Africa by 2030
East African community Protocol on environment and natural resources Management	Conservation of natural resources wetlands included
-The Ramsar Convention	Framework for international cooperation for the conservation and wise use of wetlands and their resources
United Nations Strategic plan for forests 2017-2030	Increase forest area by 3% worldwide by 2030 signifying an increase of 120 million hectares.
United nation decade on ecosystem Restoration 2021-2030	Is a rallying call for the protection and revival of ecosystems all around the world for the benefits of people and nature.
United nations Convention on Biological Diversity	Conservation of biological diversity, sustainable use of its components and the fair and equitable sharing of benefits arising from the use of genetic resources
United Nation Convention to Combat Desertification (UNCCD	Combat desertification and degradation in semi-arid areas and Magarini is one of them
United Nations Framework Convention on Climate Change (UNFCCC 1992)	Climate Change mitigation and adaptation
African Convention on the Conservation of Nature and Natural Resources, 1968 (as revised in 2003).	Natural Resource Conservation
Convention on Migratory Species (Bonn Convention, CMS) 1979	Conservation of terrestrial, marine and avian migratory species
Convention on International Trade in Endangered Species of Wild Fauna and	Regulation of trade in species which are endangered, or which may become endangered

Convention/Agreement	Relevance to Magarini mangrove Ecosystems
Flora (CITES)	if their exploitation is not controlled
Kyoto Protocol 1997	Kenya being one the signatories of this protocol on reduction of green-house gas emission and clean development mechanisms, Kenya participates in sale of carbon credits. Under this annex, Magarini Mangrove Community Forest Association will benefit from this
Sustainable Development Goals (SDGs): Goal 12,13,14 and 15	A strategy in tackling the world's greatest challenges related to global sustainable developments so as to achieve better and more sustainable future for all

4.3 Link to National Planning

4.3.1 Vision 2030

Vision 2030 is Kenya's development blueprint aiming at making the country a newly industrializing middle-income nation, providing high quality of life for all the citizens. The Vision is based on three pillars namely; the Economic pillar, Social pillar and Political pillar. The Economic pillar aims at providing prosperity to all Kenyans through an Economic Development Programme focusing on achieving an average Gross Domestic Product (GDP) growth rate of 10% per annum by the year 2030.

Environment is captured under the social pillar that seeks to build a just and cohesive society with social equity in a clean and secure environment. Forestry development cuts across components of the social pillar and is likely to get a central position in driving the country to achieving the vision.

Kenya government flagship projects for the environment tied to the three pillars and relevant to this plan include:

- The Water Catchment Management Initiative –rehabilitating the water towers
- The Wildlife Corridors and Migratory Routes Initiative – reclaiming all wildlife corridors and migratory routes
- The Land Cover and Land Use Mapping Initiative– comprehensive mapping of all land use patterns in Kenya
- Clean and healthy environment for every citizen

- Sustainable utilization of natural resources
- Increasing forest cover to 4% by 2012 and up to 10% by 2030, now fast-tracked to 2022
- Controlling invasive species to restore degraded areas.

4.3.2 National Forest Programme 2016-2030

The National Forest Programme (NFP) is a strategic framework for forest policy, planning and implementation to coordinate the sector's development. The NFP is designed to sustain and restore the resilience of forests in the country by ensuring that forests are able to withstand and recover from climate-related stresses and disturbances such as droughts, wildfires, and epidemics of insects and diseases while adhering to the principles of sustainable forest management. Sustainable forest management will ensure that benefits derived from forests meet current needs and still contribute to the requirements for long-term development. In view of this, investing in forestry research is critical in the development of appropriate technologies and in supporting innovations.

The NFP recommends good governance in the management of forest resources. Key areas proposed for intervention related to this PFMP for enhanced good forest governance include:

- Strengthening capacity of forest institutions to deliver on their mandates
- Reducing conflicts between industry, communities and governments at both national and county levels over resource management and benefit sharing
- Providing for the active involvement of vulnerable and marginalized groups in the society
- Enhancing forest law enforcement and compliance
- In conjunction with the development of the national REDD+ strategy developing a system for information on status of environmental and social safe Rangers.

It further calls for special attention to be paid to public participation where participatory approaches to forest conservation and management will be enhanced to ensure that the relevant government agencies, county governments, private sector, civil society and communities are involved in planning, implementing and decision-making processes. Involvement should be in all levels of forest management of women, youth, people living with disabilities and marginalized groups in society.

4.3.3 KFS Strategic Plan, 2023-2027

The strategic plan goal is to increase the forest cover by 1.15% during the plan period. This is the third medium term institutional blueprint document. It outlines the organization's roadmap to achieving the aspiration of Kenyans towards 10% tree cover after enactment of Forest Conservation and Management Act 2016. Key among outlined flagship projects relevant to this PFMP are:

- Rehabilitation of water towers and management of water catchments
- Farm and drylands tree planting initiatives
- Promotion of bamboo establishment and utilization
- Control of invasive species
- Forest parks and recreational areas initiative
- Forest protection and security

4.4 Rationale for management planning

The foundation of this management plan is the need for sustainability in conservation and benefit generation of the Magarini Mangrove Forest. There are immense ecological and economic paybacks to be accrued from a well-managed forest for which purpose this plan is geared towards. The following are snippets of the basis for this plan.

4.4.1 Value of Magarini Mangroves Forest

Magarini mangroves forest is rich in biodiversity of both flora and fauna. The mangrove forest has a rich biodiversity, including forestry, animals, endangered bird species and migratory birds' species. Has significant value to the forest adjacent communities that depend on it and it has a source of livelihood. They rely on the forest for energy requirements such as fuel wood, beekeeping, medicinal herbs and construction materials e.g., poles, fitos as well as other benefits. Although these practices are regulated by law due to their negative impacts on the environment, they are still regularly practiced and the need for alternative options is more than obvious. The forest also provides biodiversity conservation, climate moderation, ecotourism, research and educational values.



Plates 10: Participatory resource map

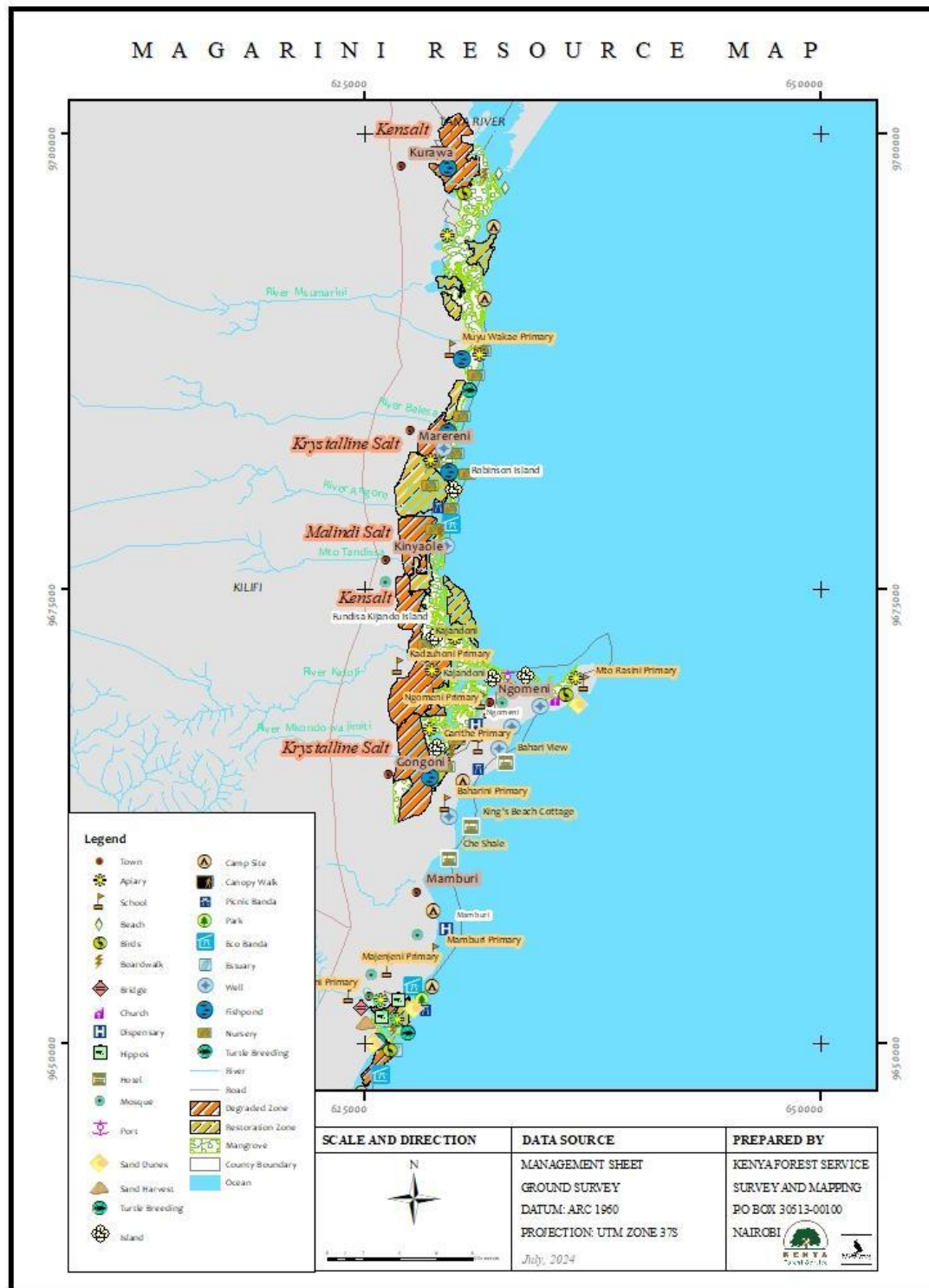


Figure 9: Resource Map

4.4.2 Threats to mangroves conservation

The main threats to the Magarini mangrove forest are inadequate enforcement of forest laws and regulations owing to inadequate personnel including forest guards, inadequate financial resources and requisite equipment such as patrol vehicles and boats among others, low community interest in PFM resulting from low benefits, which have resulted to inadequate community involvement in PFM activities. The case of wildlife poaching has also continued to pose challenges to the conservation of wildlife wiring the Magarini mangrove Forest while poverty continues to drive over exploitation of forest resources for sustenance. Moreover, there are cases of human wildlife conflict that have resulted in the poor attitude of the local community towards forest conservation. The existence of a weak CFA characterized by poor governance capacity and external interference further threatens effective mangrove forest conservation initiatives.

Table 27: Threat and Solution Matrix

Threats/constraints	Proposed solutions
Low community participation in PFM activities	Community sensitization/conservation awareness. CFA membership recruitment Adequate benefit sharing mechanism
Wildlife poaching	Community sensitization Initiation of sustainable IGAs
Weak CFAs	Capacity building of CFAs Resource mobilization to sustain CFA activities
Illegal extraction of forest products e.g. timber, poles, charcoal production	Community sensitization Initiation of sustainable IGAs
Disposal of high saline water by salt farms to the mangrove forest	Participatory monitoring of water salinity Identify boundaries between mangrove forest and salt farms Unblock rivers emptying into the ocean Salt companies to implement drainage of high saline water using closed system circulation approach Application of modern salt production technology
Poverty resulting to overexploitation of the mangrove forest resources	Initiation of IGAs to provide extra/alternative livelihoods to the forest adjacent community

4.4.3 Constraints to Mangrove Conservation

1. Mangroves are vulnerable to natural events such as changes in sea levels, which can cause significant damage.
2. Rising sea levels, increasing temperatures, and changing precipitation patterns have negatively impacted mangrove health and distribution.
3. The invasion of *Prosopis juliflora* (Mathenge) a Non-native species outcompetes mangroves, altering ecosystem dynamics and reducing biodiversity.
4. Coastal development for urbanization, tourism, agriculture, and salt-making has led to mangrove deforestation and habitat fragmentation.
5. Overharvesting mangrove wood for fuel, construction, and other purposes has depleted these forests.
6. Local communities rely on mangroves for their livelihoods, challenging conservation efforts without providing alternative income sources.
7. Inadequate enforcement of conservation laws and regulations has led to illegal logging, land conversion, and other destructive activities.
8. Poor coordination between government agencies, NGOs, and local communities has resulted in fragmented and ineffective conservation efforts.
9. Limited financial resources for conservation projects hinder the implementation and sustainability of mangrove protection measures.
10. Lack of comprehensive data on mangrove ecosystems, including their biodiversity, health, and ecological functions, has impeded effective conservation planning.
11. Mangrove restoration requires specific conditions, such as appropriate hydrology and sediment quality, making successful restoration projects difficult to achieve.
12. Limited capacity to monitor and evaluate conservation efforts reduces the ability to assess progress and adapt strategies as needed.

4.3 Problem analysis

Magarini Mangrove PFMP was built around solving problems and issues the community identified that are associated with the mangrove forest. These problems were grouped into thematic areas as follows.

4.3.1: Degradation of the mangrove forest and its biodiversity resources:

Degradation, in the context of mangrove forests and biodiversity resources, refers to the decline in the quality, structure, and functionality of these ecosystems. It can be manifested in various ways, such as the loss of habitat complexity, reductions in species richness and abundance, and alterations in ecological processes and services. The primary drivers of mangrove degradation include land-use changes, overexploitation, pollution, and climate change, which can interact synergistically to exacerbate the negative impacts on these ecosystems.

4.3.2: Land use and natural resource management issues in the mangrove forest landscape:

One of the significant issues associated with land use management in the mangrove forest landscape is the fragmentation of mangrove habitats. Coastal development projects, salt pans and residential areas, often lead to changes in land use patterns and increased sedimentation in mangrove forests. These activities can result in soil erosion, altered water flow, and decreased water quality, which negatively impact mangrove health and survival. Overexploitation due to unsustainable harvesting practices can lead to a decrease in mangrove populations and loss of biodiversity within these ecosystems. Land use changes in mangrove forest landscapes can lead to pollution from agricultural runoff and industrial waste disposal. These pollutants can contaminate soils and water bodies within mangrove forests, threatening the health of these ecosystems. Climate change poses significant challenges for land use management in mangrove forest landscapes due to its influence on temperature regimes, sea levels, and extreme weather events

4.3.3: Community livelihoods through sustainable use of natural resources available:

Mangrove forests provide a range of livelihood opportunities for communities living in coastal areas. The sustainable use of these natural resources can lead to improved community livelihoods while ensuring the conservation of mangrove ecosystems. Here are some of the ways communities can achieve sustainable livelihoods in mangrove forests:

4.3.4: Forest protection and coordination:

Forest protection and coordination in mangrove forests means that conservation efforts should be strategically planned to protect both the biodiversity of mangroves and the ecosystem services they provide. This means that conservation efforts should not only focus on protecting the species of mangroves, but also on protecting the habitats and ecosystems that they are part of. This can be done by creating protected areas, restoring degraded mangrove forests, and managing human activities in and around mangrove forests.

4.3.5: Research, Communication, awareness creation and capacity building:

Communication, awareness creation, and capacity building are crucial elements in mangrove conservation efforts. They play a vital role in fostering understanding, promoting participation, and ensuring the long-term sustainability of mangrove ecosystems. Communication involves effectively conveying information about the importance of mangroves, the threats they face, and the actions needed to protect them. Awareness creation focuses on raising public consciousness about the value of mangroves and the consequences of their degradation. Capacity building involves equipping individuals and communities with the knowledge, skills, and resources needed to effectively participate in mangrove conservation.

4.4 Vision, Missions and Objectives

4.4.1 The vision of the plan

The Magarini Mangrove PFMP envisions being the best coastal regional plan in mangrove and biodiversity conservation and economically empowering of its adjacent community.

Swahili Version

Kuwa Mwongozo bora katika mwambao wa pwani Kwa utunzaji wa raslimali za msitu wa mkoko, bayo anuai na kuinua kiuchumi jamii zinazoishi karibu na msitu wa mkoko.

Giriama Translation

“Kukala mulongozo mudzo kahiza mwambao wa pwani kwa kutsunza ushaha wa tsaka ra mikoko, hamwenga na zhumbe virizhoko kwa kunula akalatsi kiutsumi”

4.4.2 Mission of the plan

To make integrated plan where forest sectors stakeholders achieve sustainable growth in the social, economic and environment benefits by all user groups

4.4.3 Overall objectives

The overall objective of the plan is to conserve the mangrove forest and enhance the livelihood of the adjacent community through the Community Forest Association. The implementation of Magarini participatory forest management plan is anchored on the following strategic objectives aimed at achieving long term conservation of the forest and sustainable livelihoods among the Forest Adjacent Community.

4.4.4 Specific objectives

1. To enhance Mangrove Forest Conservation and Protection

This will address the following issues;

- Control of invasive species e.g. *Prosopis juliflora* -This can be done through physical control (manual removal using mechanical tools), biological control using pathogens and parasites on targeted areas, and chemical control (applying herbicides and pesticides on targeted areas).
- Control selective cutting of mangroves, both subsistence and commercial -Through community engagement and conducting awareness campaigns on the importance of mangroves and also involving the local communities in the protection and management of mangroves.
- Controlled sand harvesting -Mainly done through establishment of regulations addressing sand harvesting and permit to control where and when the sand harvesting occurs.
- Controlled pollution and siltation -Done by providing waste treatment facilities, organizing clean-ups and carrying out mangrove restoration to stabilize the shorelines.
- Enhance restoration of degraded sites -Through organizing mangrove planting events on the degraded sites/areas.

2. To enhance proper land use and natural resource management in the mangrove forest landscape

This will address the following;

- Reduce forest land encroachment -Provision of alternative livelihoods such as bee keeping, fish farming, and crop farming on adjacent lands to reduce over dependence on the mangrove forest
- Enhance local ownership -This is done by using the land tenure system allowing forest adjacent communities to own private lands, communal lands, and access the public lands
- Ensure access to forest and designated areas -Can be possible by increasing access to forest and giving equal authority under supervision
- Mapping mangrove areas and adjacent land use -Mainly done by the surveyors to ease activities taking place around the forest

3. To improve community livelihoods through sustainable use of natural resources available

This will address the following;

- Enhancing fisheries productivity and management -Encouraging sustainable fishing using standardized nets that only catches the required number of fish will help to reduce overfishing hence increasing the productivity of fisheries
- Improve beekeeping production and value chain -Bee keeping can be improved by offering training services to bee keepers and providing them with beehives together with other necessary requirements
- Ecotourism development -Development of ecotourism activities such as sand dune, boardwalk, birding etc.
- Improve domestic energy efficiency and fuelwood -The adjacent communities will only be allowed to collect the dead fuel woods which will provide them with energy
- Establish tree nurseries -Engaging the adjacent communities and supporting them with seeds to establish tree nurseries which will help them to raise income
- On farm forestry -Distribution of seedlings to the forest adjacent communities and encouraging them join CFAs will help to promote on farm forestry

4. To Improve Forest Protection and Coordination

This will help to address;

- Enrol, train and equip community scouts -This can be easily made possible through organizing educational camps and workshops. This will help to equip the individuals with knowledge on how best they can protect the forest
- Establish KFS outpost/station -Building of stations and putting up outposts will provide residence and ease protection activities
- Control human wildlife conflicts -Engaging the forest adjacent communities on how to protect themselves from dangerous animals, raising awareness on the importance of wildlife and how to protect them, and raising alarm whenever there is outbreak of dangerous animals
- Improve stakeholders' capacity to protect the forest by equipment and skills sharing through workshops

5. Communication, awareness creation and capacity building

This will address the following;

- Create awareness and attitude change -This can be done by organizing workshops to make the forest adjacent communities understand and embrace their role in the conservation and management of forest resources
- Build CFA and user groups capacity to manage themselves as functioning bodies by conducting AGMs.

4.5 Forest zonation and utilization

The Magarini Mangrove Forest zoning scheme aims to provide a framework for reconciling management needs of conserving natural resources, promoting sustainable use of forest resources, regulating, and promoting visitors' use. The scheme identifies areas where similar types and levels of use and management emphasis are appropriate and will enable the extent and type of visitor use to be managed spatially. For effective implementation of the specific objectives and actions articulated in this plan, the Magarini Mangrove Forest area will be zoned into _ as specified in the table 4.5 below:

Table 28:Mangrove Forest Zonation

Zone	Zone criteria	Management objectives
Biodiversity conservation zone	Area with high protection status	Protect all existing natural forest and its biodiversity Protection for natural regeneration Develop ecotourism facilities in all ecotourism attraction site as per the tourism development plan Create access tracks and nature trails with minimal ecological impacts
Fuel wood extraction zone	300m from the main Mangrove Forest boundary inside the forest	Only dead fuel wood to be collected
Subsistence utilization zone (None Wood product)	Alongside the Mangrove Forest Boundary	Allow only non-extractive Income Generating Activities Beekeeping Medicinal herbs collection Rehabilitation of degraded areas Aquaculture /Mariculture
Intervention zone	Forest adjacent zone, 5 km buffer from the mangrove forest boundary.	Promote on farm forestry and fruits orchards Promote alternative income for livelihood improvement Promote alternative and affordable energy technologies To create awareness and support basic education

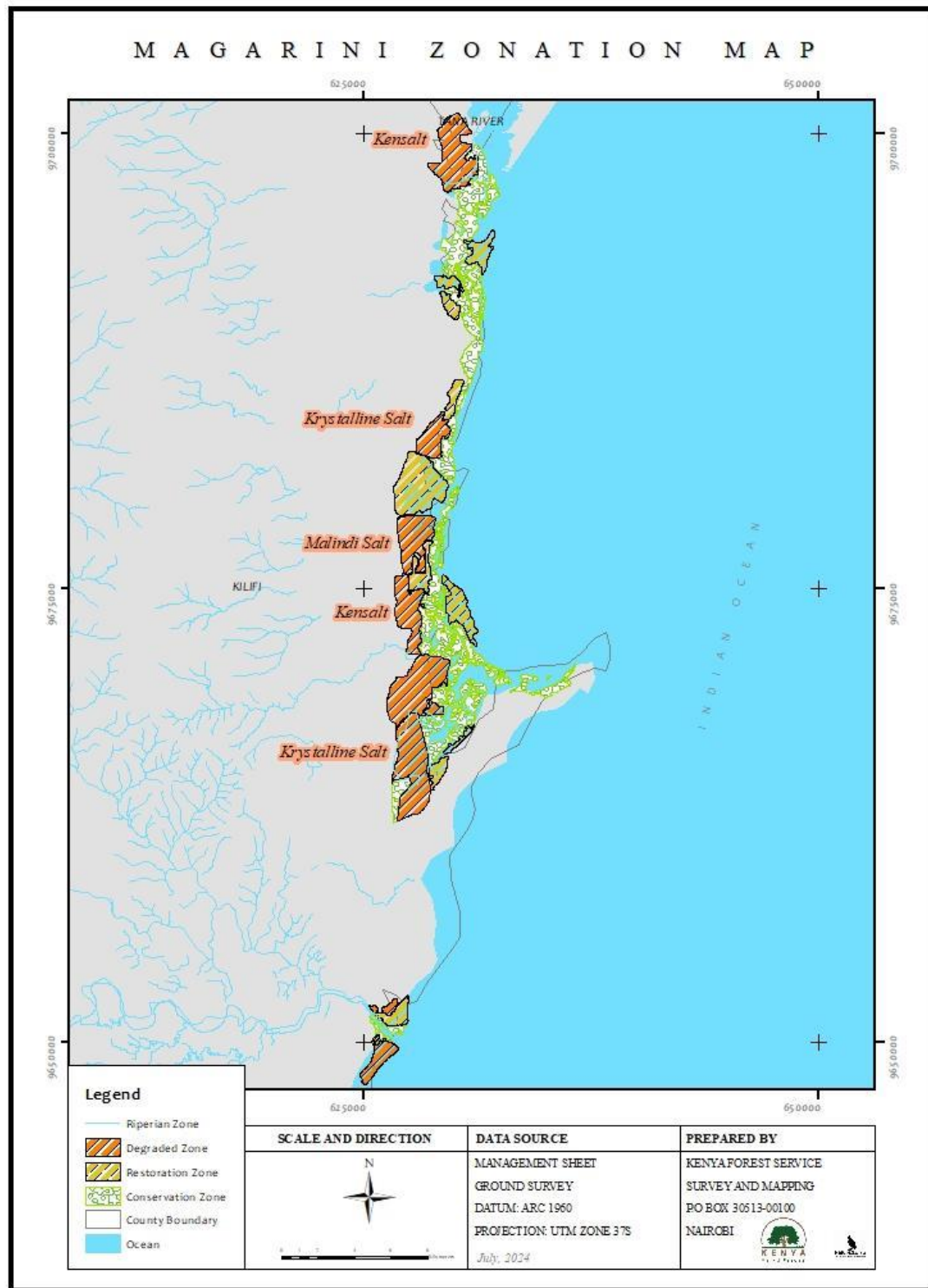


Figure 10: Zonation Map

CHAPTER FIVE:MANAGEMENT PROGRAMS

This chapter was developed based on the objectives of this plan and the strategies on how to solve the challenges and problems encountered by the local community. After having done situational analysis, and identification of threats of the Magarini mangrove ecosystem, five management programs were proposed to deal with the aforementioned issues.

- Mangrove forest and biodiversity Conservation Program
- Community Participation and Development Programme
- Water Resources Management Programme
- Wildlife and Ecotourism Management programme
- Fisheries and Marine Management Programme
- Protection and Security Management Programme
- Human Resource Management Programme
- Infrastructure and Equipment Management Programme
- Research and Education Management Programme

5.1 Mangrove Forest and Biodiversity Conservation Programme

5.1.1 Background

Mangroves are of high environmental importance such as carbon sequestration which is 10 times compared to terrestrial forest and therefore it's a major resource that plays a critical role in sustaining both local and national economies. These ecosystems however face multiple challenges including; Over-exploitation of wood products, conservation of mangrove forest areas to other land issues, pollution and sedimentation, Human wildlife conflicts and possible threats from salt firms. Their protection is therefore key in sustaining the provision of ecosystem goods and services. This program aims to ensure that mangrove forests are managed sustainably for non-timber forest products while maintaining environmental integrity.

Table 29: Degraded Areas

Area	Ha	Causes	Possible Solution
Garithe	96.315	Illegal grazing Illegal logging Blockage of channels Disposal of brine water (Salt manufacturing)	Awareness Restoration Protection Adapt environmentally friendly ways of disposing brine water
Ngomeni	28.328	Illegal Logging Sedimentation of the channels Illegal Grazing Collection of mud for construction Bait digging	Awareness creation Restoration with suitable species Protection
Rasi	115.74	Illegal Grazing Illegal Logging Charcoal production	Awareness creation Restoration with suitable species Protection
Marereni	13	Illegal Logging Blockage of channels through construction of dykes Disposal of brine water Salt farming	Awareness creation Restoration with suitable species Adapt environmentally friendly ways of disposing brine water
Kurawa	9.7	Illegal Logging Blockage of channels through construction of dykes Disposal of brine water Salt farming	Awareness creation Restoration with suitable species Adapt environmentally friendly ways of disposing brine water
Kadzuhoni	5.25	Encroachment Disposal of brine water Illegal Logging Unsustainable fishing method Unsustainable honey harvesting methods Salt farming	Boundary Realignment Protection Awareness creation Restoration with suitable species Adapt environmentally friendly ways of disposing brine water
Muyu wa Kae	30.75	Encroachment Disposal of brine water Illegal Logging Unsustainable fishing method Unsustainable honey harvesting methods Salt farming	Boundary Realignment Protection Awareness creation Restoration with suitable species Adapt environmentally friendly ways of disposing brine water
Kadzuyuni	11.25	Encroachment Disposal of brine water Illegal Logging Unsustainable fishing method Unsustainable honey harvesting methods Salt farming	Boundary Realignment Protection Awareness creation Restoration with suitable species Adapt environmentally friendly ways of disposing brine water
Kinyaole	2.75	Encroachment Disposal of brine water Illegal Logging Unsustainable fishing method Unsustainable honey harvesting methods Salt farming	Boundary Realignment Protection Awareness creation Restoration with suitable species Adapt environmentally friendly ways of disposing brine water
Sabaki	0.55	Siltation Illegal Grazing Illegal Logging Encroachment Invasive species i.e Mathenge	Physical uprooting of mathenge Protection Awareness creation Boundary Realignment

Total	263. 6855		
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5.1.2 Management issues and challenges

1. Vulnerability of mangroves to climate change and other natural calamities.
2. Over-exploitation of mangrove forest leading to loss and degradation of the habitats.
3. Inadequate knowledge on balancing different uses of mangroves and the associated ecosystem.
4. Encroachment and conversion of mangrove areas to other land-uses
5. Inadequate inventory data that could be used for mangrove forest management.
6. Disposal of saline water from salt firms leading to destruction of the ecosystem.
7. Occupation of available mangrove land by Invasive species such as *Prosopis juliflora* (mathenge)

5.1.3 Management Objectives

1. To protect mangrove forests for sustained ecosystem integrity and climate change mitigation.
2. To rehabilitate degraded mangrove forest areas.
3. To improve policing and protection from human illegal activities.
4. To promote sustainable utilization of mangrove non-wood products.
5. To manage and control the spread of invasive species within the mangrove area.
6. To promote proper disposal of saline water

5.1.4 Management Actions

Table 30: Mangrove Management programs and conservation actions.

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
Objective 1: To protect mangrove forests for sustained ecosystem integrity and climate change mitigation.										
Identify Mangr	No.	1	Reports Identifi	1					KFS, KEFRI, CFA,	3M

ove areas with unique habitat s and species diversit y for biodive rsity conser vation			cation of Site						KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, HOTEL S, SANM ARCO	
Monito r Mangr ove areas prone to coastal erosion , sedime ntation and other natural threats	No.	5	Report	1	1	1	1	1	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO	2M
Create aware ness betwee n stakeh olders about applica ble laws and regulat ions related to Mangr ove	No.	30	Report s Minute s	6	6	6	6	6	KFS, KEFRI, CFA	2M
Objective 2: To rehabilitate degraded mangrove forest areas.										
Map and identif y the degrad ed mangr	Ha	263. 6855	Maps	263. 6855					KFS, CFA	1M

ove area										
Delineate areas for natural regeneration	Ha.	263. 6855	Reports Photos	52.7	52.7	52.7	52.7	52.7	KFS, KEFRI, CFA, KWS, NK, COBEC, DEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	2M
Undertake Mangrove nursery establishment	No.	10	Reports Photos	2	2	2	2	2	KFS, KEFRI, CFA, KWS, NK, COBEC. EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	10M
Prepare and implement annual restoration plans	No.	5	Work plans Report	1	1	1	1	1	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	1M
Undertake restoration programs in the degraded Mangrove	Ha.	300	Reports Areas restored	60	60	60	60	60	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS,	70M

areas									SANM ARCO, BMU	
Objective 3: To improve policing and protection from human illegal activities.										
Train scouts to Enhance community policing	No.	40	Minutes of Meetings		20		20		KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	5M
Organize and implement community awareness barazas	No.	30	Reports	6	6	6	6	6	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU, NGAO	2M
Objective 4: To enhance sustainable utilization of Mangrove non-wood products.										
Undertake Mangrove Forest resource assessment to ascertain availability of various products and qualities	No.	3	Report	1		1		1	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	2M
Prepare	No.	6	Report	2	1	1	1	1	KFS, KEFRI,	1M

annual sustainable harvesting plans for non-wood products									CFA, KWS, NK, COBEC, DEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	
Objective 5: To manage and control the spread of invasive species within the Mangrove area.										
Conduct an EIA	No	7	EIA report						KFS, CFA, NEMA,	2M
Sensitize community living around the mangrove on the impact of grazing	No	20	Photos Reports	4	4	4	4	4	KFS, CFA, COBEC, EDEN, GRIOT	5M
Manage and control the spread of <i>Prosopis juliflora</i>	Ha.	30	Reports on area cleared	6	6	6	6	6	KFS, CFA, COBEC, EDEN, GRIOT	5M
Deploy rangers to conduct law enforcement through patrols	No	20	Rangers deployed	20					KFS, CFA, Security from salt firms, Strategic partners	
Objective 6: To promote proper disposal of saline water										
Conduct site visits in the salt compa	No	7	Companies visited Photos	7					KFS, CFA, BMU, NEMA, CGK,	0.1M

nies for verification of current disposal of saline water.									Salt Representative	
Develop participatory monitoring and evaluation team for daily monitoring of water quality-CFA, BMU, Salt Companies	No	1	Reports Photos	1					KFS, CFA, BMU, NEMA, CGK, Salt Representative	0.2M
Procure water-testing gadget-10	No	10	Receipts	10					KFS, CFA, BMU, NEMA, CGK, Salt Representative	0.1M
Conduct water quality test and compile report on the same	No	60	Reports	12	12	12	12	12	KFS, CFA, BMU, NEMA, CGK, Salt Representative	0.3M
Objective 7 :To reclaim all encroached mangrove area to public land										
Survey and map the mangr	No	1	No. of Surveys	1					KFS, CFA	2M

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5.2: Community Participation and Development Programme

5.2.1 Background Information

The communities living adjacent to Magarini Mangrove Forest are generally poor with low income due to high rate of unemployment and poor agricultural practices. Majority of the community members rely on the Mangrove Forest as source of fuel wood, building material and food. There is a need to create awareness and build capacity in areas of on- farm Forestry, smart agriculture, Energy efficient cooking technologies, apiculture, aquaculture/Mariculture and other livelihood activities.

5.2.2 Management issues and Challenges

1. Inadequate livelihood of communities leading to high poverty level
2. Inadequate community involvement in forest conservation and management
3. Ignorance and lack of conservation awareness
4. Overexploitation of forest resources
5. Inappropriate fishing and honey Harvesting methods and technologies
6. Lack of cooperation between stakeholders and the community living adjacent to the Mangrove Forest.
7. Land ownership issues limiting development

5.2.3 Management objective

1. Enhance alternative livelihood options such as nature-based enterprise
2. Enhance conservation awareness through barazas and platforms that gives the entire community an opportunity to freely participate in conservation program
3. Inspire and educate new generations, current children and youth, to protect wildlife and sustainably use natural resources
4. Ensure sustainable resource extraction in the Forest by CFA members
5. Enhance by providing modern technologies for beekeeping and fishing

6. Recruiting of more members from community living adjacent to the Forest into user groups in the CFA

5.2.4 Management Actions

Table 31: Management Actions for Community Participation and Development Programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)	
				1	2	3	4	5			
Objective 1: Enhance alternative livelihood options such as nature-based enterprise											
Encourage community in production and marketing of Mangrove seedling	No.	10M	Nursery reports and number of seedlings planted	2	2	2	2	2	NK, COBEC, EDEN, KFS, KEFRI, GK, GRIOT	25M	
Conducting training on Mangrove nurseries	No.	5	Training Reports and pictures	1	1	1	1	1	KEFRI, KFS	2.5M	
Training on ecotourism enterprises	No.	3	Reports and Pictures	3					CGK, KFS, KWS, NK, Ministry of Tourism	100M	
Conduct training on Aquaculture and Mariculture	No	5	Reports and Pictures	1	1	1	1	1	KFS, CFA, CGK-Fisheries Dept, Nature Kenya, KMFRI, NGAO, KEFRI,	2.5M	
Establish and Support beekeeping in Ngomeni ,Garithe, Kinyaule, Muyu wa Kae, Kadzuyuni, Kurawa , Mto wa Mawe, Sabaki	No.	8	Number of beekeeping enterprise supported and reports	8					CFA, Min of Agr, KFS, NK, CGK	10M	
Procure modern beehives and honey harvesting gears,	No.	220 beehives 22 harvesting gears	Reports and pictures	220	0	0	0	0	CFA, NK, COBEC, KFS, NMK, CGK, MIN. OF AGR	1.54 M	
Establishment of honey processing unit	No.	1	Reports and pictures	1	0	0	0	0	CFA, NMK, CGK, COBEC, KFS, NK, MIN. OF AGR	2M	

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
On farm tree growing (No of seedlings)	No.	500,000	No. of seedlings planted and Progress Report	100,000	100,000	100,000	100,000	100,000	KFS, NK, COBEC, EDEN, CFA, CGK,	10M
Organizing education exchange visits	No.	15		3	3	3	3	3	KFS, CFA, CGK, NGAO, Nature Kenya, Strategic Partners	2M
Support the farmers in 11 villages with farm inputs	No.	2000	No. of farmers supported and Reports	400	400	400	400	400	Min. of Agr, CFA NK, COBEC, CGK,	10M
Procure charcoal briquette machine 1 per area	No.	7	Machines procured		7				Min. of Agr, CFA NK, COBEC, CGK,	8M
Procure interlocking brick making machine 1 per area	No.	7	Machines procured		7				Min. of Agr, CFA NK, COBEC, CGK,	8M
Objective 2: Enhance conservation awareness through barazas and platforms that gives the entire community an opportunity to freely participate in conservation programme										
Conduct community sensitization barazas	No.	50	number of barazas, reports and pictures	10	10	10	10	10	CHIEFS, WARD ADMIN, CFA, NK, VILLAGE ELDERS, KFS, COBEC	2M
Engage community in International environmental days	No.	50	Reports and pictures	10	10	10	10	10	CFA, KFS, KEFRI, COBEC, EDEN, NK, CGK, EARTHLUNGS	10M
Objective 3 Inspire and educate new generations, current children and youth, to protect wildlife and sustainably use natural resources										
Strengthening wildlife and environmental clubs in schools (No. of Schools)	No.	20	Reports	4	4	4	4	4	CFA, KFS, NK, SALT FIRMS, KWS	5M
Support the community by providing scholarship to needy children	No.	100	No. of children supported & Reports	20	20	20	20	20	CFA, KFS, CGK, NK, Salt Firms	30M

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
(No. of children)										
Objective 4 Ensure sustainable resource extraction in the Forest by CFAs members										
Developing and implementing user right guidelines and other unsustainably extracted resources	No	7	reports	7					KFS, CFA, COBEC, NK, EDEN, SALT FIRMS, Pharmacy and Poisons Board, Strategic Partners	5M
New members registration into the user groups	No.	1000	Number of members registered and Reports	200	200	200	200	200	CFA	0.5M

5.3: Water Resources Management Programmes

5.3.1 Background

Magarini has one permanent river i.e Sabaki River and other seasonal rivers as follows; Gongoni kwa Katoli, Kadzuhoni Mkondo wa simiti, Angore at Kambi ya waya, Baleesa at Marereni, Msumaniri and Kanagoni .They serve the surrounding communities for purposes of domestic and commercial uses. However, the water resources face challenges, which should be addressed for betterment of the ecosystem.

5.3.2 Management challenges

1. Water pollution
2. Cultivation along riparian areas outside the forest
3. Trampling of animals causing soil erosion and siltation in water resources.
4. Lack of animal watering points.
5. Blockage of seasonal rivers

5.3.3 Management objectives

1. Sensitization on water management to the community and salt firms

2. To effectively manage waste and Sensitize Community on total led sanitation and solid waste management
3. To rehabilitate the affected areas with conservation appropriate tree species and enhance the conservation of riparian areas and water catchment areas.
4. Establish alternative water points outside and inside the Forest.
5. Unblocking of seasonal rivers for effective water flow

5.3.4 Management actions

Table 32: Management actions for Water Resources Management Programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
Objective 1: Sensitization on water management to the community and salt firms										
Sensitization barazas on water use and management	No.	75	Photos and attendance list, Minutes.	15	15	15	15	15	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU, MAWA SCO, WRA, NGAO	4M
Unblocking all seasonal rivers	No	6	Report and Pictures	6					KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU, MAWA SCO, WRA,	0.5m

									NGAO	
Trainin g of the commu nity Water Resour ces Users Associa tion (WRUA)	No.	8	Attend ance list, Minute s of meetin gs		2	2	2	2	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU, MAWA SCO, WRA	1M
Aware ness on water Act 2016 and water resourc es manag ement throug h stakeh olders meetin g at the locatio ns	No.	15	Photos, Report s	15					KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU, MAWA SCO, WRA, NGAO, PHOs, WRUA, KEMRI	0.5M
Objective 2: To effectively manage waste and Sensitize Community on total led sanitation and solid waste management										
Public aware ness creatio n on use of pit latrines	No	50	Numbe rs of public barazas and Report s	10	10	10	10	10	KFS, CFA, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU PUBLIC HEALT	5M

									H, NGAO	
Construct solid waste Collection point	No	10	Number of sites	2	2	2	2	2	KFS, COUNTY GOVT, PUBLIC HEALTH, CFA, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	2.5M
Organize beach cleanup on quarterly basis	No	20	Clean up conducted	4	4	4	4	4	KFS, CFA, CGK-Env Dept, NGAO, Schools	10M
Objective 3: Rehabilitate the affected areas with conservation appropriate tree species and enhance the conservation of riparian areas and water catchment areas.										
Identification and prioritization of critical water catchment sites and riparian areas to be rehabilitated	No.	1	Photos, Reports		1				KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	0.2M
Raise indigenous seedlings such as Mkulu Mnago	No.	40,000	No. of seedlings raised	8000	8000	8000	8000	8000	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT	2M

									FIRMS, SANM ARCO, BMU	
Planting of the seedlings in riparian areas	Ha.	100	No. of riparian areas planted	20	20	20	20	20	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	2M
Maintenance in the rehabilitated areas	Ha.	100	Water points maintained	20	20	20	20	20	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	3M
Create awareness on sustainable sand harvesting	No	20	Photos Reports	4	4	4	4	4	KFS, CFA, NEMA, CGK, NGAO, WRUA, WRA, Strategic Partners	1M
Objective 4: To establish alternative water points outside and inside the Forest.										
Drilling of boreholes in 6 blocks	No.	6	Drilled boreholes	2	1	1	1	1	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS,	12M

									SANM ARCO, BMU	
Provision of water storage tanks to CFA on-farm nurseries	No.	20	Tanks installed	4	4	4	4	4	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	2M
Construct animal water troughs	No	6	Troughs constructed	2	1	1	1	1	KFS, KEFRI, CFA, KWS, NK, COBEC, EDEN, GRIOT INTL, SALT FIRMS, SANM ARCO, BMU	12M

5.4 Wildlife and Ecotourism Management Programme

5.4.1 Background

Magarini Mangrove Forest is endowed with diverse wildlife and has high potential due to the availability of attractive sceneries and wildlife. If fully exploited, this would generate income for the community and reduce exploitation pressure on the forest. This management programme seeks to maximize benefits derived from ecotourism through marketing, develop tourism infrastructure, and build capacity of communities to effectively manage tourism enterprises in the Magarini Mangrove Forest. Tourism development activities provide benefits to communities but have positive and negative impacts on the Mangrove Forest ecosystem. The programme shall guarantee sustainable use of the Forest ecosystem and ensure ecosystem integrity. The purpose of this development programme is therefore to enhance tourism development and management to maximize benefits and revenue streams while safeguarding ecosystem integrity.

5.4.2 Management Challenges

1. Inadequate tourism infrastructure
2. Inadequate marketing plans for tourism products and services
3. Inadequate benefits from tourism for the local communities
4. Community not involved in ecotourism activities

5.4.3 Management Objectives

1. To develop an effective tourism plan and infrastructure and diversify tourism products
2. To enhance the forest and whole ecosystem as a tourist destination to travelers in the national, resident and locals.
3. To enhance community capacity in tourism entrepreneurship and implement stakeholders, benefits sharing strategies.
4. To address human-wildlife conflicts
5. To develop ecotourism management to CFA

5.4.4 Management actions

Table 33: Management Actions for Wildlife and Ecotourism Programme

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
Objective 1 To develop an effective tourism plan and infrastructure and diversify tourism products										
Develop Magarini Mangrove tourism development plan	No	1	Magarini Mangrove Forest tourism master plan	1					CFA, , CGK, KFS, KWS, TRA, NK	3.5M
Conduct feasibility studies to access the impacts of tourism activities on the Magarini Mangrove Forest ecosystem	No	1	Reports	1					CFA, CGK, KFS, KWS, TRA,	1.5M
Develop access roads to eco-tourism sites	No	5	Number of access roads developed and reports	2	1	1	1		CGK, KFS, KWS, TRA, CFA, Strategic Partners	15M
Develop and upgrade tourism facilities		14	No. of tourism facilities upgraded						CFA, CGK, KFS, KWS, TRA, NK, COBEC, WWF	
Establish Proposed Boardwalk at Moi, Kinyaule, Garithe, Muyu wa Kae, Kurawa	No	5		1	1	1	1	1	KFS, CFA, Nature Kenya, TRA, KWS, COBEC, CGK, Strategic Partners	15 M
Proposed Picnic Site at Moi, Kinyaule, Garithe,	No	7	No of Sites Developed	1	2	2	2		KFS, CFA, Nature Kenya, TRA, KWS,	5M

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
Muyu wa Kae, Kurawa, Ngomeni (Fungu la baniani A), Mambrui									COBEC, CGK, Strategic Partners	
Eco Bandas at at Moi, Kinyaule, Garithe, Muyu wa Kae, Kurawa	No	5	No. of Eco banda Developed		1	1	2	1	KFS, CFA, Nature Kenya, TRA, KWS, COBEC, CGK, Strategic Partners	5M
Proposed Zipline at Moi	No	1	Zipline developed	1					KFS, CFA, Nature Kenya, TRA, KWS, COBEC, CGK, Strategic Partners	10M
Proposed Canopy walk at Sabaki river mouth	No	1	Canopy walk developed	3	1	1	1	1	KFS, CFA, Nature Kenya, TRA, KWS, COBEC, CGK, Strategic Partners	10M
Establish proposed camp site at Sabaki	No	1	Campsite developed			1			KFS, CFA, Nature Kenya, TRA, KWS, COBEC, CGK, Strategic Partners	5M
Establish proposed Children fun park at Sabaki and Mambrui	No	2	Photos Reports		2				KFS, CFA, Nature Kenya, TRA, KWS, COBEC, CGK, Strategic Partners	10M
Develop Introduce and maintain a comprehensive system of visitor database	No	1	System developed	1					CGK, KFS, KWS, TRA, NK, COK	0.5M
Objective 2 To Market Magarini Mangrove ecosystem as a tourist destination to tourists, both local and international										
Develop website and social media handles such as facebook, Instagram, X, tiktok	No	1	Operational website and accounts	1					KFS, KWS, CFA, SARICODO, WWF, NK, CGK, TRA	0.5M
Print media i.e banners, sign posts, flyers, brochures	No	6	Reports, photos		6				KFS, CFA, STRATEGIC PARTNERS	1M
Electronic media for advertisement i.e Radios, documentaries	No	5	Reports	1	1	1	1	1	KFS, CFA, STRATEGIC PARTNERS	0.5M
Roadshows and walks	No	2	Reports, photos		1		1		KFS, CFA, STRATEGIC PARTNERS	3M
Develop tourism circuit	No	1	Circuit developed	1					KFS, KWS, TRA, COBEC, SARICODO, EDEN, SALT FARMS, CGK, NK, NMK	500,000
Objective 3 To enhance community capacity in tourism entrepreneurship and benefit sharing strategies										
Conduct community training in tourism entrepreneurship	No	5	No. of training and reports, photos	1	1	1	1	1	KFS, KWS, CFA, SARICODO, NK, TRA, WWF, COBEC, NMK, CGK, NGAO,	8M
Training of local tour guides	No	16	Reports and trained guides		16				KFS, KWS, CFA, NK, SARICODO, TRA	3M

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
Organize and enhance local and international tourism event e.g beach soccer tournaments, cultural events e.t.c	No	5	Reports and calendar of events	1	1	1	1	1	KFS, KWS, CFA, NK, SARICODO, TRA	6M
Enhance public and private partnerships in the management of ecotourism ventures	No	5	MoUs	1	1	1	1	1	KFS, KWS, CFA, TRA, SARICODO, CGK	2M
Develop benefit sharing mechanisms	No	1	Document developed	1					KWS, KFS, CFA, NK, SARICODO, TRA	150,000
Objective 4. To address human-wildlife conflicts										
Sensitize the community through barazas on human wildlife conflicts, wildlife behaviors and compensation mechanisms	No	20	No. of barazas conducted	4	4	4	4	4	CGK, KFS, CFA, NGAO, SARICODO, TRA, KWS	2M
Sensitization on Wildlife Conservation and Management Act 2016	No	20	No. of barazas conducted	4	4	4	4	4	CGK, KFS, CFA, NGAO, SARICODO, TRA, KWS	2M

5.5: Fisheries and Marine Management Programme

5.5.1 Background

Mangroves support rich biodiversity with high fish abundance. They provide fish nursery grounds ideal for fish breeding for much of the world's fish, shrimps, crabs and other shellfish. It provides food, shelter from predation and acts as a buffer zone. In this manner Mangrove acts as a critical source to replenish fish stock.

5.5.2: Management Issues and challenges

1. Over-exploitation of Mangrove fishery resources
2. Unsustainable fishing methods
3. Illegal fishing methods(poison)
4. Perception that the resource cannot be depleted
5. Over dependence on the fisheries resource.
6. Lack of alternative livelihood.
7. Inadequate fishing equipment and gears.
8. Unskilled fishermen.

5.5.3: Management Objectives

1. To venture into other alternative livelihood
2. To use sustainable fishing methods.

5.5.4: Management actions for Fisheries and Marine programme

Table 34: Management Actions for Fisheries and Marine Management Programme

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budge t (Ksh)
				1	2	3	4	5		
Objective 1: To venture into other alternative livelihood										
Identify areas of establishing aquaculture	No	4	Area identified	4					CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN.	5M
Establishment of complete Aquaculture ponds. fingerlings, pond liners, Pipping, fencing, shading)	No	4	Number of ponds constructed		1	1	2		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN.	6M
Establishment of complete mariculture ponds.	No.	4	No. of Ponds established	1	1	2			C.G.K IUCN CFA N.K	6M
Establishment of Artemia ponds in Kadzuhoni	No.	2	No. of ponds established		2				C.G.K IUCN CFA N.K	7M
Capacity building of 500 fishermen on conservation and management of fisheries resources	No	4 training sessions	-No. of trainings conducted Training reports	1	1	1	1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN.	10M
Objective 2: To use sustainable fishing methods.										
Procurement of sustainable fishing gear (gill nets)	No	20	Gill Nets Receipts		10		10		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN.	2M
Procurement of 27 ft fibre boat	No	2	Fibre Boats procured		1		1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN.	4M
Procurement of complete modern offshore fishing boat Engines (40HP)- Yamaha	No	2	40HP outboard Engine		1		1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN	1.5M
Procurement of GPS	No	2	GPS		1		1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN	1M
Procurement of fish finder	No	2	Fish finders		1		1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI,	80,000

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
									IUCN	
Procurement of fishing anchor of 20 Kgs	No	2	20kg Fish Anchor		1		1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN	40,000
Procurement of life rings	No	4	Life ring		2		2		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN	40,000
Procurement of Life Jackets	No	12	Life Jackets		6		6		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN	30,000
Procurement of Cooler box 100L	No	2	100L cooler box		1		1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN	80,000
Capacity building of 500 fishermen on conservation and management of fisheries resources	No	4 training sessions	-No. of trainings conducted Training reports	1	1	1	1		CFA, KFS, NK, KWS, KMFRI, CGK, KEFRI, IUCN.	10M

5.6: Protection and Security Management Programme

5.6.1 Background

Successful protection of Magarini Mangrove Forest from illegal activities and threats will depend on the provision of adequate security. There is a need to protect Mangroves in Magarini from illegal extractions, Forest fires and other forms of threats. Magarini Mangroves forms part of Jilore Forest station which has inadequate security personnel hence there is need to enhance security.

5.6.2 Management challenges

1. Illegal extractions of Forest products
2. Inadequate communication and surveillance systems
3. Inadequate personnel e.g., rangers, scouts

5.6.3: Management objectives

1. To protect Magarini Mangrove Forest from illegal activities and illegal extractions
2. Improve communication and surveillance systems.
3. To improve surveillance and security in the mangrove forest

5.6.4 Management actions for Protection and security management programme

Table 35: Management actions for Protection and security management programme

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)	
				1	2	3	4	5			
Objective 1 To protect Magarini Mangrove Forest from illegal activities and illegal extraction of Forest products											
Purchase individual scout equipment	No.	30	Issuance forms	15	15				KFS, CFA, NK, KWS, COBEC, SALT FIRMS.	1.5M	
Conduct field patrols by rangers and scouts	No.	480	Reports photos	96	96	96	96	96	CFA, KWS, NK, COBEC, KFS, SALT FIRMS.	15M	
Conduct regular meetings with NGAO, opinion/religious leaders, CSOs to discuss security and law enforcement strategies.	No.	20	Minutes	4	4	4	4	4	CFA, KWS, NK, COBEC, KFS, AROCHA KENYA, KEFRI, SALT FIRMS.	0.6M	
Objective 2: Improve communication and surveillance systems											
Improve information gathering through recruited community informers	No.	27	Number of informers recruited	27					KFS, CFA, DEVELOPMENT PARTNERS	3.5 M	
Objective 3:To improve surveillance and security in the mangrove forest											
KFS to deploy forest rangers	No.	15	Records Pay slips	15					KFS		
Enrolment and training community scouts in specific needs	No.	30	Number of scouts training conducted	15	15				KFS, CFA, NK, KWS, COBEC, EDEN, SALT FARMS	3M	

5.7: Human Resource Management Programme

5.7.1 Background

This management program aims to enhance the capacity of various stakeholders including, CFAs, KFS and other relevant stakeholders in Forest management and livelihood development. The main challenges relevant to this program are Poor coordination between stakeholders, inadequate human resource and inadequate skills in sustainable Forest management among others.

5.7.2 Management issues and challenges

1. Poor coordination between stakeholders
2. Inadequate human resource
3. Inadequate skills in sustainable forest management

5.7.3 Management Objectives

1. To enhance coordination between stakeholders
2. Empowerment of more human Resource
3. To provide training and capacity building for sustainable Forest management

5.7.4: Management actions for Human resource Management Program

Table 36: Management actions for Human resource Management Program

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
Objective 1: To enhance coordination between stakeholders										
Establish Forest level management committee	No.	1	Committee established	1					CFA, NK, KEFRI, KFS, KWS, COBEC, EDEN, Salt Firms, KEMSFED, CGK,	0.1M
Hold FLMC meetings	No.	20	No. of meeting & minutes	4	4	4	4	4	CFA, NK, KEFRI, KFS, KWS, COBEC, EDEN, Salt Firms, KEMSFED, CGK	2M
Objective 2. Empowerment of more human Resource										
Leadership and governance training	No.	25	Report	5	5	5	5	5	CFA, NK, KEFRI, KFS, KWS, COBEC, EDEN, Salt Firms, KEMSFED, CGK	5M
Objective 3. To provide training and capacity building for sustainable Forest management										

Train CFA management committee members on Forest management	No.	5	Report and pictures	1	1	1	1	1	CFA, NK, KEFRI, KFS, KWS, COBEC, EDEN, Salt Firms, CGK	2M
Conduct exchange visits for CFA	No.	5	Reports and pictures	1	1	1	1	1	CFA, NK, KEFRI, KFS, KWS, COBEC, EDEN, Salt Firms, CGK	5M

5.8 Infrastructure and Equipment Management Programme

5.8.1 Background

Sufficient infrastructure coupled with efficient logistics and procurement procedures is an important aspect of management in the mangrove forest. Magarini mangrove forest infrastructure includes access roads, boardwalk, Eco-Bandas etc. Proper management of this has a direct impact on the Forest protection and ecotourism.

There is inadequate infrastructure necessary to ensure proper operation and effective monitoring of the activities impacting the forest. Access to the forest is limited by blocked access roads

5.8.2 Management Issue and Challenges

- Inadequate provision and maintenance of infrastructure
- Insufficient logistic means to support field operations
- Weak communication means within the ecosystem
- Inaccessibility to the mangrove forest

5.8.3: Management objectives

- To put in place all necessary components of forest infrastructure required for the proper functioning of the forest and maintain in such a way as to ensure its availability at minimal cost.
- To create a vehicle fleet necessary to implement forest management activities.
- To put in place effective communication systems
- To improve access to mangrove forest

5.8.4 Management actions for Infrastructure and Equipment Management

Programme

Table 37: Management actions for Infrastructure and Equipment Management Programme

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)
				1	2	3	4	5		
Objective 1 To provide and maintain adequate infrastructure and equipment in key institutions										
Establish Proposed KFS-station at Kibaoni	No	1	Photos						KFS	5M
Establish KFS outpost at □ Marereni □ Ngomeni □ Kurawa	No	3	Outpost Constructed	3					KFS	6M
Construct and fully equip a resource Centre	No.	1	Number of constructed buildings		1				CFA, KFS, NK, KEFRI, SARICODO, KWS, NMK, SAN MARCO PROJECT, Salt Firms, Strategic Partners	10M
Ensure power and water supply for resource Centre	No	1	Installation record	1					CFA, KFS, NK, KEFRI, SARICODO, KWS, NMK, SAN MARCO PROJECT, Salt Firms, Strategic Partners	1M
Procure the necessary equipment for efficient running of a tree nursery Jembes Rakes Shade nets Gumboots Watering can Spades Wheelbarrow Pangas	Sets	2	Equipment Procured						KFS, CFA, CGK, Strategic Partners	12M

Action	Unit	5-year target	Means of verification	Annual targets (years)					Lead Agencies	Budget (Ksh)	
				1	2	3	4	5			
Objective 2 To procure vehicle fleet necessary to implement forest management activities											
Procure vehicle-Land cruiser	No	1	Purchase and inventory records			1			CFA, KFS, KWS, NK, KEFRI, SARICODO, NMK, SALT FIRMS, SAN MARCO PROJECT	15M	
Procure transport motorcycle(BOXER - 150CC	No	8	Purchase and inventory records	2	2	2	2		CFA, KFS, KWS, NK, KEFRI, SARICODO, NMK, SALT FIRMS, SAN MARCO PROJECT	1.5M	
Fuel and maintenance of vehicle and motorcycle	KES	9	Functional movable assets	2	2	2	2	1	CFA, KFS, KWS, NK, KEFRI, SARICODO, NMK, SALT FIRMS, SAN MARCO PROJECT	9M	
Objective 3: To put in place effective communication systems											
Map GSM coverage within the area of operation	No	1	Maps		1				CFA, KFS, Strategic partner	2M	
Procure communication and surveillance equipment, boat, smartphone, binoculars, VHF Radios, GPS	No	8	Records	2	2	2	2		CFA, KFS, KWS, NK, KEFRI, SARICODO, NMK, SALT FIRMS, SAN MARCO PROJECT	10M	
Procure a public address system	No	1	Photos Receipts		1				CFA, KFS, KWS, NK, KEFRI, SARICODO, NMK, SALT FIRMS, SAN MARCO PROJECT	0.5M	
Objective 4: To improve access to mangrove forest											
Get the required road map from survey office	No	1	Maps	1					CFA, KFS, KWS, NK, KEFRI, SARICODO, NMK, SALT FIRMS, SAN MARCO PROJECT		

5.9 Research and Education Management Programme

5.9.1 Background

The programme provides the information based upon which other management programmes carry out intervention activities. It aims at ensuring that the integrity of the forest ecosystem is enhanced and issues aimed at ensuring ecosystem integrity are addressed through integrated management. The programme further aims at addressing the various researchable issues that cut across all the programs

5.9.2 Management issues and challenges

- i. Habitat loss and degradation
- ii. Loss of biodiversity
- iii. Inadequate resources and capacity to undertake research and monitoring
- iv. Poor adoption of research findings by stakeholders
- v. Weak linkages between research and management of forest resources
- vi. Climate change
- vii. Inadequate inventory data that could be used for management

5.9.3 Management Objectives

- i. Use research and sound conservation practices for improved ecosystem management
- ii. Ensure the sound and sustainable management of the Magarini Mangrove Forest ecosystem which will support tourism development and sustainable use of natural resources
- iii. Maintain and improve the integrity of the ecosystem through habitat management

5.9.4 Management action for Research and Education

Table 38: Management action for Research and Education

Actions	Units	5 years target	Means of verification	Annual targets					Lead agency	Budgets (KShs)	
				1	2	3	4	5			
Objective 1 :Use research and sound conservation practices for improved ecosystem management											
Collection of available information of the Forest and its ecosystem	No.	1	Report	1						KEFR I, KMF RI, KFS, CFA, NK, COB EC, NMK , ARO CHA	5M

and identi fy knowl edge gaps Under take resear ch on biodiv ersity assess ment in Maga rini mangr ove	No	1	Repor ts	1			KEN YA, SALT FIRM S	
							KEFR I, KMF RI, KFS, CFA , NK, COB EC, NMK , A ROC HA KEN YA , SALT FIRM S	3M
Disse minati on of resear ch findin gs	%	100	Repor ts			1	KEFR I, KMF RI, KFS, CFA , NK, COB EC, NMK , A ROC HA KEN YA , SALT FIRM S	1M
Identi fy levels of Forest degra dation	%	100	Repor ts	50	50		KEFR I, KMF RI, KFS, CFA, NK,	2M

									COB EC, NMK , ARO CHA KEN YA , SALT FIRM S	
Traini ng comm unitie s in biodiv ersity protec tion and conse rvatio n	No.	350	Peopl e traine d	70	70	70	70	70	KEFR I, KMF RI, KFS, CFA, NK, COB EC, NMK , ARO CHA KEN YA, SALT FIRM S	4M
Train CFA memb ers in data collec tion and ecosy stem monit oring techni ques	No.	6	Traini ng report	2	2	2			KEFR I, KMF RI, KFS, CFA, NK, COB EC, NMK , ARO CHA KEN YA , SALT FIRM S	0.5M
Invest igate	No.	1	Repor t		1				KEFR I,	4M

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Objective 2 Ensure the sound and sustainable management of the Magarini Mangrove Forest ecosystem which will support tourism development and sustainable use of natural resources

Under stand key species populations in the ecosystem	No.	3	Report	1	1	1	KEFR I, KMF RI, KFS, CFA, NK, COB EC, NMK	3M
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Provide measures for the long-term survival of key species	No.	1	Report	1			KEFR I, KMF RI, KFS, CFA, NK, COB EC, NMK	13M
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Objective 3 Maintain and improve the integrity of the ecosystem through habitat management

Ensure	No.	4	Four	2	2		KWS,	2M
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e adequ ate long- term water availa bility for wildli fe			water points establ ished						KFS, CFA, NK, COB EC, NMK , ARO CHA KEN YA, SALT FIRM S, CGK, WRA KEFR I, KMF RI, KFS, CFA, NK, COB EC, NMK , ARO CHA KEN YA, SALT FIRM S	
Identi fy, monit or, and mana ge alien specie s	No.	5	Repor ts	1	1	1	1	1		3M
Mana ge Forest fires	No.	On need basis	Repor t	1	1	1	1	1	KFS, CFA , NK, COB EC, NMK , ARO CHA KEN YA , SALT FIRM S	3M
Avoid	No.	On	EIA/E	1	1	1	1	1	NEM	2M

destru ctive and insens itive devel opme nts within the Forest ecosy stem (parti cipati on in EIAs)		need basis	A report							A, KEFR I, KMF RI, KFS, CFA , NK, COB EC, NMK , ARO CHA KEN YA , SALT FIRM S, KFS, CFA
To receiv e stude nts, intern s, visitor s on excha nge basis	No.	5	No. of excha nge visits	1	1	1	1	1		

CHAPTER SIX:

PLAN IMPLEMENTATION

6.1 Plan implementation

Successful implementation of this plan will be guided by implementation of activities outlined in the various management programs. The activities in each program have been prioritized and resources identified for mobilization. The roles and responsibilities of relevant stakeholders have also been identified for smooth implementation of the management actions.

This plan will be implemented for 5 years (2025– 2030) through Annual CFA and station-based annual work plans with support from other sectoral plans. A monitoring and evaluation framework is included in the Plan to ensure its effective implementation. The Plan will be reviewed after 5 years and amendments undertaken on a need basis.

6.2 Resource mobilization and funding of the management plan

Effective implementation of Magarini Mangrove Participatory Forest Management Plan will require substantive funds for the recurrent and the capital development expenditure over the next 5 years (Chapter 5). The source of finance will come from fundraising through proposals written to non-state actors, Government consolidated funds as well as funds from external partners. Government funds will include: Funds appropriated to the national institutions for forest conservation and management; including KFS, KWS and KEFRI; revenue generated from licenses, levies and royalties imposed on forestry related activities and services; County Government funds appropriated through proposal writing for funding on nature-based activities in the mangrove forest. In addition, financial management, resource mobilization and revenue generation will be enhanced for successful implementation of the plan.

6.3 Financial management

To guide the implementation of this management plan, a financial management mechanism/system will need to be prepared for Magarini mangrove forest. Financial management will involve appropriate regulation of recurrent and development budgets. Expenditure will follow budget allocations for prescribed activities. Revenue collection based on forest resources will be in accordance with the Kenya Forest Service regulations and procedures

while funds due to the CFA will adhere to their constitution and by-laws governing management of various user groups. The CFA will develop proposals to raise funds from the various stakeholders identified in the plan and undertake financial management as guided by each donor. This will enable generation of adequate finances and other resources needed to implement various forest management activities as stipulated by this plan. Annual budget reviews will be undertaken to prioritize the operations in accordance with available funds and other prevailing circumstances and emerging issues.

6.4 Environmental Impact Assessment

Environmental Impact Assessments (EIA) will be carried out on all planned development activities before they are undertaken to ensure that potential negative impacts are recognized and mitigation measures included in the plan, in accordance with the requirements of EMCA (1999). Several activities that require environmental impact assessment have been identified and include establishment and expansion of eco-tourism facilities and buildings such as campsites and nature trails, construction of structures such as CFA offices and resource centers and construction of access roads.

6.5 Plan monitoring and evaluation

Information generated from monitoring and evaluation enables amendment of the plan during its implementation so as to reflect realities on the ground. Monitoring the implementation of this plan will be necessary to address emerging issues and adjusting of activities as need arises to ensure that the desired objectives are achieved. Thus, the M&E tool will assess project achievements, success and constraints, and provide a feedback mechanism to improve proposed activities, make adjustments wherever necessary and mitigate potential negative impacts. This will be achieved through the quarterly and annual reports station-based and CFA reports. M&E will therefore guide sound decision making on Mangrove Forest resource management.

6.6 Institutional Arrangements for Plan Implementation

Kenya Forest Service shall initiate the formation of a Local Level Mangrove Forest Management Committee consisting of representatives from KFS, representatives from the Magarini Mangrove community forest association (MMCFA) and other stakeholders in the area such as Nature

Kenya, NMK, KWS, KEFRI, Griot, Eden, COBEC and County Government of Kilifi in accordance with the National Mangrove Ecosystem Management plan (2017-2027). The committee will assist in implementation of the PFMP and the MFMA, and will be in charge of fundraising, implementation of specified activities, monitoring and evaluation in partnership with stakeholders, partners and other Government institutions as illustrated in Figure 6.

No.	Institution	No. of Members	Remarks
1	Kenya Forest Service	1	Forest station manager
2	Magarini Mangrove Community Forest Association	3	Chairman, treasurer, secretary (Based on blocks)
3	NGAO	1	Senior Asst. Chief Ngomeni Sub-loc
4	KWS	1	Senior Warden
5	KEFRI	1	Eco-region Office
6	County Government of Kilifi	3	• Ward administrator-Gongoni • Magarini Sub –county Environment Officer • Fisheries Officer
7	Nature Kenya	1	Project Officer
8	COBEC	1	Project Coordinator
9	Salt firms	1	Representation
10	Co-opted members with no voting powers		Will be called upon as need arises (Eden Restoration, Arocha Kenya, Griot
	TOTAL	13	

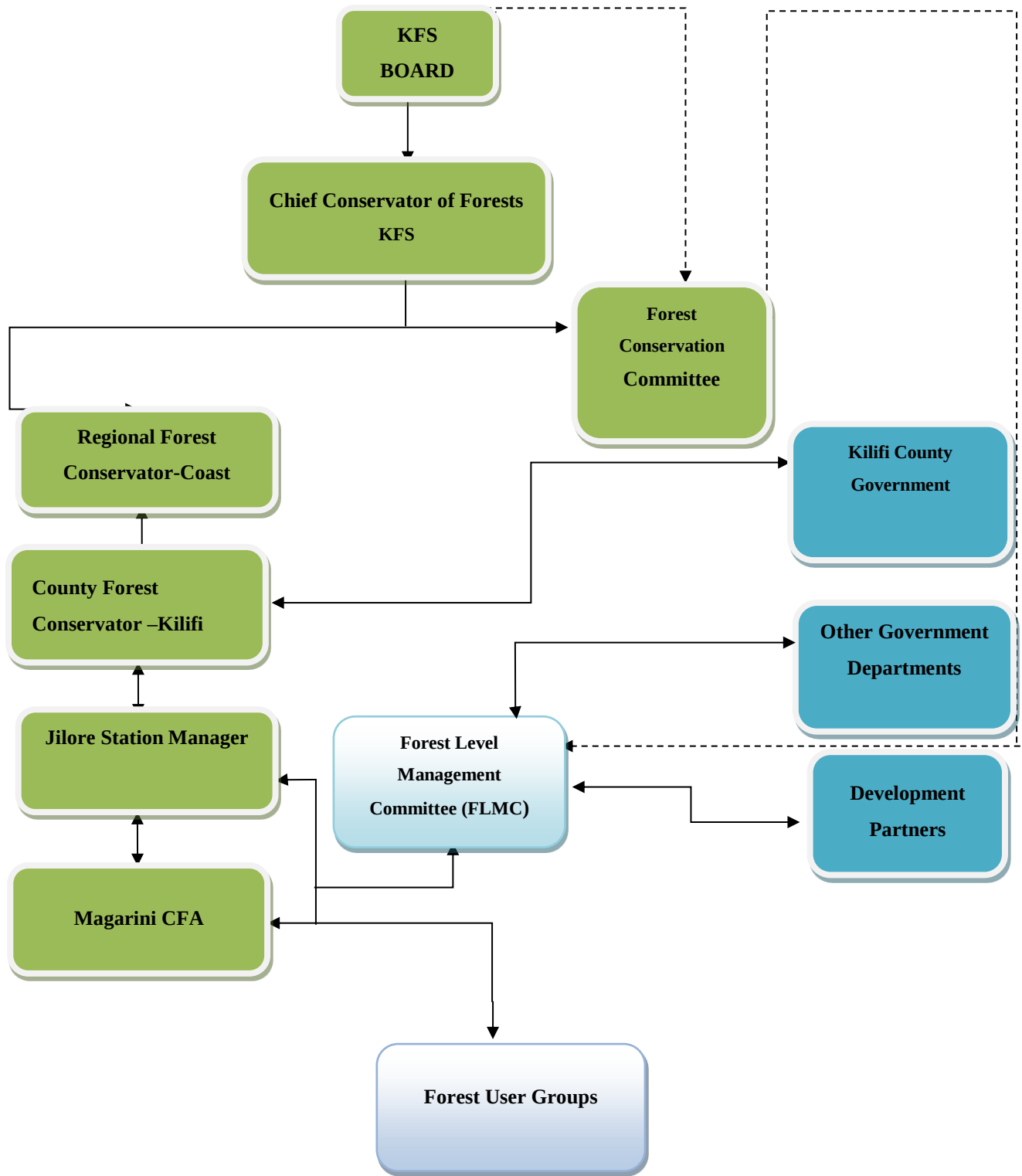


Figure 11: Institutional arrangement for implementation of Magarini Mangrove PFMP

REFERENCES

- Arabuko –Sokoke Forest Management Team (2002).Arabuko –Sokoke Strategic Forest Management Plan 2002-2027.Birdlife International, UK.
- Bennun, L.A. and Njoroge P. (1999) important bird areas in Kenya. Nairobi: Nature Kenya.
- Government of Kenya (2006). National Energy Policy and Energy Act, The Government Printers, Nairobi, Kenya.
- Dr. Wekesa, C., Rutto, G., Nyamai, V., Tabitha, Kioko, and Baya. (2024). Structure and status of mangroves disturbance in Sabaki and Magarini ecosystem. Government of Kenya (2008). Vision 2030, The Government Printers, Nairobi, Kenya.
- Government of Kenya (2009). The Agriculture (Farm Forestry) Rules Government of Kenya, 2010.
- GOK (2010). The constitution of Kenya 2010. Government Printers, Nairobi, Kenya
- Government of Kenya (2012). The County Governments Act, The Government Printers, Nairobi, Kenya.
- United Nations (2012). Sustainable Development Goals.
- Government of Kenya (2013). Agriculture, Fisheries and Food Authority (AFFA) Act No. 13.
- Government of Kenya (2013). National Government Co- Ordination Act: No 1; The Government Printers, Nairobi, Kenya.
- Government of Kenya (2015). The Wildlife Conservation and Management Act: The Government Printers, Nairobi, Kenya.
- Government of Kenya, (1999). Environmental Management and Coordination (Amendment) Act (EMCA). The Government Printers, Nairobi, Kenya.
- Government of Kenya (2016). The Forest Conservation and Management Act: The Government Printers, Nairobi, Kenya.
- Government of Kenya (2016). National Forest Program. The Government Printers, Nairobi, Kenya.
- GOK (2006). Energy Act. The Government Printers, Nairobi, Kenya.
- GOK (2008). Kenya Vision 2030.
- GOK (2010). Constitution of Kenya. Government Printers, Nairobi, Kenya.
- GOK (2012). County Government Act. The Government Printers, Nairobi, Kenya.
- GOK (2012). The Land Act. The Government Printers, Nairobi, Kenya.
- GOK (2013). Agriculture, Fisheries, and Food Authority Act.

GOK (2013). The Wildlife Conservation and Management Act. The Government Printers, Nairobi, Kenya.

GOK (2015) Draft National Forest Policy. The Government Printers, Nairobi, Kenya.

GOK(2015). Environmental Management and Coordination (Amendment) Act. The Government Printers, Nairobi, Kenya.

GOK (2016).Climate Change Act. The Government Printers, Nairobi, Kenya.

GOK (2016). Forest Conservation and Management Act.

GOK (2016). Ministry of Environment and Natural Resources

GOK (2016). Water Act. The Government Printers, Nairobi, Kenya.

GOK (2017). KFS Strategic Plan (2023-2027)

MENR (2015). National Forest Programme of Kenya (2016-2030).

Nature Kenya (2016). Kenya's Important Bird Areas Trends and Status Report.

United Nation Framework Convention on Climate Change (1997). The Kyoto Protocol

Tito, M. E., Mbuvi, J. K., Musyoki, S. U., Mwalewa, M., & Mwangangi, R. (2024). Socio-economic survey of mangrove forest adjacent communities in northern Kilifi County.

(Braun, H. M. (1980). Kenya Soil Survey. Republic of Kenya 23p).

(Kilifi County Government, 2018).

APPENDICES

Appendix 1: List of Participants

S/No	Name	Institution/ Organization	Inception	Scoping	Election of LPRT	LPRT Training	Field Survey	Zero Draft Preparation	Presentation and Draft 1 Preparation	Validation
1.	Elvis K Fondo	CFC Kilifi	✓	✓	✓					
2.	William Ochi	FSM-Jilore	✓	✓	✓	✓	✓		✓	✓
3.	Santos Ingosi	KFS- Mgt Plans	✓	✓						
4.	Joan Atibo	KFS-Mgt Plans	✓	✓		✓	✓		✓	✓
5.	Angela A Nyangwe	KFS-Mgt Plans							✓	✓
6.	Bryson Busolo Omondi	KFS-Surveyor					✓			
7.	Josyline Thambu	KFS			✓					
8.	Stephen Kioko	Nature Kenya				✓	✓	✓		
9.	Kunundu Eric	Nature Kenya				✓	✓	✓		
10.	Justice Baya	Nature Kenya				✓	✓	✓		
11.	Moses Amadi	Nature Kenya					✓	✓		
12.	Birya Kalu Guwa	Ngomeni				✓	✓	✓		
13.	Linnet Zabibu Pascal	KCG- Environment					✓	✓		
14.	Japhet Charo Faini	Gongoni				✓	✓	✓		
15.	Patience Harusi Chitoleh	Sabaki				✓	✓			

16.	Ali Sheban Alis	Ngomeni					✓			
17.	Ali Jumaa Nassor	Gongoni					✓			
18.	Shamu Justin	Kurawa				✓	✓			
19.	Zena Khamis	Marereni				✓	✓			
20.	Patricia Nyevu Kahindi	Kurawa				✓	✓			
21.	Michael Charo Kaingu	Marereni				✓	✓			
22.	Charo Ngumbao	ASFADA				✓	✓	✓		
23.	Nelson Mwakwaya Katana	Kinyaule				✓	✓			
24.	Benson Kadenge	Sabaki				✓	✓			
25.	Joseph Mangi	Sabaki					✓	✓		
26.	Martha M. Dzombo	Ngomeni				✓	✓			
27.	Emily Yesendi Reuben	Interior				✓	✓			
28.	Joseph Katana Sheni	Interior				✓	✓	✓		
29.	Ibrahim K. Barisa	Marereni				✓	✓	✓		
30.	Jacob I. Iha	Sabaki				✓	✓	✓		
31.	Jimmy M. Mweta	Kambi ya waya				✓	✓	✓		
32.	Dauglas M. Charo	MSW					✓	✓		
33.	Chifwete Bao Kaluo	BMU					✓			
34.	Anne Murithi	KAM				✓	✓	✓		

35.	Evans Mbora	C.C.K					✓			
36.	Stephen Charo Katana	KCKB.M.U					✓			
37.	Patrick Gambo	KAM				✓	✓			
38.	Shida Kombe	KENSALT					✓			
39.	Francis Kagama	Nature Kenya				✓	✓	✓		
40.	Juma D. Shehe	CFA				✓		✓		
41.	Ishmael M. Angore	Interior				✓				
42.	Shadrack Magambo Toya	CFA				✓				
43.	Mwanaisha Lali	CFA				✓				
44.	Garama Fondo	MMCFA				✓		✓		
45.	Mwangome Muye	COBEC						✓		
46.	Kahindi Nzai	MMCFA						✓		
47.	Loyce Chea	MMCFA						✓		
48.	Dara Rose	MMCFA						✓		
49.	Mishi Charo	MMCFA						✓		
50.	Wara Katana	MMCFA						✓		
51.	Lewa Nichlus Ruwa	MMCFA						✓		
52.	Patrick Gowa Katana	MMCFA						✓		
53.	Rodgers Kahindi	MMCFA						✓		
54.	Enock Sonkoyo	KFS						✓		

55.	William Iha	Kilifi County Government						✓		
56.	Deblina Mtana	CGK-F.O						✓		
57.	Erastus Kithi	COBEC						✓		
58.	Jackson Yerih Kadenge	Muyu Wa Kae								
59.	Michael Kombe Mungere	MMCFA								
60.	Azani Ngombao Thoya	MARERENI								
61.	Joshua K. Dzombo	NGOMENI								
62.	Clarise Wanjiro Ponda	KIBAONI								
63.	Josephine Musyoke	KEFRI								
64.	Nelton Mzungu Katana	MAMACOFA								
65.	Kasena Gona Chengo	MAMACOFA								
66.	Evans Jilani	MAMACOFA								
67.	Estony Mwanyamba	MMCFA								
68.	Paul Ngalla Mwagandi	SARICODO								
69.	Chrispin Kahindi Mangi	MMCFA								
70.	Garama Ngumbao	ASFADA								
71.	Rose Mwangangi	KEFRI								
72.	M.T.C Mbuvi	KEFRI					✓			

73.	Chengo Charo	MMCFA								
74.	Sylvia Mwalewa	KEFRI								

Appendix 2: Participation in Sensitization and Election of LPT from 22nd to 24th August 2023

Date	Venue of Baraza	Location covered	Total
22/08/2023	Majenjeni Primary school	Magarini	76
	Kadzuhoni Market	Gongoni	75
	Ngomeni Market	Gongoni	91
	Garithe Market	Gongoni	125
	Kibaoni Market	Fundi Issa	55
	Marereni Chiefs Office	Marereni	89
23/08/2023	Kanagoni Market	Marereni	101
	Muyu waKae Playing ground	Marereni	203
	Kinyaole primary school	Fundi Issa	98
24/08/2023	Moi-Sabaki Market	Magarini	37

Appendix 3: List of tree and Shrubs species found within Magarini

No	Local Name	Common Name	Scientific Name	Importance of tree species
	Mijikenda			
1.	Mkoko		<i>Rhizophora mucronate</i>	Timber Fuel wood Building poles
2.	Muia		<i>Bruguiera</i>	Timber Fuel wood Building poles
3.	Kikandaa		<i>Lumnitzera racemosa</i>	Timber Fuel wood Building poles
4.	Mkandaa		<i>Ceriops tagal</i>	Timber Fuel wood Building poles
5.	Msikundazi		<i>Heritiera littoralis</i>	Timber Fuel wood Building poles
6.	Mchu		<i>Avicennia marina</i>	Timber Fuel wood Building poles
7.	Mkomafi		<i>Xylorcarpud gratatum</i>	Timber Fuel wood Building poles
8.	Mlilana		<i>Sonneratia alba</i>	Timber Fuel wood Building poles
9.	Mkomafi dume		<i>Xylocarpus moluccensis</i>	Timber Fuel wood Building poles
10.	Mkilifi	Neem tree	<i>Azadirachta Indica</i>	Timber Poles
11.	Muborea	gmelina	<i>Gmelina arborea</i>	Timber
12.	Mvunje	Whistling pine	<i>Casuarina eqwisetifolia</i>	
13.	Muembe	Mango tree	<i>Mangifera indica</i>	Timber Fruits
14.	Mkanju	Cashew nut tree	<i>Anacardium occidentale</i>	Timber Fuel wood Fruits
15.	Mnazi	Coconut palm	<i>Cocos nucifera</i>	Timber Coconut production Makuti
16.	Mkoma	Doom palm	<i>Hyphaene compressa</i>	Fruits
17.	Mjaji	Monkey /elephant/ orange	<i>Strychnos spinosa</i>	Fruits
18.	Mkone		<i>Grewia plagiophylla</i>	Ropes Fuel wood Building poles
19.	Mnyumbu		<i>Lannea schweinfurthii</i>	Timber Fuel wood

20.	Mwamba	pod-mahogany	<i>Afzelia quanzensis</i>	Timber Fuel wood
21.	Mathenge		<i>Prosopice juliflora</i>	Fuel wood
22.	Mkayamba	Camel foot	<i>Piliostigma thonningii</i>	
23.	Mtsemeri	Nile thorn	<i>Acacia senegalisis / acacia nilotica</i>	Fuel wood Building poles
24.	Mkingiri		<i>Dichrostachys cinerea</i>	
25.	Mhowe		<i>Thespesia danis</i>	Edible fruits Building poles Fuel wood
26.	Mugamu	Blue gum	<i>Eucalyptus saligna</i>	Building poles Fuel wood
27.	Mwanga	Terminalia	<i>Terminalia spinosa</i>	
28.	Mkulu	Bird cherry	<i>Diospyros bussei</i>	Timber Fuel wood Building poles
29.	Mnango	Milk berry	<i>Manilkara mochisia</i>	Timber Fuel wood Building poles
30.	Kikwatha	Gum Arabic tree	<i>Acacia senegal</i>	
31.	Mung'ambo		<i>Manilkara sansibarensis</i>	Edible fruit Timber
32.	Mkungu	Bastar almond	<i>Terminalia catappa</i>	Fruits
33.	Mtundukula	Sour plum	<i>Ximenia americana</i>	
34.	Mkunazi	Buffalo thorn	<i>Ziziphus Mauritania</i>	Edible fruit
35.	Mkokoa	henna	<i>Maytenus senegalensis/lawsonia inermis</i>	
36.	Mkasiri			
37.	Mkereng'enze			
38.	Mkwaju	Tamarind	<i>Tamarindus Indica</i>	Fruits
39.	Mhega kululu			Timber Fuel wood Building poles
40.	Mfudu		<i>Vitex ferruginea</i>	Fruits
41.	Mzungi	Ben oil/ moringa	<i>Moringa oleifera</i>	Medicinal
42.	Muuyu	Baobab	<i>Atansonia digitata</i>	
43.	Msufi	Silk cotton tree	<i>Ceiba pentandra</i>	

Appendix 4: List of wildlife and Bird Species Found in Magarini Mangrove

COMON NAME	SCIENTIFIC NAME	LOCAL NAME
Wildlife Species		
Sykes Monkey	<i>Cercopithecus mitis</i>	Kima
Vervet Monkey	<i>Chlorocebus pygerythrus</i>	Tsalu
Olive baboon	<i>Papio anubis</i>	Yonda
Dikdik	<i>Madoque</i>	kavii
Cape Hare	<i>Lepus capensis</i>	Tsungula
Hippopotamus	<i>Hippopotamus amphibius</i>	Kiboko
Genet cat	<i>Genetta genetta</i>	Nzuzi
Leser Garago	<i>Garago senegalensis</i>	Komba
Giant Gambian rat	<i>Cricetomys gambianus</i>	Kuhe
Mongoose	<i>Herpestidae</i>	Kalakonje
Fisi	<i>Hyna spurred</i>	Crucuta crucuta
African civet	<i>Viverra civetta</i>	Kala konje
Aardvack	<i>Orycteropus afer</i>	Loma /mhanga
Wild cat	<i>Felis lybica</i>	Monzo
Savanna monitor lizard	<i>Varanus exanthematicus</i>	Mburu kenge
Crocodile	<i>Crocodylidae</i>	mamba
squirrel	<i>Sciuridae genera</i>	Kavare
Birds Species		
Abyssinian white-eye	<i>Zosterops abyssinicus</i>	
African golden oriole	<i>Oriolus auratus</i>	Kolobilo
African palm swift	<i>Cypsiurus parvus</i>	
African paradise flycatcher	<i>Tersiphone viridis</i>	Kanyeri
African Sacred ibis	<i>Threskimos aethipicus</i>	
African spoonbill	<i>Platalea alba</i>	
Amethyst Sunbird	<i>Chalcomitra amethystina</i>	Kajema-kozi
Barn swallow	<i>Hirundo rustica</i>	Katsungurizi
Bat hawk	<i>Macheiramphus alcinus</i>	
Black-backed puff back	<i>Dryscopus cubla</i>	
Black-headed oriole	<i>Oriolus larvatus</i>	Kolobilo ra kitsa-kiru
Black kite	<i>Milvus migrans</i>	Mwee
Black-winged stilt	<i>Himantopus himantopus</i>	
Black-crowned tchagra	<i>Tchagra senegalus</i>	Ororo
Blue-napped mousebird	<i>Urocolius macrourus</i>	Mbuche
Caspian tern	<i>Hydroprogne caspia</i>	
Coastal cisticola	<i>Cisticola haematocephalus</i>	Kasoso
Collard palm thrush	<i>Cisticola haematocephalus</i>	

Collard pratincole	<i>Giareola pratincola</i>	
Common Greenshank	<i>Tringa nebularia</i>	
Common Bulbul	<i>Pycnotus barbatus</i>	Kashore
Common/ fork-tailed Drongo	<i>Dicrurus adsimilis</i>	Mlamba
Common ringed plover	<i>Charadrius hiaticula</i>	
Common Sandpiper	<i>Actitis hypoleucos</i>	
Common tern	<i>Sterna hirundo</i>	
Crested francolin	<i>Francolinus sephaena</i>	Kereng'endze
Curlew sandpiper	<i>Calidris ferruginea</i>	
Dimorphic egret	<i>Egretta dimorpha</i>	
East coast boubou	<i>Laniarius sublacteus</i>	
Emerald-spotted dove	<i>Turtur chalcospilos</i>	Kathoro
Eurasian golden oriole	<i>Oriolus oriolus</i>	Mutumwa Wa kolobilo
Eurasian whimbrel	<i>Numenius phaeopus</i>	
Golden palm weaver	<i>ploceus bojeri</i>	Ts'ongo
Grassland Pipit	<i>Anthus cinnamomeus</i>	
Great white egret	<i>Ardea alba</i>	
Greater crested tern	<i>Thalasseus bergil</i>	
Greater Flamingo	<i>Phoenicopterus roseus</i>	
Greater sand plover	<i>Charadrius leschenaultii</i>	
Grey-headed heron	<i>Ardea melanocephala</i>	
Grey-headed kingfisher	<i>Halcyon leucocephala</i>	Muchebele
Grey heron	<i>Ardea cinerea</i>	
Grey plover	<i>Pluvialis squatorola</i>	
Gull-billed tern	<i>Gelochelidon nilotica</i>	
Heuglin's gull	<i>Lurus heuglini</i>	
House crow	<i>Corvus splendens</i>	Kunguru
Intermediate egret	<i>Ardea intermedia</i>	
Isabellian shrinker	<i>Lanius isabellinus</i>	
Kittlitz's plover	<i>Charadrius pecuarius</i>	
Lesser black-backed gull	<i>Larus fuscus</i>	
Lesser crested tern	<i>Thalasseus bengalensis</i>	
Lesser flamingo	<i>Phoeniconaias minor</i>	
Lesser grey shrike	<i>Lanius minor</i>	
Lesser sand plover	<i>Charadrius mongolus</i>	
Lesser striped swallow	<i>Hirundo abyssinica</i>	
Little egret	<i>Egretta girzetta</i>	
Little ringed plover	<i>Charadrius dubius</i>	
Little stint	<i>Calidris minuta</i>	
little swift	<i>Apus affinis</i>	Katsumbwirizi
Long-tailed cormorant	<i>Micro carbo africanus</i>	
Long-tailed fiscal	<i>Lanius cabanisi</i>	Bonobono
Malachite Kingfisher	<i>Alcedo cristata</i>	Muchebele zia
Marsh sandpiper	<i>Tringa stagnatilis</i>	

Northern Brownbul	<i>Phyllastrephus strepitans</i>	
Northern greenbul (Little greenbul)	<i>Eurillas virens</i>	
Northern grey-headed sparrow	<i>Passer griseus</i>	
Pied avocet	<i>Recurvirostra avosetta</i>	
Pied Kingfisher	<i>Ceryle rudis</i>	
Purple-banded sunbird	<i>Cinnyris bifasciatus</i>	
Red-billed quelea	<i>Quelea quelea</i>	Ts'ongo- mustafu
Red-billed firefinch	<i>Lagonosticta senegala</i>	
Red-fronted tinkerbird	<i>Pogoniulus pusillus</i>	Kamango
Red-backed shrike	<i>Linius collurio</i>	Kagonzi
Red-chicked cordon-bleu	<i>Uraeginthus bengalus</i>	katsenzere
Red-eyed dove	<i>Streptopelia semitorquata</i>	Giya-mangamanga
Ring-necked dove	<i>Streptopelia capicola</i>	Giya-peruperu
Ruddy turnstone	<i>Arenaria interpres</i>	
Sacred ibis	<i>Threskimos aethipicus</i>	
sanderling	<i>Calidris alba</i>	
Saunders tern	<i>Sternula saundersi</i>	
Scarly babbler	<i>Turdoides squamulata</i>	Zhege-zhege
Slender-tailed nightjar	<i>Caprimulgus clarus</i>	
Sombre greenbul	<i>Andropadus importunus</i>	
Sooty gull	<i>Ichtyaetus herprichii</i>	
Speckled mouse bird	<i>Colius striatus</i>	Panza
Spectacled Weaver	<i>Ploceus ocularis</i>	
Spotted morning thrush	<i>Cichladusa guttata</i>	
Spotted palm thrush	<i>Cichladusa guttata</i>	
Spur-winged plover	<i>Vanellus spinosus</i>	
Swift tern	<i>Thalasseus bergii</i>	
Terek Sandpiper	<i>Xenus cinereus</i>	
Three-banded plover	<i>Charadrius tricollaris</i>	
White-browed coucal	<i>Centropus superciliosus</i>	Gude
White-browed robin chat	<i>Cossypha heuglini</i>	
White-fronted plover	<i>Charadrius marginatus</i>	
White-winged black-tern	<i>Childonias leucopterus</i>	
wood sandpiper	<i>Tringa glareola</i>	
Yellow-bellied stork	<i>Mycteria ibis</i>	
Yellow-billed egret	<i>Ardea brachyrhyncha</i>	
Yellow-fronted canary	<i>Serinus mozambicus</i>	Kanangunangu
Zanzibar Sombre Greenbul	<i>Andropadus importunus</i>	Kajawili

No.	Site (local area name)	GPS Readings	Type of Forest and Status	Main Tree/Plant Spp	Animal Spp of Special interest	Threats Identified	Possible Solution	Current and Potential
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Appendix 5: List of Resources Mapped in Magarini Mangrove

		Elevation (M)	Northings	Eastings						
1	Ondo	5	0629584	9680736	Good shape	Mangrove	Flamingoes	Pollution, Land degradation	Restoration, Patrols by KFS, Awareness	Nil
2.	Ikulu	3	0630061	9680627	Some degree degradation	Black mangrove	Oysters, Fish	Charcoal production, pollution	Restoration, Patrols by KFS, Awareness	Nil
3	Ikulu	3	0630022	9680658	Some degree degradation	Ceriops, Rhizophora, Bruguiera	Oysters, Fish	Charcoal production, illegal logging	Restoration, Patrols by KFS	Nil
4	Mto wa mawe	0	0629410	9681923	Intact	Bruguiera, Prosopis. Ceriops, Avicennia	Birds, Oysters, Fish, Baboons	Collapsed bridge	Re-construction of the bridge	Bridge
5.	Kwa kanyama	8	0630139	9683715	Degraded	Avicennia, Ceriops, Rhizophora, Bruguiera	Fish, Prawns	Charcoal production, illegal logging, Mangrove debarking	Restoration	Nil
6.	Kwa kanyama	13	0630173	9683680	Degraded	Avicennia, Rhizophora	Fish	Environmental degradation, Pollution	Restoration	Nil
7	Mto wa mawe	6	0630123	9682391	On- going degradation	Avicennia, Ceriops, Rhizophora, Bruguiera	Fish, Prawns	Degradation, Impossible roads	Education and awareness on Mangrove forest, Climate change	Potential
8	Kwa kanyama	9	0629752	9683062	Degraded	Avicennia, Ceriops, Rhizophora	Fish	Illegal logging, Mangrove debarking	Security, Awareness	Nil
9	Kwa kanyama	7	0629564	9682589	Degraded	Avicennia, Rhizophora	Fish	Illegal logging	Restoration	Nil
10	Kwa kanyama	7	0629557	9682543	Degraded	Avicennia, Ceriops	Fish	Pollution	Awareness	Nil
11	Mto wa mawe	1	0629361	9682063	Intact	Avicennia, Ceriops, Rhizophora, Bruguiera	Crabs, Fish, Oysters, Birds	Pollution	Restoration	Nil

12	Mto wa mawe	2	0629388	9682092	Degraded	Avicennia, Ceriops, Rhizophora, Bruguiera	Birds	Environmental degradation, Pollution	Restoration, Patrols by KFS	Nil
13	Mto wa mawe	3	0629446	9682132	Degraded	Avicennia, Ceriops, Rhizophora, Bruguiera	Bees	Environmental degradation, Pollution	Waste disposal system, Awareness	Nil
14	Ikulu	3	0630004	9680668	Degraded	Avicennia, Ceriops, Rhizophora, Bruguiera	Fish	Charcoal production, illegal logging, Pollution	Waste disposal system, Awareness	Nil
15	Mto wa mawe	6	0629919	9682281	Degraded	Avicennia, Ceriops, Rhizophora, Bruguiera	Prawns, Birds	On-going Mangrove forest destruction	Restoration	Nil
16	Mto wa mawe	2	0629937	9682287	Degraded	Avicennia, Ceriops, Rhizophora, Bruguiera	Fish	Unsustainable fish harvest, Illegal logging	Restoration	Nil
17	Mto wa mawe	3	0630007	9682319	On- going forest destruction	Avicennia, Ceriops, Rhizophora, Bruguiera	Prawns, Fish, Oysters, Birds	On-going Mangrove Forest destruction	Restoration, Awareness	Nil
18	Kadzuyuni 002	1	0629363	9694406	Degraded and bare	Mtswi	Monkeys, Baboons	Encroachment	Restoration	Fishing
19	Kithungu area 018	10	0629478	9691894	Degraded	Mtswi, Mkoko-msinwi, Mkoko-mkandaa	Baboons, Crabs, Monkeys, Fish	Blockage of channels	Restoration and protection	Tree nursery
20	Kwa Japhet jaji 017	11	0629380	9691953	Shrubs and thickets	Mtswi, Majaji, Palm tree	Baboons, Gazelle, Hyenas, Rabbits, Mouse, Birds	Sand storms, Soil erosion	Restoration and protection	Sand harvesting sites, wells
21	Ngwabao tsofa 016	7	0629301	9692659	Degraded area	Mtswi, Mkoko-msinwi, Mkoko-mkandaa	Baboons, Gazelle, Hyenas, Rabbits	Blockage of channels by salt firm	Restoration	Tree nursery

22	Kwa Kitsao Ngundi 015	1	0629600	9692847	Sparsely populated area	Mtswi, Mkoko-mkandaa	Baboons, Gazelle, Hyenas, Rabbits, Birds	Soil erosion, High salinity water	Restoration	Fish ponds
23	Kwa Walaedi 014	5	0629785	9693358	Degraded area	Mtswi, Mkoko-msinwi, Mkoko-mkandaa	Baboons, Hyenas, Birds	Soil erosion by domestic animals	Restoration and protection	Tree nursery
24	Solar salt pump station (01) 013	6	0629681	9693399	Sparsely populated	Mtswi, Mkoko-mwiya	Baboons, Hyenas, Birds	High salinity water, illegal logging by community	Restoration	Tree nursery-Propagules
25	Solar salt 012	10	0629474	9693641	Sparsely populated	Mtswi, Mkoko-mwiya, Grass	Baboons, Hyenas, Birds, Crabs	Soil erosion	Restoration	Potential fish ponds
26	Solar salt 011	6	0629217	9693808	Sparsely populated	Mangrove-msindi	Crabs	Soil erosion	Restoration	Water chanel
27	Kwa Jahazi 007	13	0629419	9693892	Sparsely populated	Mtswi, Mkoko-msinwi, Mkoko-mkandaa, Sea grass	Birds, Baboons, Monkeys, Fish	Fishermen cutting seedlings	Restoration	Tree nursery
28	Sanuel Uwoa Aza Rako 005	12	0629804	9694262	Degraded	Mwiya	Goats , Cows	Invasive species, Grazing	Restoration of Mwiya, Create awareness	Grass for grazing, Seed stands (propagules)
29	Sanuel Uwoa Aza Rako 006	8	0629741	9694028	Degraded	Mwiya, Mtswi, Mkandaa	Baboon, Monkeys, Insects(Bees)	Illegal logging	Restoration, Sensitization of the community	Bee keeping site, Mangrove Forest, Sea grass
30	Kwa Tuva 004	7	0629864	9694811	Sparsely	Mtswi, Marara, Mathenge, Mkipa	King fisher, Squirrel, Crabs	Illegal logging by community	Restoration	Firewood
31	Kwa Bahati	7	0629935	9695122	Sparsely	Mtswi	Crabs , Fish, Squirrels	Erosion, Illegal logging	Restoration	Mangrove

32	Mshikthini	17	0625085	9652355	Nil	Nil	Birds	Nil	Nil	Tarmac road, Lwandan swamp
33	Bridge	19	0625158	9652258	Nil	Nil	Birds	Nil	Nil	Nil
34	Darajani	20	0625166	9652394	Nil	Acacia, Neem tree	Birds	Nil	Nil	Tarmac roads, Trading centre
35	Kwa Lete	21	0625609	9652601	Nil	Mkingiri	Birds	Nil	Nil	Lwandan swamp
36	Majenjeni	25	0626041	9653163	Nil	Neem trees	Cows, Birds	Nil	Nil	Feeder road, Borehole, Majenjeni primary school
37	Kibokoni	16	0626268	9652622	Nil	Neem trees, Acacia, Prosopis	Cattle, goats	Land sub- division	Adapt zero grazing/ keeping small number of livestock	Kibokoni swamp, Sand dunes
38	Kibokoni	12	0626476	9652223	Nil	Combretum, Constrictum	Birds	Irrigation, Siltation, Pollution from farm chemicals	Regulated farm practices	Sand dunes, Livestock
39	Kwa Bioza	16	0625929	9657842	Nil	Nil	Birds	Nil	Nil	Resource centre
40	Kavunjoni	4	0627365	9650387	Sand plain	Grasses, Mangroves	Turtle, Birds	Overfishing, Livestock grazing	Awareness and training, Production plan	Beach, Sand dunes, Grass, Fish, Landing site

41	River mouth	2	0626817	9650507	Intact	Mangroves, Prosopis	Birds	Pollution by plastics, Shifting sand, Grazing, Debris	Practice of good livestock management, Practice environmental friendly activities in farming	Nil
42	River estuary	1	0626613	9650555	Intact	Mangroves, Prosopis	Birds, Crabs	Prosopis invasion, Goats and cattle, Debris and plastic, Illegal logging	Controlled grazing, Agroforestry	Channel s, Estuary (River mouth), River Sabaki, Apiaries
43	Picnic site	3	0626632	9650778	Intact	Mangroves	Birds, Crabs	Plastic pollution	Install burning bins, Awareness	Mangrov es, Picnic banda, River mouth, Crabs, Birds
44	Kakwajuni	1	0626037	9651110	Intact	Mangroves, Casuarina	Birds	Prosopis invasion, Sand harvesting, Animal invasion	Cutting and uprooting of the invasive trees, Introduce alternative livelihoods	Feeder road, Shallow wells(fresh water), Sand harvesti ng
45	Olekina	1	0625724	9657392	Intact	Acacia, Mangroves, Prosopis, Baobab, Neem tree, Doom palm	Birds, Crabs	Encroachment on riparian land	Pegging and making of the riparian	Mangrov es, Birds
46	Kakwajuni	0	0625791	9657149	Disturbed	Ceriops, Rhizophora	Goats	Goats, Mbugu(climbers)	Cut and uproots	Nil

									climbers, Community awareness, Livesock control	
47	Kiyumani	1	0625603	9657515	Disturbed	Mangroves	Hipopotamus	Prosopis invasion, Illegal cutting of mangroves, Encroachment	Uprooting prosopis in Mangrove forest, Pegging and marking of riparian land	Nil
48	Mamburui	13	0625785	9657833	Nil	Nil	Nil	Nil	Nil	Nil
49	Mamburui	19	0625158	9652258	Nil	Nil	Nil	Nil	Nil	Nil
50	Mamburui	16	0624948	9652201	Nil	Nil	Nil	Nil	Nil	Nil
51	Moi	37	0624744	9650982	Nil	Neem tree	Birds	Plastic and polythene waste pollution	Dig or install dumping pits, Awareness	Nil
52	Moi	37	0624533	9650953	Nil	Neem tree	Nil	No dumping pits and bins, No public toilets	Awareness, Advocate for allocation of funds	Nil
53	Moi	37	0625502	9651079	Disturbed	Prosopis, Mangrove	Birds, Hipopotamus	Invasive species, Overgrazing	Nil	Nil
54	Moi	37	0625921	9650515	Disturbed	Prosopis, Mangrove	Hipopotamus	Cultivating near the riparian land, Siltation	Awareness	Nil
55	Moi	37	0626753	9649722	Disturbed	Prosopis, Mangrove	Hipopotamus	Siltation, Encroachment at the riparian land	Law enforcement, Awareness	Nil
56	Moi	37	0626823	9649341	Disturbed	Grass, Casuarina	Birds	Overgrazing, Drought	Awareness, Fencing	Nil
57	Moi	37	0626087	9650042	Nil	Casuarina, Coconut tree	Birds, Hippopotamus	Overgrazing, Drought	Awareness, Irrigation	Nil

58	Moi	37	0625753	9650092	Disturbed	Avicennia	Hipopotamus	Illegal logging, Encroachment	Awareness, Develop a forest management plan	Nil
59	Moi	37	0625625	9650031	Disturbed	Prosopis, Neem tree	Hipopotamus	Sand dune degradation, Habitat destruction	Embrace eco-tourism, Re-forestation	Nil
60	Garithe	7	0629554	9664998	Degraded	Avicennia, Ceriops, Casuarina, Prosopis	Fish	Pollution	Awareness	Potential
61	Garithe	8	0629233	9664668	Degraded	Avicennia, Ceriops, Casuarina	Fish	Illegal logging	Restoration	Nil
62	Garithe	5	0629491	9665438	Degraded	Avicennia, Ceriops, Rhizophora	Fish	Forest degradation	Restoration	Potential
63	Garithe	8	0628928	9665532	Degraded	Avicennia, Ceriops, Casuarina, Prosopis, Rhizophora, Cocos	Fish	Illegal logging	Restoration	Nil
64	Garithe	1	0630150	9666158	Intact	Avicennia, Ceriops, Casuarina, Rhizophora, Azadirachta	Lobster, Pawns	Nil	Nil	Potential
65	Garithe	1	0630219	9666350	Intact	Ceriops, Rhizophora	Fish	Pollution	Awareness	Nil
66	Garithe	3	0630042	9666187	Intact	Avicennia, Ceriops, Rhizophora	Bees, Fish, Pawns	Pollution	Awareness	Nil
67	Garithe	0	0629631	9665904	Intact	Avicennia, Ceriops, Casuarina, Rhizophora	Monkeys	Pollution, Environmental degradation	Restoration, Construction of toilets, Waste disposal management, Awareness	Potential

68	Garithe	1	0630618	9667118	Degraded	Avicennia, Ceriops, Rhizophora	Monkeys	Pollution, Environmental degradation	Restoration	Nil
69	Garithe	2	0630737	9666949	Degraded	Avicennia, Ceriops	Colombus monkey	Degradation	Restoration	Nil
70	Fisheries	5	0631266	9667966	Regenerating	Avicennia, Ceriops, Rhizophora, Briguiera, Prosopis	Prawns, Fish, Birds	Overgrazing thus destroying tree seedlings	Awareness	Nil
71	Mkomweni Island	37	0632130	9669834	Healthy	Ceriops, Rhizophora, Sonnoretia	Fish, Birds, Crabs	Nil	Nil	Existing
72	Rasi Mtoni	37	06366232	9668454	Nil	Neem tree, Coconut tree, Casuarina	Birds	Nil	Nil	Existing
73	Fungu la buriani	37	0633049	9669629	Degraded	Casuarina, Ceriops, Sonnoretia	Birds, Crabs	Pollution	Restoration, Beach clean up	Potential
74	Fungu la buriani	37	0633160	9669535	Healthy	Casuarina, Rhizophora, Briguiera, Ceriops, Gymnophira	Birds, Fish, Turtle	Nil	Nil	Existing
75	Ngomeni Landing Site	37	0633171	9668937	Degraded	Ceriops, Rhizophora, Coconut tree, Casuarina, Neem tree	Birds, Fish	Pollution	Restoration, Beach clean-up	Existing
76	Panga Araba (Wildlife watching site)	37	0635992	9669166	Degraded	Ceriops, Rhizophora	Birds, Monkey	Illegal cutting of trees	Restoration, Awareness	Potential
77	Rasi PEFA Church	37	0635464	9668941	Degraded	Ceriops, Rhizophora, Coconut tree	Birds, Monkey	Illegal cutting of trees	Restoration, Awareness	Existing
78	Rasi Mangrove Nursery Site	37	0636234	9669627	Degraded	Rhizophora, Bruiguera, Gymnorhiza	Birds, Monkey, Baboons	Illegal cutting of trees	Restoration	Existing
79	Kadoko Mangrove Hotel	37	0636177	9669831	Healthy	Ceriops, Rhizophora	Birds, Fish, Crabs,	Nil	Nil	Potential

							Prawns, Lobsters			
80	Rasi Primary School	37	0637093	9669510	Healthy	Neem tree	Birds	Nil	Nil	Existing
81	Rasi Landing	37	0636587	9670086	Healthy	Ceriops, Bruigiera, Gymnorhiza	Birds	Pollution	Beach clean-ups	Existing
82	Rasi Breathy Stone	37	0637846	9670375	Nil	Nil	Fish, Crabs, Lobsters, Octopus	Nil	Nil	Potential
83	Coco beach restaurants	37	0629644	9678069	Degraded	Briguiera, Rhizophora, Casuarina Coconut tree	Birds, Monkeys, Crabs	Illegal logging	Awareness, Forest patrol	Existing
84	Mwangaza mangrove nursery	37	0629349	9678046	Degraded	Ceriops, Rhizophora, Avicennia	Turtle, Monkeys, Crabs, Prawns, Fish	Illegal cutting of trees	Awareness, Restoration, Forest patrol	Existing
85	Kwa Kashuru Karingi	37	0628684	9676765	Degraded	Ceriops, Avicennia	Birds, Crabs, Fish	Illegal cutting of mangrove trees	Restoration	Potential
86	Kwa Tabu Kenga	37	0628722	9675341	Degraded	Ceriops, Avicennia	Birds, Crabs, Fish	Illegal cutting of trees	Reforestation, Awareness	Potential
87	Robinson Island Sanctuary	37	0630052	9678989	Healthy	Rhizophora, Briguiera, Avicennia	Birds, Snake, Salamander , Squirrel	Nil	Nil	Existing
88	Fundi Issa	37	0629075	9677607	Degraded	Ceriops, Rhizophora	Birds, Crabs, Fish	Illegal logging	Awareness, Restoration, Forest patrol	Potential
89	Kinyaote public parking	37	0629350	9678113	Degraded	Ceriops, Sonnoetia alba, Avicennia	Turtle, Monkey, Prawns, Fish	Illegal logging	Awareness, Restoration, Forest patrol	Potential
90	Robinson crewzer	37	0630275	9680352	Degraded	Ceriops, Briguiera, Avicennia, Casuarina	Weaver bird, Snake, Monkey	Nil	Nil	Existing

91	Kinyaole youth conservancy	37	0629317	9678000	Healthy	Rhizophora, Ceriops, Briguiera, Avicennia	Turtle, Monkey, Prawns, Fish, Crabs	Illegal logging	Restoration, Awareness, Patrol	Existing
92	Kinyaole landing site	37	0630295	9679438	Healthy	Rhizophora, Ceriops	Fish, Crabs	Pollution	Beach cleaning, Awareness	Existing
93	Kasinakin	4	9691721	629050	Dense	Nil	Nil	Illegal logging	Community awareness, Afforestation	Nil
94	Marereni	7	9691086	629446	Nil	Nil	Nil	Nil	Nil	Nil
95	Marereni	5	9688635	630593	Nil	Mikoko	Nil	Nil	Nil	Nil
96	Marereni	2	9688159	630958	Moderate	Mikoko	Nil	Nil	Nil	Nil
97	Marereni	2	9687005	631174	Nil	Nil	Nil	Deforestation	Planting trees	Nil
98	Marereni	3	9687285	630570	Nil	Nil	Nil	Nil	Nil	Nil
99	Marereni	2	9686672	631039	Scattered	Mivinje, Mikoko	Nil	Nil	Nil	Nil
100	Marereni	1	9686035	630903	Scattered	Nil	Nil	Human factor	Develop a marine protection team	Nil
101	Marereni	1	9685461	630644	Scattered	Mivinje, Mikoko, Mithenge	Nil	Nil	Nil	Open area
102	Marereni	5	9684209	629318	Scattered	Mivinje, Mangrove, Mithenge	Nil	High salinity, Degradtion of mangrove trees	Control of resources	Salt harvesting
103	Kwawa shopping centre	8	0627153	9698002	Degraded	Prosopis, Juliflora,	Nil	Nil	Nil	Existing
104	Bwanpwani	1	0631150	9699493	Degraded	Prosopis, Juliflora, Marina, Avicennia	Nil	Nil	Nil	Existing
105	Bwanpwani	1	0631113	9699170	Degraded	Rhizophora, Ceriops,	Nil	Soil erosion	Building of wall barriers	Existing

						Briguiera, Avicennia, Xylocarpus				
106	Bwanpwani	1	0631106	9699126	Degraded	Xylocarpus, Ceriops, Avicennia	Bees, Birds	Encroachment	Awareness, Forest boundary marking	Potential
107	Mto Kilifi	10	0633039	9697180	Healthy	Rhizophora, Ceriops, Briguiera, Xylocarpus, Lumnitzera	Monkeys, Turtle	Plastic pollution, Beach erosion	Proper waste disposal, Frequent beach clean use	Potential
108	Mto Kilifi	12	0633149	9698036	Intact/ Healthy	Rhizophora, Ceriops, Coconut tree, Palm tree Avicennia	Monkey	Illegal logging	On- farm forestry	Existing
109	Mto Kilifi Primary School	10	0633361	9699411	Intact	Rhizophora, Ceriops, Palm tree, Avicennia	Baboon, Monkey	Illegal harvesting of forest trees	On- farm forestry	Existing
110	Kwa Makatsa Katsa	18	0631258	9698566	Degraded	Rhizophora, Ceriops, Briguiera, Avicennia	Nil	Forest degradation	Forest protection	Existing
112	Primary School	10	0630497	9696790	Intact	Rhizophora, Ceriops, Briguiera, Avicennia	Baboons, Monkeys	Nil	Nil	Existing
113	Kurawa Salt Company	9	0629376	9698111	Degraded	Ceriops, Avicennia	Nil	High saline water released to mangrove plantations	Proper salt water circulation, Proper waste disposal	Existing
114	Kadzuhoi	23	0629377	9698111	Relatively Degraded	Mgadi, Avicennia, Prosopis juliflora, Baobab	Nil	Encroachment by salt firms	Survey and issuance of land titles	Existing
115	Kadzuhoi	3	0627724	9670921	Nil	Mgadi, Avicennia, Prosopis juliflora	Nil	Expansion of saltpans	Survey department and ministry of	Existing

									Land	
116	Kadzuhoni	1	0628212	9671012	Nil	Avicennia, Ceriops, Mgadi	Flamingo	Illegal logging, Sedimentation and brine	Public awareness, Proper salt waste disposal, Law enforcement on the protection of the riparian areas	Existing
117	Kajandoni	1	0628348	9671924	Degraded	Avicennia, Ceriops, Rhizophora	Bush baby	Brine, Illegal logging,	Restoration, Monitoring pf brine disposal, Law enforcement	Existing
118	Kavunjeni	37	0629103	9673186	Relatively Degraded	Ceriops, Rhizophora, Xylocarpus, Bruguiera, Sormoretia	Bush baby	Illegal logging, Charcoal making, Illegal fishing gear, Unauthorised honey harvesting	Public education and awareness, Law enforcement	Existing
119	Kijandoni	11	06289226	9672627	Relatively Degraded	Coconut tree, Cashew nut tree, Moringa olafera, Combretum (Mugambo), Casuarina, Tamarindus indica	Bush baby, Baboon, Monkey	Illegal cutting of Mangrove trees for the purpose of construction	Resettlement	Existing
120	Kadzuhoni	4	0628727	9671237	Severely Degraded	Ceriops, Rhizophora, Bruguiera, Avicennia	Baboon, Monkey, Bush baby, Flamingo	Illegal logging, Destruction of seedlings by humans and crabs	Public awareness, Law enforcement, Raised beds, Shade nets	Existing
121	Kaisala	4	0629004	9669162	Degraded	Ceriops, Rhizophora, Avicennia, Sormoretia	Flamingo, Bush baby, Monkeys	Illegal logging, Encroachment by salt firms	Survey and laying of beacons	Existing

122	Kimaru	11	0629564	9667750	Relatively degraded	Ceriops, Rhizophora, Avicennia, Bruguiera, Sormoretia	Bush baby, Black monkey	Illegal logging	Restoration	Existing
123	Kensalt	9	0628174	9668528	Degraded	Nil	Nil	Nil	Nil	Existing

Appendix 6: Monitoring and evaluation Framework

Management Programme	Objective	Activity	Unit	Plan target	Indicator	No. of beneficiaries	Annual targets (Yrs)					Achievement	Variance	Remarks
							1	2	3	4	5			
Mangrove and biodiversity Management Programme	To protect mangrove forests for sustained ecosystem integrity and climate change mitigation.	Identify Mangrove areas with unique habitats and species diversity for biodiversity conservation	No.	1	Reports Identification of Site									
		Monitor Mangrove areas prone to coastal erosion, sedimentation and other natural threats	No.	5	Report									
		Create awareness between stakeholders about applicable laws and regulations related to Mangrove	No.	30	Reports Minutes									

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