



REPUBLIC OF KENYA



Ewaso Narok Swamp Integrated Management Plan 2022-2032



Food and Agriculture
Organization of the
United Nations



EUROPEAN UNION



nema
mazingira yetu | uhai wetu | wajibu wetu

**Ewaso Narok Swamp
Integrated Management Plan
2022-2032**

TABLE OF CONTENTS

LIST OF ACRONYMS	VIII
PREFACE	X
FOREWORD	XI
ACKNOWLEDGEMENT	XII
Name	XII
Institution	XII
EXECUTIVE SUMMARY	XIII
CHAPTER 1: INTRODUCTION	15
1.1 Ewaso Narok Swamp location and size	15
1.2 Demography	17
1.3 Physical Setting; Climate, Topography, Geology, Hydrology, Soils and Infrastructure	18
1.4 Biodiversity	21
1.4.1 Flora	22
1.4.2 Fauna	23
1.5 The historical perspective/context	23
1.6 Why the need for a management Plan?.....	24
1.7 Scope of the plan	24
1.8 Approach used to develop plan	24
CHAPTER 2: The Ecological and Socio-Economic Features of Ewaso Narok Swamp	28
2.1 Ecological and Biological features	28
2.1.1 Flora	28
2.1.2 Fungi	29
2.1.3 Macroinvertebrates	30
2.1.4 Fish	31
2.1.5 Herpetofauna	32
2.1.6 Avifauna	32
2.1.7 Mammals	33
2.2 Socio-economic and cultural values	33
2.2.1 Crop cultivation	33
2.2.2 Livestock farming	34
2.2.3 Fishery	34
2.2.4 Building materials.....	35
2.2.5 Source energy	35
2.2.6 Ecotourism.....	35
2.2.6 Market	36
CHAPTER 3: REVIEW OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS	37
3.1 Introduction	37
3.2 National Policy and Legal Framework	37
3.2 International legal frameworks	38

CHAPTER 4: STAKEHOLDER ANALYSIS	40
4.1 Introduction.....	40
4.2 Methodology.....	40
CHAPTER 5: THREATS FACING EWASO NAROK SWAMP	43
5.1 Biodiversity loss	43
5.2 Land use changes	43
5.3 Unsustainable water use.....	44
5.4. Changing flooding regimes	46
5.5 Social economic and cultural threats	46
5.6 Governance	47
5.7 Resource use conflict	48
5.8 Pollution	48
CHAPTER 6: VISION GOAL AND MANAGEMENT OBJECTIVES	49
Vision.....	49
Goal.....	49
Management objectives.....	49
CHAPTER 7: MANAGEMENT PROGRAMS	50
7.1 Biodiversity Management Programme.....	50
Biodiversity management issues and challenges.....	50
Operational objectives	50
7.2 Land Resources Management Programme	51
Background/ Introduction	51
Management issues and challenges.....	51
Operational Objectives	51
7.3 Water Resources Management	51
Background	51
Management Challenges	52
Objectives	52
7.4 Socio-economic Development Programme	52
Introduction	52
Management issues and challenges.....	53
Operational objectives	53
7.5 Governance Improvement Programme.....	54
Management challenges	54
Operational objectives.....	55
CHAPTER 8: MANAGEMENT PLAN IMPLEMENTATION FRAMEWORK	57
CHAPTER 9: MONITORING AND EVALUATION	71
REFERENCES.....	73
ANNEX.....	74

List of Figures

Figure 1: Map of Kenya showing the location of Laikipia County and Ewaso Narok swamp..	15
Figure 2: Map showing Ewaso Narok catchment	16
Figure 3: Comparison of Swamp land cover between 1986 and 2010	17
Figure 4: Map showing the topography around Ewaso Narok swamp.....	18
Figure 5: Map showing ecological zones within Ewaso Narok sub-catchment.....	19
Figure 6: Map showing the drainage system in Ewaso Narok sub catchment	20
Figure 7: Map showing soil types around Ewaso Narok swamp	21
Figure 8: Map showing Forest Reserves in Laikipia County.	22
Figure 9: Showing large scale tomato farming adjacent to the swamp	33
Fig 10: Community members' herding livestock at Ewaso Narok swamp.....	34
Figure 11: Fish ponds at Ewaso Narok swamp	35
Figure 12: Shows local community members on a bird watching exercise around Ewas Narok	35
Figure 13 : Casual laborers sorting out tomato harvest to be loaded on to the truck then taken to the market.....	36
Figure 14: Image showing swamp vegetation cleared and replaced with banana plantation close to one of the streams in Ewaso Narok Swamp	43
Figure 15: land adjacent to Ewaso Narok swamp that has been cleared for maize cultivation	44
Figure 15: Water abstraction points within Ewaso Narok Sub catchment	45
Figure 17: Photos showing economic activities around Ewaso Narok swamp	47

List of Tables

Table 1: List of macroinvertebrate orders collected in the swamp and their sensitivity to pollution based on SASS5.....	31
Table 2: National legislations	37
Table 3: International legal frameworks	39
Table 4: Categories of stakeholders identified	41
Table 5: Template for power/interest grid	42
Table 6: Shows a summary of biodiversity management program	50
Table 7: Summary of management actions for Socio-economic development programme	53
Table 8: Summary of management actions to improve governance.....	55
Table 9: Implementation framework for Ewaso Narok swamp	57
Table 10: Monitoring and Evaluation framework	71

List of Pictures

Plate 1: Taskforce members during drafting workshops.....	25
Plate 2: Biodiversity Scientists after data collection	25
Plate 3: Stakeholder consultation meeting at Rumuruti	26
Plate 4: Stakeholder consultation meeting at Rumuruti	26
Plate 5: Stakeholders during the Ewaso Narok validation workshop at Panari Hotel, Nayhururu.....	27
Plate 6: Crop wild relatives and important species recorded	29
Plate 7: Macro-fungi fruit bodies collected Ewaso Narok Swamp.....	30
Plate 8: Aquatic Macro-invertebrates collected Ewaso Narok Swamp.....	30
Plate 9: Photos of fish species collected in Ewaso Narok Swamp	32
Plate 10: Amphibians and reptiles recorded in Ewaso Narok Swamp.....	32

LIST OF ACRONYMS

BATUK	British Army Training Unit Kenya
CBO	Community Based Organisation
CFA	Community Forest Association
CGL	County Government of Laikipia
CGN	County Government of Nyandarua
CIDP	County Integrated development Programme
CETRAD	Centre for Training and Integrated Research in Arid Development
EMCA	Environmental Management and Coordination Act
ENNCA	Ewaso Ng'iro North Catchment Area
ENNDA	Ewaso Ng'iro North Development Authority
FAO-UN	Food and Agricultural Organization of the United Nations
GIS	Geographic Information System
GOK	Government of Kenya
IMPACT	Indigenous Movement for Peace and Advancement and Conflict Transformation
IUCN	International Union for Conservation Of Nature
KEFRI	Kenya Forestry Research Institute
KERRA	Kenya Rural Roads authority
KFS	Kenya Forest Service
KLMC	Kenya livestock Marketing Council
KNBS	Kenya National Bureau of Statistics
KWHSa	Kenya Water Harvesting and Storage Authority
KWTA	Kenya Water Tower Agency
KWS	Kenya Wildlife Service
LAICONAR	Laikipia County Natural Resource Network
MoALF&C	Ministry Of livestock, Fisheries and Cooperatives
MoLPP	Ministry Of Lands and Physical Planning
MRC	Mpala Research Centre
MoSC&H	Ministry of Spots Culture and Heritage
MoT&W	Ministry of tourism and wildlife
NDMA	National Drought Management Authority
NEMA	National Environmental Management Authority
NGO	National Government Administrative Offices
NMK	National Museums of Kenya
NLC	National Land Commission
NGO	Non-Governmental Organization
NMK	National Museum of Kenya
NYAHUWASCO	Nyahururu Water and Sewerage Company
NWHSa	National Water Harvesting and Storage Authority
NWSB	Northern Water Service Board
SNV	Netherlands Development Organization
TNC	The Nature Conservancy
UNDP	United Nation Development Programme
WI	Wetland International

WRA
WSTF

Water Resources Authority
Water Sector Trust Fund

PREFACE

The County Government of Laikipia is mandated by the Constitution of Kenya, 2010 to undertake requisite environmental conservation and management functions. Article 42 of Chapter 4, the Bill of Rights, confers every person the right to a clean and healthy environment, including the right of the environment protected for the benefit of present and future generations through legislative and other measures. Further, chapter 5 (Part 2) focuses on obligations on the environment and Natural resources while Section 69 (2) indicates that every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

In advancing this constitutional and statutory mandate, the County Government of Laikipia partnered with various stakeholders to prepare Ewaso Narok Swamp Integrated Management Plan (2021-2031). The development of this plan was through a consultative process, which was informed by provisions in existing policy and legislative instruments among others; The Kenya Vision 2030, Medium Term Plan III and the Laikipia County Integrated Development Plan II 2018-2020, EMCA, FCMA.

The idea of developing this plan was prompted by the degradation and threats facing Ewaso Narok swamp among other observations made during the World Wetlands Day 2019 national celebrations which were held at the site. The situation is worsened by lack of deliberate management guide to enhance sustainable utilization and conservation of the swamp. The aim of the plan is to ensure that this valuable resource is tapped into, converted into a socio-economic venture, well managed and conserved for posterity.

Ewaso Narok swamp is the largest wetland in Laikipia County and plays a critical role in providing ecosystem services such a source of water, flood control and water purification. It borders three wards namely Rumuruti, Salama and Sosian The swamp is an important ecosystem that provides for the livelihood of both Farmers and Pastoralists. It is also a Wildlife sanctuary and a migration corridor to the Aberdares and ranches within Laikipia and Samburu County. The swamp is rich in biodiversity composition characterized by different features and diverse species of flora and fauna. Various birds' species are found in the swamp and is also important for fishing.

The journey in developing this Plan has taken nearly two (2) years. The process involved a multistakeholder approach, widespread consultations and ownership, collection and collating of information and data, drafting, validation and finalization.

The Plan identifies priority interventions under six management programmes; Biodiversity management, Eco-tourism management, Water resources management, Human-wildlife conflict management, Education and community awareness, Agriculture, Livestock, Fisheries and Governance management as well as Forestry resources management. Successful implementation of this Plan will facilitate rehabilitation of degraded areas; enhance ecological integrity, conservation, and sustainable utilization of Ewaso Narok swamp for the current and future generations.

Mobilization of sufficient resources to achieve such an arduous task is a challenge. I thank most sincerely, UN-FAO Kenya, NEMA, KFS, KWS, WRA, CETRAD, LAICONNAR and all other stakeholders, who partnered with Laikipia County in the development of this Plan. My government recognizes and fully supports this Plan as a major road map towards conservation of Ewaso Narok swamp ecosystem. My government pledges to support full implementation of this management plan.



A handwritten signature in black ink, appearing to read 'Ndiritu Muriithi'. The signature is stylized and written over a white background.

H.E. Ndiritu Muriithi, EGH, CBS
Governor

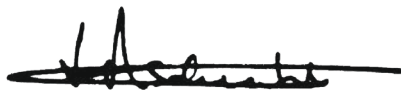
FOREWORD

The National Wetlands Conservation and Management Policy 2014 defines wetlands as areas of land that are permanently or occasionally waterlogged with fresh, saline, brackish, or marine waters, including both natural and man-made areas that support characteristic plants and animals the depth of which at low tide should not exceed 6 metres. These include swamps such as Ewaso Narok whose role in sustaining ecological and human life has continued to receive prominence at the county and national discourses. Besides supporting livelihoods, the swamp also drives various economic activities including agriculture, livestock and fisheries.

However, different sectoral interests have tended to seek exclusive access to and use of the swamp and its resource, and sectoral governance failed to recognize the interconnectedness in resource management. Ewaso Narok Swamp therefore requires collaborative management among all stakeholders thus the development and implementation of this integrated management plan. The preparation of Ewaso Narok Integrated Management Plan (IMP) is as per the requirements of Sec 42 of the Environmental Management and Coordination Act (EMCA) 1999 as well as the EMCA (Wetlands Management) Regulations, 2009.

The IMP analyses various threats and challenges impacting on the swamp's ecological integrity and proposes interventions that can be undertaken to ensure sustainable utilization of the swamp which supports a bigger population of ASAL counties as its waters drain into the larger Ewaso Ng'iro River that ends into Lorrian Swamp in Wajir County. Ewaso Ng'iro river is the main source of water for five counties with an estimated total population of 2,024,677. These are Laikipia, Isiolo, Samburu and Wajir counties.

The Ewaso Narok Integrated Management Plan proposed measures to be undertaken by various stakeholders over period of 10 years to achieve a sustainably managed swamp for biodiversity conservation and social economic development. The NEMA Board of Management looks forward to support implementation of the management plan to realize its objectives of restoring the ecological functions of the swamp.



Dr. Lul Abdiwahid
Ag. Chair, NEMA Board of Management

ACKNOWLEDGEMENT

This first Ewaso Narok Integrated Management Plan is an initiative conducted by NEMA to mitigate wetland degradation because of human activities. The development of this Action plan was made possible through stakeholders' consultation and participation. NEMA wishes to acknowledge the financial support from the Food and Agricultural Organization of the United Nation (FAO-UN) which ensured development and finalization of the integrated management plan.

Stakeholders including government institutions, NGOs, private sector players, community-based groups and County Government representatives played a very important role in preparation of Ewaso Narok Integrated Management Plan.

Special thanks are accorded to the following experts who constituted a Technical Working Group which gave guidance and technical inputs in the plan preparation process. The effective coordination, hard work and dedication they demonstrated throughout the process is highly commendable.

	Name	Institution
1.	Ms. Husna Mbarak	Food and Agriculture Organization of the UN
2.	Mr. Michael Gitonga	Food and Agriculture Organization of the UN
3.	Mr. Jattan Wako	Food and Agriculture Organization of the UN
4.	Mr. Richard Bett	Food and Agriculture Organization of the UN
5.	Dr. Jeniffer Kinoti	County Government of Laikipia
6.	Mr. John Letai	County Government of Laikipia
7.	Mr. John Hutu	County Government of Laikipia
8.	Mr. Peter Ngubu	Water Resources Authority
9.	Dr. Taita Terer	National Museums of Kenya
10.	Mr. Gilbert Kosgei	National Museums of Kenya
11.	Mr. Jacob Orahle	Kenya Wildlife Services
12.	Mr. Samuel Mukundi	Kenya Forest Service
13.	Ms. Grace Wairagu	National Lands Commission
14.	Ms. Emma Odera	CETRAD
15.	Mr. David Wanjohi	LAICONAR
16.	Mr. Stephen Katua	National Environment Management Authority
17.	Mr. Dan Ashitiva	National Environment Management Authority
18.	Ms. Caroline Muriuki	National Environment Management Authority
19.	Mr. Jackson Muturo	National Environment Management Authority

Further, NEMA is committed to steer implementation of the integrated management plan in the 10 years period



Mammo B. Mammo
Director General

EXECUTIVE SUMMARY

The Ewaso Narok Integrated Management Plan was developed in pursuant to Sec 42 of the Environmental Management and Coordination Act (CAP 387) which provides for conservation and management of wetlands in the country. It is the first management plan for the swamp and seeks to ensure sustainability in the utilization of the swamp resources. The management plan has identified key priority activities that will be implemented in the period 2021- 2031 to address the numerous environmental and social issues facing the swamp.

The goal of this management plan is to ensure a restored and sustainably managed swamp contributing to community livelihood and prosperity. Implementation of the management plan will not only ensure sustainable management, but also contribute to the regional and international obligations on conservation of wetlands. The integrated management plan, which is divided into nine chapters, is a product of an extensive and highly participatory process that involved stakeholders from national government institutions, County government of Laikipia, Samburu, Isiolo and Nyandarua, NGOs, private sector players, experts and local communities. Ewaso Ng'iro and Pesi Rivers pass through Ewaso Narok Swamp, which flows and joins Enkare Narok creating a great riverine habitat for wildlife before joining the Lorian swamp then flows underground to emerge in Somalia and eventually flows into the Indian Ocean. During the dry season the swamp harbors thousands of livestock coming from Samburu, Isiolo and Baringo counties. Recently, the swamp became a source of conflict between farmers and pastoralist competing for resources since its a critical dry period refuge area. Therefore, this integrated management plan is meant to provide a guide for sustainable resource use taking into consideration the different livelihood option existing in the swamp.

Chapter one introduces the swamp in terms of location, size and physical size, highlighting that the swamp directly supports approximately 580 households. The chapter also gives a summary of biodiversity found around the swamp in terms of flora and fauna. The chapter then gives a justification for developing this management and concludes by highlighting the approach used in developing the plan.

Chapter two presents in detail the ecological and socio-economic features of the swamp. Different flora and fauna species are present in the swamp are discussed. Chapter 3 provides a review of policy, legal and institutional frameworks, at national and international levels, relevant for the conservation and sustainable development of Ewaso Narok Swamp.

Chapter four provides analyses stakeholders whose action or inaction directly or indirectly impact on the management of the swamp and its resources. The analysis further categorizes stakeholders in terms of power, interest and influence on the conservation and management of the swamp.

Chapter Five on the other hand is a detailed presentation of threats and challenges facing the existence of the swamp such as habitat degradation and biodiversity loss while Chapter Six is about the vision, goal and management objectives to be put in place so as to help address the threats highlighted in Chapter Five. The management programmes and operational objectives are then highlighted in Chapter Seven. The five management programmes have been grouped thematically based on the threats and challenges identified.

Chapter Eight is the management plan implementation framework presented in a table. The

table presents the management programmes as identified in the previous chapter as well as operational objectives. Under each operational objective, activities and their sub-activities have been proposed. The chapter also presents the expected output and outcomes for each sub-activity, their performance indicators, an indicative budget as well as timeframe for implementation.

Lastly Chapter 9 is Monitoring and evaluation of the management plan implementation status. This is in recognition of the fact that successful implementation of the management plan will depend on how the activities are effectively executed, monitored and evaluated and, where necessary, adjustments made to ensure that the activities lead to achievement of the desired outcomes and objectives.

CHAPTER 1: INTRODUCTION

1.1 Ewaso Narok Swamp location and size

Ewaso Narok Swamp is in Rumuruti, Laikipia County (0°19'19.81"N, 36°35'39.28"E). The name "Rumuruti" originated from a Maasai term meaning: "going round the swamp because the swamp was impassable. The swamp occurs along the Eng'are Narok River which drains into Ewaso Ng'iro River that drains into Lorian Swamp in Wajir County. Ewaso Ng'iro River is the main source of water for four counties with an estimated human population of 2,024,677. These are Laikipia, Isiolo, Samburu and Wajir counties. The swamp is in a semi-arid grassland area with frequent drought and unreliable rainfall of less than 714 mm and high temperatures. Consequently, the size of the swamp fluctuates between 5 and 19.5 km² between dry and wet season annually. The water in the swamp emanates from Nyandarua Mountains and Lake Ol' Bolossat catchment areas (Fig 1).

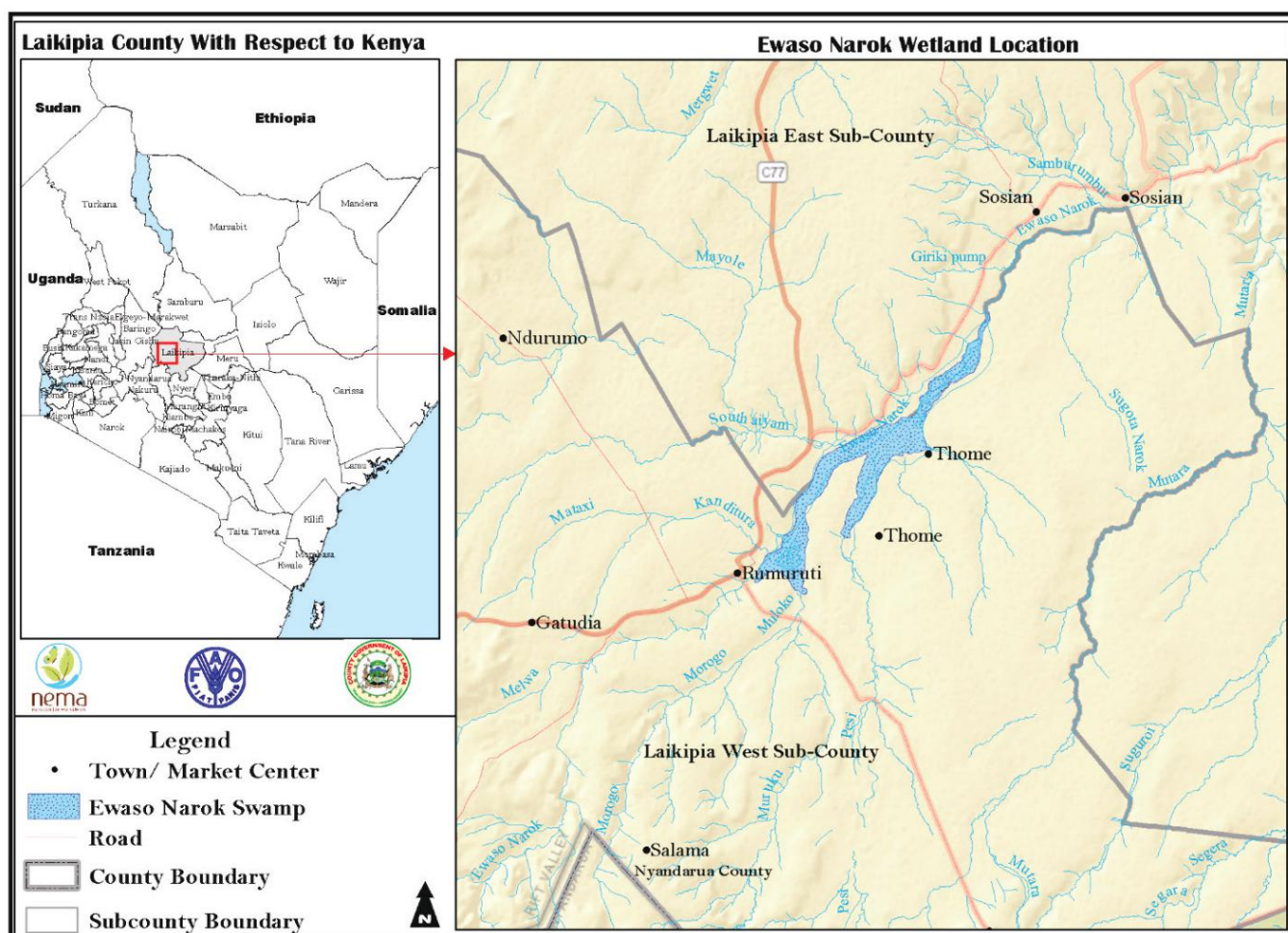


Figure 1: Map of Kenya showing the location of Laikipia County and Ewaso Narok swamp

"Laikipia" is a Maasai word meaning trees plain reflecting the expansive highland plateau (CIDP 2018-2022). The County lies between latitudes 0° 18" South and 0 ° 51" North and between longitude 36° 11" and 37° 24' East. It covers an area of 9,462 km² and ranks as the 15th largest county in the country by land size (Laikipia County CIDP 2018-2022). Laikipia borders seven counties: Samburu County to the North, Isiolo County to the Northeast, Meru County to the East, Nyeri County to the Southeast, Nyandarua County to the South, Nakuru County to the Southwest and Baringo County to the West.

Ewaso Narok swamp lies in Ewaso Narok sub-catchment within the larger Ewaso Ng'iro North Catchment Area (ENNCA). The sub catchment has a total area of 1,840 Km² with a combined human population of 80,741 (male 40,689, female 40,052, GoK/KNBS 2019), density 44 persons per Sqkm living within nineteen sub-locations that are partly or completely within the 10km sub-catchment as shown Figure 2.

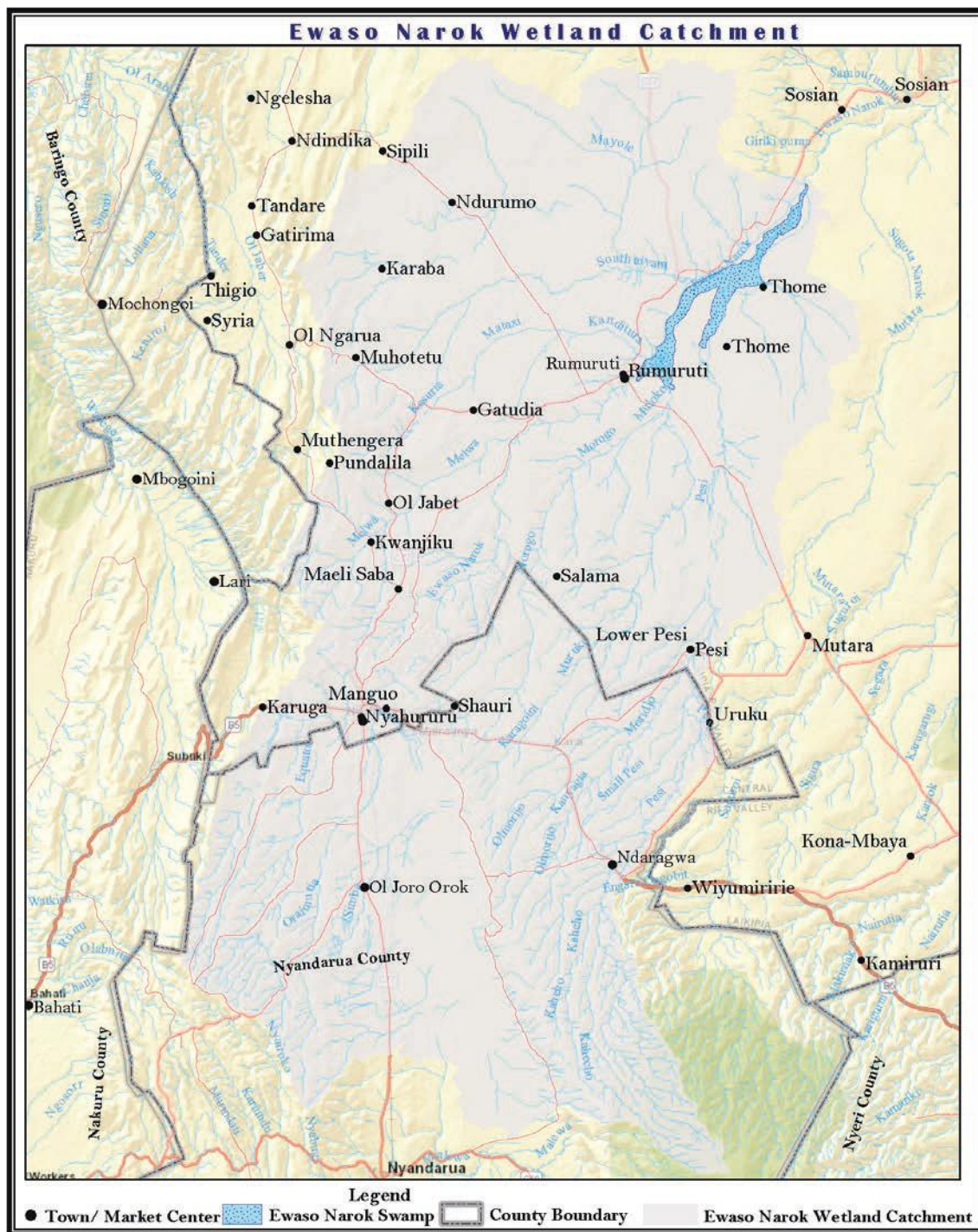


Figure 2: Map showing Ewaso Narok catchment

Settlement around Ewaso Narok has been rising gradually since the 1950s with main increases emanating from the 1990 to 2020 migrations. Human population within Rumuruti area is approximately 32,993 according to KNBS national census in 2009. The population is projected to grow in the coming years to 63,546 due to vibrant commercial activities and formal employment opportunities (Laikipia CIDP 2018-2022) The gradual rise in settlement over the decades explains the changes in land cover within the swamp as shown in Figure 3.

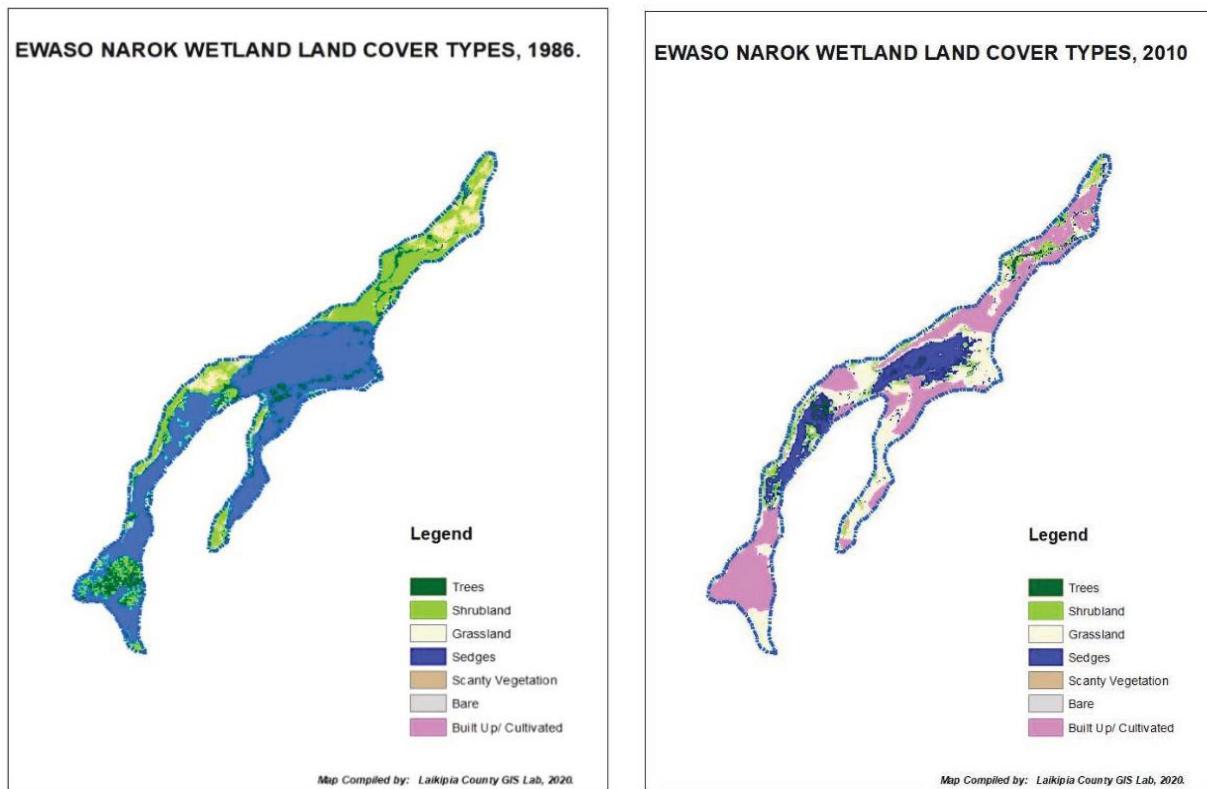


Figure 3: Comparison of Swamp land cover between 1986 and 2010

1.2 Demography

As per the 2109 census, the total number of population is 513,879 disaggregated as 259,440 males and 259,102 females and the population is projected to reach 527,496 by 2020. The number of the households in the county is 149,271 with average household size of 3 (KNBS 2019). The county comprises of four gazetted sub-counties: Laikipia West, Laikipia East, Laikipia North and Kirima sub-counties. There are two additional proposed sub-counties, namely Nyahururu and Laikipia Central. The county is cosmopolitan with about 23 communities, the main groups being Maasai, Samburu, Rendile, Somali, Pokots, Kalenjins, Meru, Kikuyu and Turkana. The county is largely rural in settlement with the main economic activities being crop farming, livestock rearing, tourism, retail and wholesale trade.

The number of households near the swamp depends on the season or flooding regime. During the wet season people move to higher grounds because they are afraid of the damage caused by floods. However, when the flooding recedes in the dry season, both the farmers and pastoralists move into the riparian reserves for farming and grazing. During a stakeholder's forum held in June 2021, the community leaders stated that there were 17 villages with an average of 600 people per village living around Ewaso Narok swamp. In addition, there are approximately 30,000 people farming in the swamp both commercial and subsistence. Factors attracting settlement around the swamp include wetland fertility and water availability.

The swamp and the adjoining hinterland are regarded as public land hence prone to encroachment. Due to aridity, erratic rainfall and frequent drought in this area, the small-scale farmers primarily involved in subsistence cultivation encroach into the riverine area, where water availability is guaranteed. This is followed by draining of the swamp to provide more area for cultivation of the plots surrounding the swamp.

A series of cultivation plots inside the swamp were conspicuous from the reconnaissance survey that

was undertaken in September 2020. The draining of the swamp has been ongoing for sometimes and as a result the size of the swamp is reducing at an alarming rate. If the trend is left unchecked, it will lead to ultimate disappearance of the swamp in near future.

1.3 Physical Setting; Climate, Topography, Geology, Hydrology, Soils and Infrastructure

Laikipia County lies between 1800 m in the North and 2100 m above sea level in the South while the swamp and surrounding area lies between altitude 1696m-1964m asl. The annual rainfall in Laikipia county ranges between 400mm and 1000 mm, which is bimodal in nature, while its maximum temperature range is between 20 and 37 °C annually. Ewaso Narok swamp and the surrounding areas lie between the semi- humid to arid which is generally flat and falls in a plateau since change in elevation is minimal

(Fig 4). The area receives between 400 to 500mm annual rainfall that is not adequate to support rain fed agriculture and hence the need to abstract water from the swamp to supplement rainfall. In areas around the swamp, daily temperatures vary with altitude and season; mean temperatures range within 22°C - 26°C and temperature Minimum and Maximum are 6°C - 14°C and 35°C respectively (GOK, 2010).

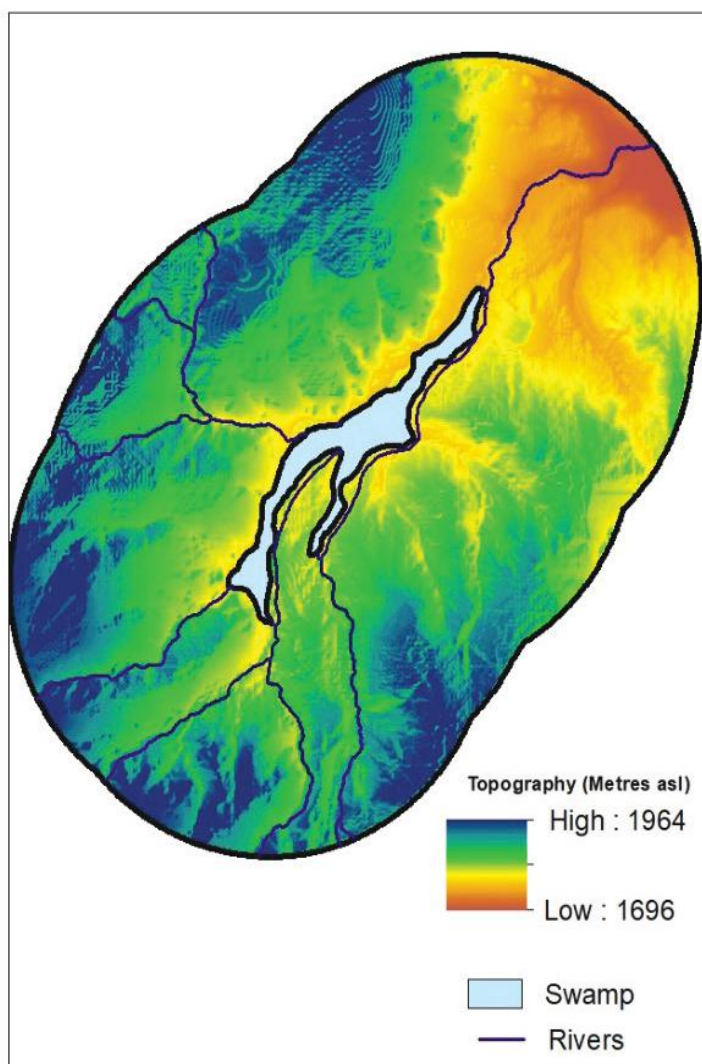


Figure 4: Map showing the topography around Ewaso Narok swamp

The Ewaso Narok swamp occurs in agro-climatic zone IV as shown on the map (Fig 5) which is mainly dry and is suitable for ranching. The same area is currently characterized by land transformation into small-scale cultivation drawing water from the swamp. The number of farmers practicing crop farming has been increasing over the years posing a threat to the survival of the swamp.

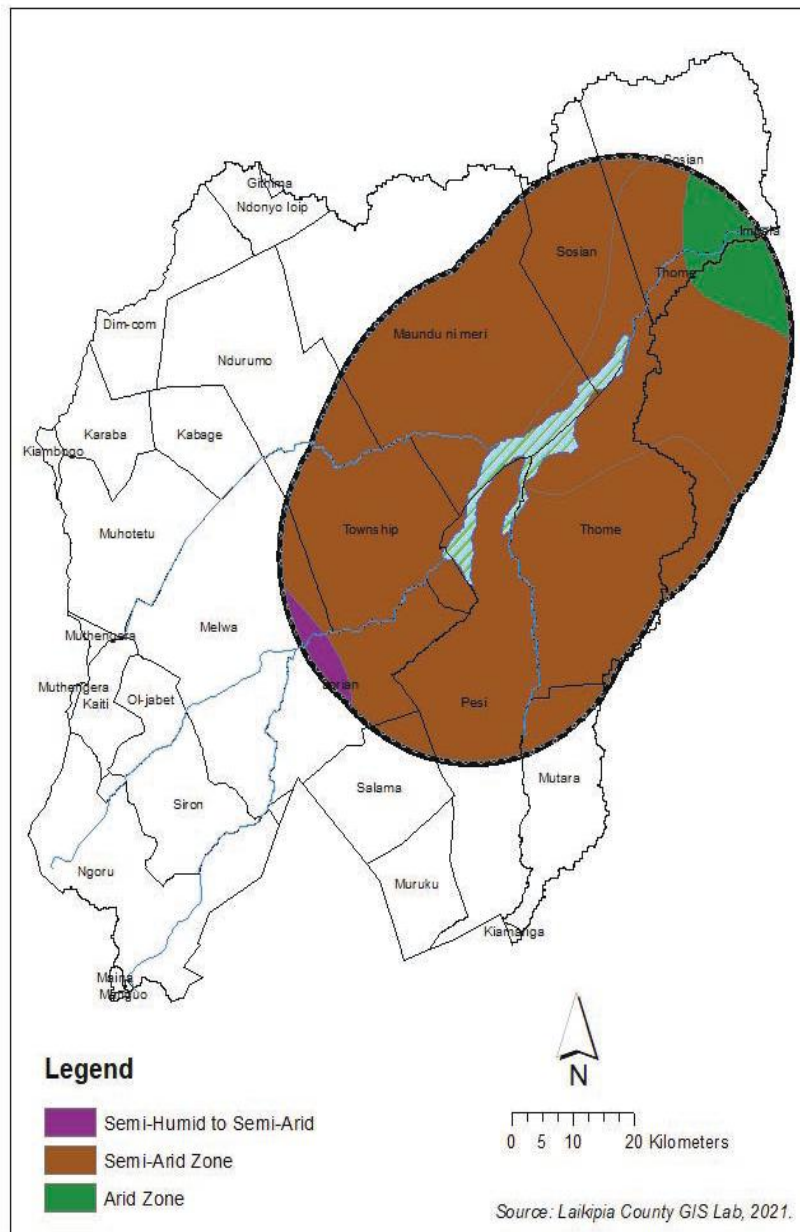


Figure 5: Map showing ecological zones within Ewaso Narok sub-catchment

The drainage system forming Ewaso Narok swamp originates from the Nyandarua ranges and the Lake Ol’Bolossat catchment, catchment areas as well as tributaries feeding into Eng’are Narok River. These include Nanyuki, Burguret, Likii, Ontulili, Sirimon Timau Rivers, Eng’are Ngobit, Moyok, Pesi and Mutara rivers. The Ewaso Narok swamp is a remnant of a series of once numerous wetlands such as Pesi, Mutara and Manguo, which have been drained in pursuit of food production shown below (Fig 6)

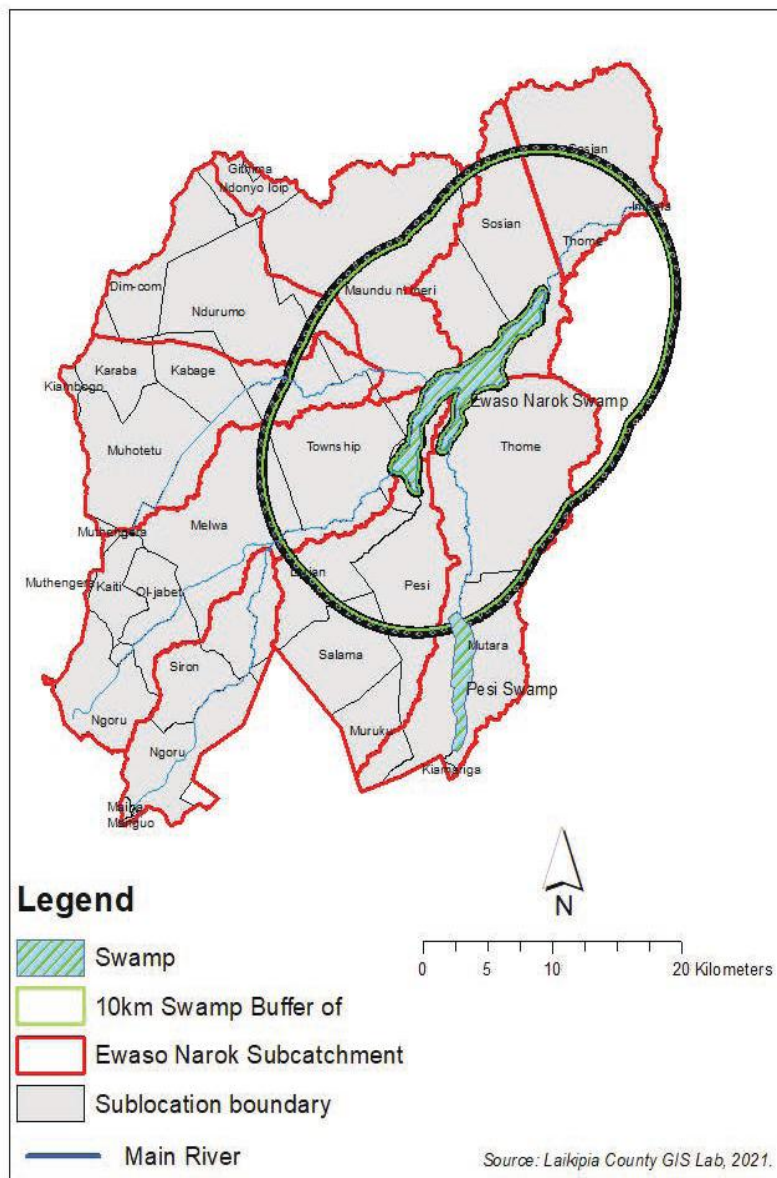


Figure 6: Map showing the drainage system in Ewaso Narok sub catchment

Some of the infrastructure within the swamp includes three canals, which run parallel to the swamp that were designed and built in 1943. The purpose of the canals was to provide water for domestic use and livestock outside the wetland. The canals are fed by three intakes constructed around the same time. There are several boreholes and a dam around the swamp that supplement water for livestock and domestic use.

Two-thirds of the Laikipia County has moderately productive soils. However, the southern and south-eastern sides are less agriculturally productive, because of the presence of clay soils, hence mainly used for ranching. The Plateau depressions are characterized by dark grey to black 'vertisols' and 'planosols' soil, which are unsuitable for crop production (GoK, 1994). Fig 7

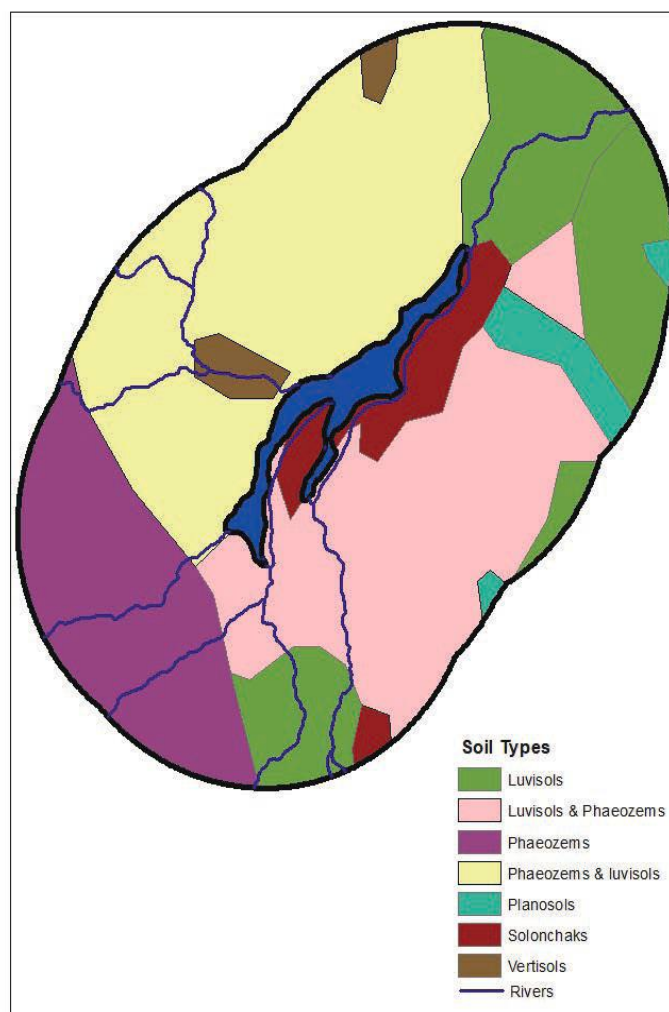


Figure 7: Map showing soil types around Ewaso Narok swamp

1.4 Biodiversity

Ewaso Narok swamp is rich in biodiversity abundance and distribution. The county has a gazetted forest area totaling to 580 Km² comprising both the indigenous and plantation forests. According to the Laikipia county forest conservation strategy (2013-2030), the county has a forest cover of 6% excluding the on-farm forest. There are six gazetted and one non gazetted forest in Laikipia covering a total area of 580 KM². Mukogodo forest in the Northern part of the county is the only gazetted natural forest while the rest are plantation forests and includes Lariak, Marmanet, Ng’arua, Rumuruti and Shamanek forests (FAO, 2015). Marmanet, Rumuruti forests form the catchment areas for Ewaso Narok swamp. Fig 8

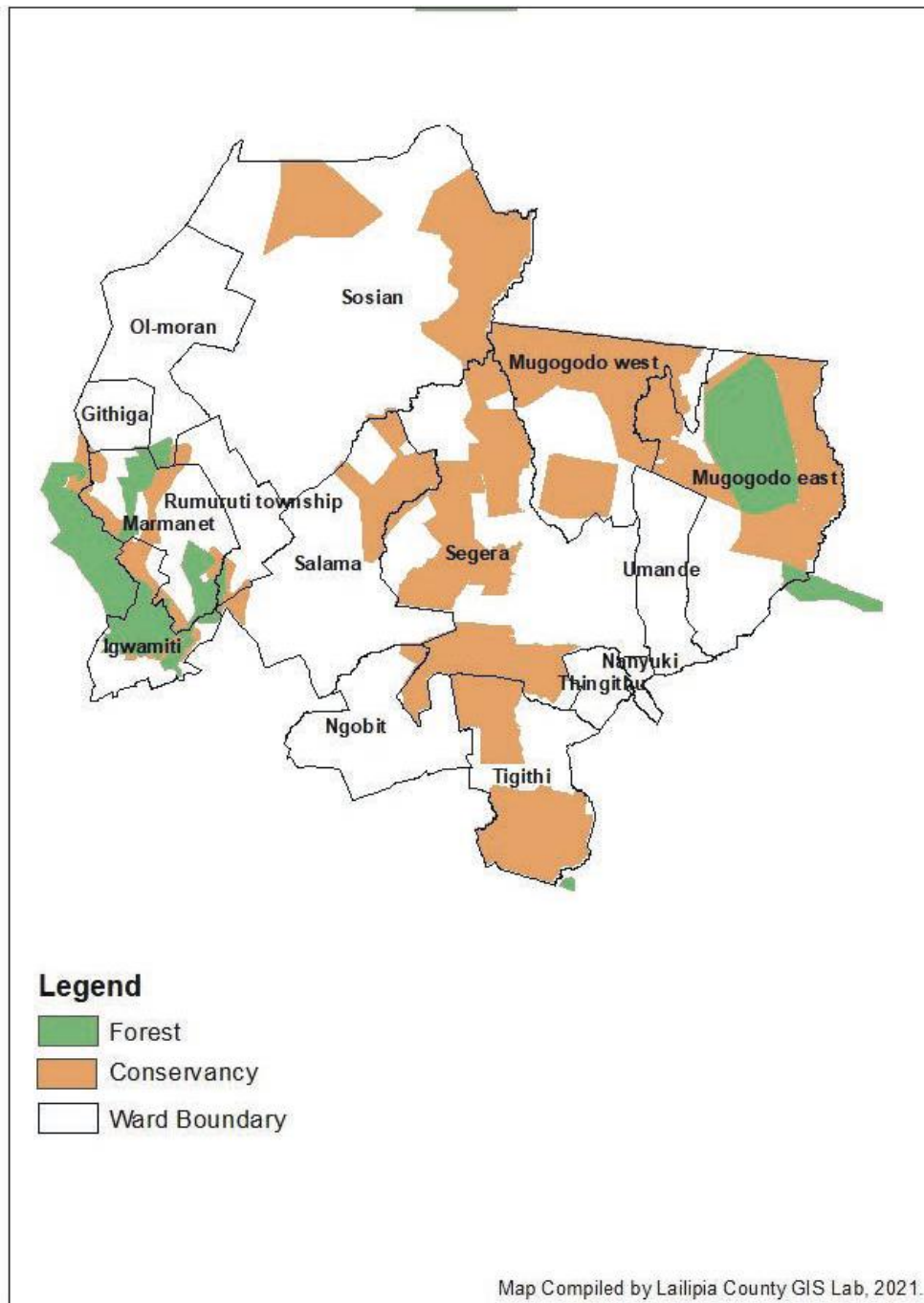


Figure 8: Map showing Forest Reserves in Laikipia County.

1.4.1 Flora

Vegetation distribution in Ewaso Narok Swamp is strongly influenced by an altitudinal pattern, with dry forest occurring on the highest elevations and a gradient of Acacia–Themeda bushes on the plains (Taiti, 1992b). However, as exceptions to the overall regional ecological gradient are edaphic communities of *Acacia drepanolobium* in the central plains, escarpment vegetation and secondary communities induced by historical management factors. The gentle warping in the south has contributed to ponding in valleys leading to the formation of swamps, which are mainly dominated by *Cyperus papyrus* L. and *C. latifolia* Poir. (Thenya 2001).

According to Thenya 2001, 106 plant species were recorded and classified into 26 families while a recent rapid biodiversity assessment conducted by National Museum of Kenya in 2020 recorded 148 plant species in and around the swamp. The lifeforms having the highest number of species were herbs (108), shrubs (26), climbers (9) and trees (5).

1.4.2 Fauna

The swamp is an important habitat, watering and grazing grounds for several species. Since the swamp is surrounded by semi-arid landscape, its importance is highly pronounced in the dry periods.

There are 411 recorded invertebrates' species in Ewaso Narok swamp represented in orders; Hymenoptera, Hemiptera, Coleoptera, Lepidoptera, Diptera, Orthoptera, Araneae, Collembola, Thysanoptera, Blattodea, Demaptera, Neuroptera, Odonata and Mantodea (Macharia et al., 2017). Approximately, 127 Species of birds were identified in and around the swamp (Kenya Bird map; Wamiti et al. 2010)

Thirteen mammal species have been recorded in the swamp including the African Buffalo, hippopotamus and piscivores like Cape clawless otter *Aonyx capensis* Schinz (Thenya, 1998). Several herps and fish species have also been recorded from Ewaso Narok Swamp. Most recent study by NMK documented 6 species of herps: amphibians (4) and reptiles (2) in Ewaso Narok swamp and its surroundings. Likewise, 9 species of fish were recorded including economically important *Oreochromis spilurus*, *Clarias gariepinus*, *Labeo percivali*,

1.5 The historical perspective/context

Before 1970, extensive land use in the sub-catchment was predominantly ranching and pastoralism (Taiti, 1992a). During this period, wetland utilization and biodiversity had remained in a state of relative equilibrium with minimal disturbances apart from natural hazards like drought, which the ecosystems were able to restore themselves. However, the advent of independence saw increased freedom of movement, property ownership and population increase which was accompanied by land subdivision into small scale plots of 2–10 ha (Thenya, 1998). Most of these migrants came from the neighbouring and high potential areas such as Meru, Nyandarua, Nakuru, Embu, Nyeri and Kiambu (Thenya, 1998).

The earliest settlement dates back to the 1980s in Ewaso Narok swamp, with 60% of the current occupants moving in between 1986 and 1989, reaching a peak of settlement in 1992. By 1997, the Ewaso Narok swamp had a population of 3480 persons, with a strong upward trend. The average household was six to eight persons; however, this was very dynamic, depending on season and activities. In the wet season, the population decreased significantly because of flooding, but this was reversed rapidly during the dry season as both farmers and pastoralists flocked to this area for water and forage. The main factors that have been responsible for this migration into the area are the Africanization process of settlement in former white highlands, Drought, reduction in farm size in the agricultural high potential areas and absentee landowners.

In the 1990s households were near the wetland boundary with 80% of the households being in the riparian zone Thenya et al (2011). Currently very few people live inside the wetland with the majority of them moving to the neighboring absentee landowners' farms (Thome, Mathenge, Mathira) and only coming in for seasonal cropping. According to Thenya et al (2011), the main driving force for the settlements over the years is inadequate land in place of origin. Other reasons include

- Tribal/ethnic conflict
- Lack of employment
- Insecurity
- Drought
- Inadequate water/rains
- Lack of pasture
- Poverty
- Transferred professionally
- Lack of water

A change of attitude and way of life have also accompanied these changes of land use. The local nomadic tribes have slowly been changing to agro-pastoralists as a result of the declining grazing land and changing economy in general. While this change is a progression towards the region's food sufficiency, it also exerts great pressure on the few water resources available. In addition, it contributes

to reductions in macrophyte and riparian vegetation cover through harvesting as building materials, hence destroying habitat in the process. This greatly interferes with important dry season grazing zones and puts migrant farmers into direct conflict with wildlife and pastoralists who have used the wetland from time immemorial as critical dry season grazing area and drought refugia. Due to the increased irrigated farming, the water available from the wetland and rivers is not adequate to meet demand, hence the increasing conflicts between farmers over water. The local administration must intervene on frequent occasions to solve water-related conflicts. Drainage of the wetland has been practiced with a perception that it's beneficial in creating more land for farming to address food and nutrition security.

1.6 Why the need for a management Plan?

Wetlands are dynamic areas, influenced by both natural and human factors. In order to maintain their biological diversity and productivity, and to permit the wise use of their resources, there is an urgent need to conserve them through well focused management actions. To achieve these objectives effectively, a common understanding, and sometimes an agreement, is needed between the various managers, owners, occupiers, and others whose activities link to, or are affected by the wetland. Therefore, the management planning process provides the mechanism to achieve this understanding and agreement in a collaborative manner.

1.7 Scope of the plan

The scope of the plan is about 700 km² with a 10 Km buffer around the swamp including the area of the swamp (23km²) Fig 7. The 10 km radius around the wetland covers community members utilizing the swamp resources directly as a source of livelihood. The neighboring farms are Thome, Rumuruti Municipality, Jennings farm, Mathenge, Maundu Meri, Mathira, Gorare and Narok farm.

Despite the geographical limits of this management plan described above, the ecosystem-based approach to natural resource management of the larger Ewaso Nyiro basin will be adopted as some of the impacts on the swamp transcends the territorial boundaries of counties, communities, and generations

1.8 Approach used to develop plan

The process was spearheaded by a taskforce appointed by NEMA from government, non-government agencies. Government agencies presents were, WRA, KWS, KFS, WRA, NLC, Min. Of Lands and Physical Planning and Laikipia County Government. Non state actors included FAO-UN, LAICONNAR and CETRAD. The task force held several consultation meetings as well as drafting workshops to put together all the inputs and views of the various stakeholders.



Plate 1: Taskforce members during drafting workshops

Development of Ewaso Narok management plan process adopted a multipronged approach anchored on stakeholder engagements. This included community level consultations, expert field assessments and observations, focus group discussions with community leaders involved and expert working groups. The process relied on literature from organizations and wetlands experts as well as tacit knowledge based on community experiences and knowledge.

The experts provided expertise skills and knowledge on the hydrology, biodiversity, social economic, cultural and sustainable livelihood options. The team of scientist from National Museums of Kenya conducted a baseline survey of biodiversity present in the swamp to guide on the appropriate management interventions. Information /data gathered by the biodiversity experts led by NMK was compiled into a report and shared with the community during the community engagement meetings.



Plate 2: Biodiversity Scientists after data collection

The taskforce organized a series of community consultation meeting in various zones in Rumuruti municipality where the local WRUAs, farmers, local administration as well as community-based organizations were involved. The first meeting was in Rumuruti and during this meeting, the local WRUA chairman expressed his concern regarding decreasing water levels due to uncontrolled abstraction by upstream users. He urged the relevant government agencies to harmonize the use of water and also rehabilitate the canals to address the problem of perennial water scarcity



Plate 3: Stakeholder consultation meeting at Rumuruti

This was followed by another stakeholder meeting in Thome. The participants expressed their regret over collapse of the canal that was primarily used for irrigation and watering of livestock. According to the participants, there was a confusion that the canal system of irrigation was banned by the WRA, a claim that was refuted by the WRA experts present at the meeting. Nonetheless, the community prioritized revival of the canals for irrigation to prevent further encroachment into the swamp. They also emphasized on more awareness on the wise use of the swamp, effective regulation of the water abstraction in the upstream, development of more boreholes and formation and operationalization of the swamp management committees.



Plate 4: Stakeholder consultation meeting at Rumuruti

A validation meeting was held at Panari Hotel, Nyahururu, Laikipia County with the aim of presenting the management plan to a wider stakeholder team and receive feedback. The team composed of participants from Isiolo, Samburu and Nyandarua County executives in charge of environment and natural resources.



Plate 5: Stakeholders during the Ewaso Narok validation workshop at Panari Hotel, Nayhururu

CHAPTER 2: The Ecological and Socio-Economic Features of Ewaso Narok Swamp

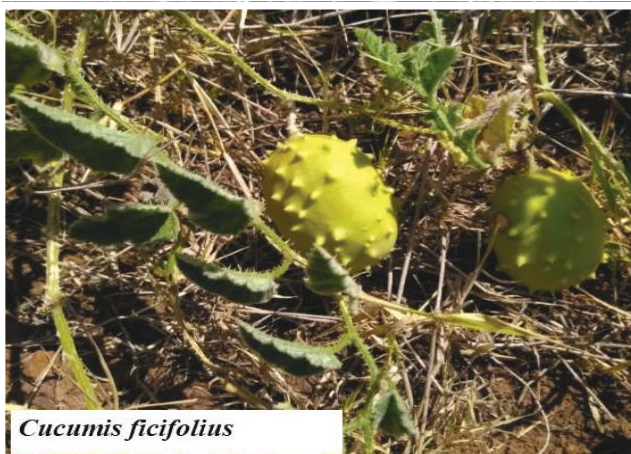
2.1 Ecological and Biological features

Ecologically, the swamp performs several ecosystems provisioning and regulating services. It acts as a flood control/buffer during heavy rains and helps in recharging groundwater aquifers. The swamp also acts as a carbon sink and helps in regulating the negative effects of climate change. The papyrus reeds serve as fish breeding grounds and provides suitable habitat to many flora and fauna. The swamp provides plenty of green forage throughout and therefore acts as a refugia for wildlife and drought reserve the pastoralist during the dry periods. In addition, the swamp serves as a migratory corridor for elephants enroute to Marmanet Forest for calving. The swamp is a source of fresh water for both domestic use and farming for the people in Rumuruti town and its zone of influence.

2.1.1 Flora

Ewaso Narok swamp provides diverse habitats for various flora and fauna. Approximately 148 plant species have been recorded in the swamp and its surrounding (Terer et al., 2020; Thenya et al., 2001). The life forms having the highest number of species were herbs (108), shrubs (26), climbers (9) and trees (5). About 25 invasive weedy species were recently recorded in the swamp due to the ongoing destruction of the natural vegetation around the swamp.

Some of the obnoxious weeds namely; *Opuntia ficus-indica*, *O. exaltata* and *Caesalpinia decapetala* are deliberately introduced as live fences by farmers (Annex 1). A few wild crop relatives that were found around the swamps includes; *Cucumis ficifolius*, *Eleusine indica*, *Sorghum arundinaceum*, *Rubus niveus*, *Vigna luteola* and *Mentha aquatica* (Terer et al 2021). The latter is an important forage plant for pollinators such as butterflies, bees and hoverflies and its leaves can be used to flavor dishes and drinks (Plate 6)



Cucumis ficifolius



Rubus niveus



Eleusine indica



Sorghum arundinaceum



Mentha aquatica






Vigna luteola

Plate 6: Crop wild relatives and important species recorded

2.1.2 Fungi

A recent survey yielded 8 macro-fungi from Basidiomycota division distributed across 3 orders (Polyporales, Russulales, Agaricales), 5 families (Polyporaceae, Stereaceae, Pleurotaceae, Schizophyllaceae, Agaricaceae) and 8 genera were documented in Ewaso Narok swamp (Terer et al., 2020). This is rather low but further consultation with the local community suggests high macro fungi diversity during rainy seasons. Fungi play an important role in nutrient cycling processes through decomposition of dead plant materials. Some species e.g. fomentarius are parasitic to host species. Others such as Pleurotus spp (gilled mushrooms) are edible and have medicinal properties. Other species such as Fomes fomentarius and Schizophyllum commune are shown to be medicinal. The destruction of natural ecosystems along the swamp to pave way for grazing land coupled with introduction of exotic trees such as Eucalyptus spp and farming along the riparian zone have destroyed macro fungi microclimate and caused loss of degradable woody and litter substrate responsible for generating diversified microclimates (Waldrop et al., 2006). (Plate 7)

<p>(a)</p>  <p><i>Fomes fomentarius</i></p>	<p>(b)</p>  <p><i>Trametes elegans</i> (synon <i>Lenzites elegans</i>)</p>	<p>(c)</p>  <p><i>Stereum hirsutum</i></p>
--	---	---

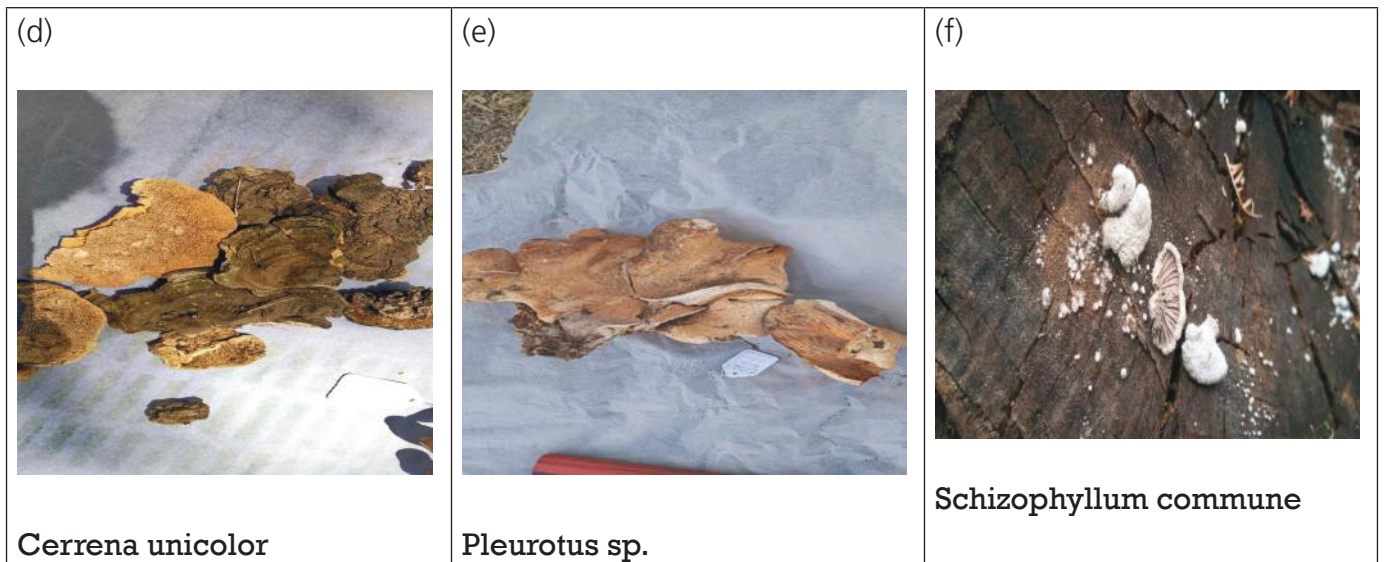
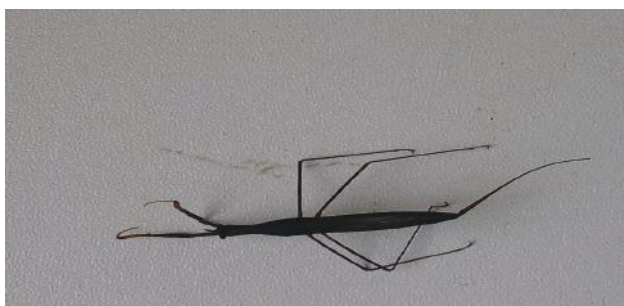


Plate 7: Macro-fungi fruit bodies collected Ewaso Narok Swamp

2.1.3 Macroinvertebrates

Macroinvertebrates belonging to thirty one families and eleven orders are distributed within the swamp (Terer et al., 2021). Some of the macroinvertebrates present include; Melania snail (family Thiaridae), whirligig beetle (family Gyrinidae), Broad-shouldered water strider (family Veliidae), stout crawler mayfly (family Tricorythidae), Dragon fly (family Gomphidae), Water scorpion (family Nepiidae), Caseless caddis fly (family Hydropsychidae) shown in the images below. (Plate 8)



Water scorpion



Melania snail



Dragon fly



Caseless caddis fly

Plate 8: Aquatic Macro-invertebrates collected Ewaso Narok Swamp

Different macroinvertebrate taxa respond differently to environmental deterioration and the presence or absence of a given taxa indicates the level of pollution. The presence of mayflies and caddisflies in low numbers and diversity or the presence of dipterans, oligochaetes, and decapods is an indicator of poor or deteriorating water quality in the swamp (Terer et al 2021). (Table 1)

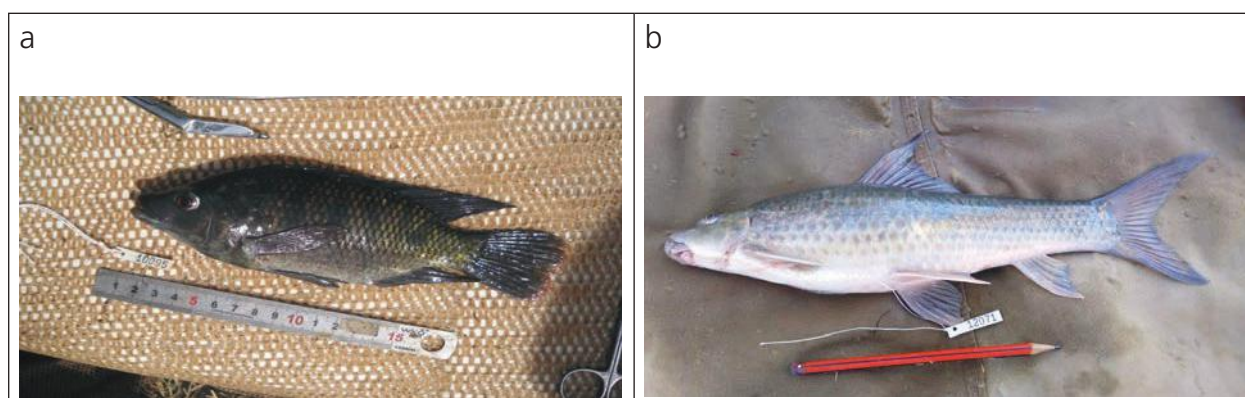
Table 1: List of macroinvertebrate orders collected in the swamp and their sensitivity to pollution based on SASS5

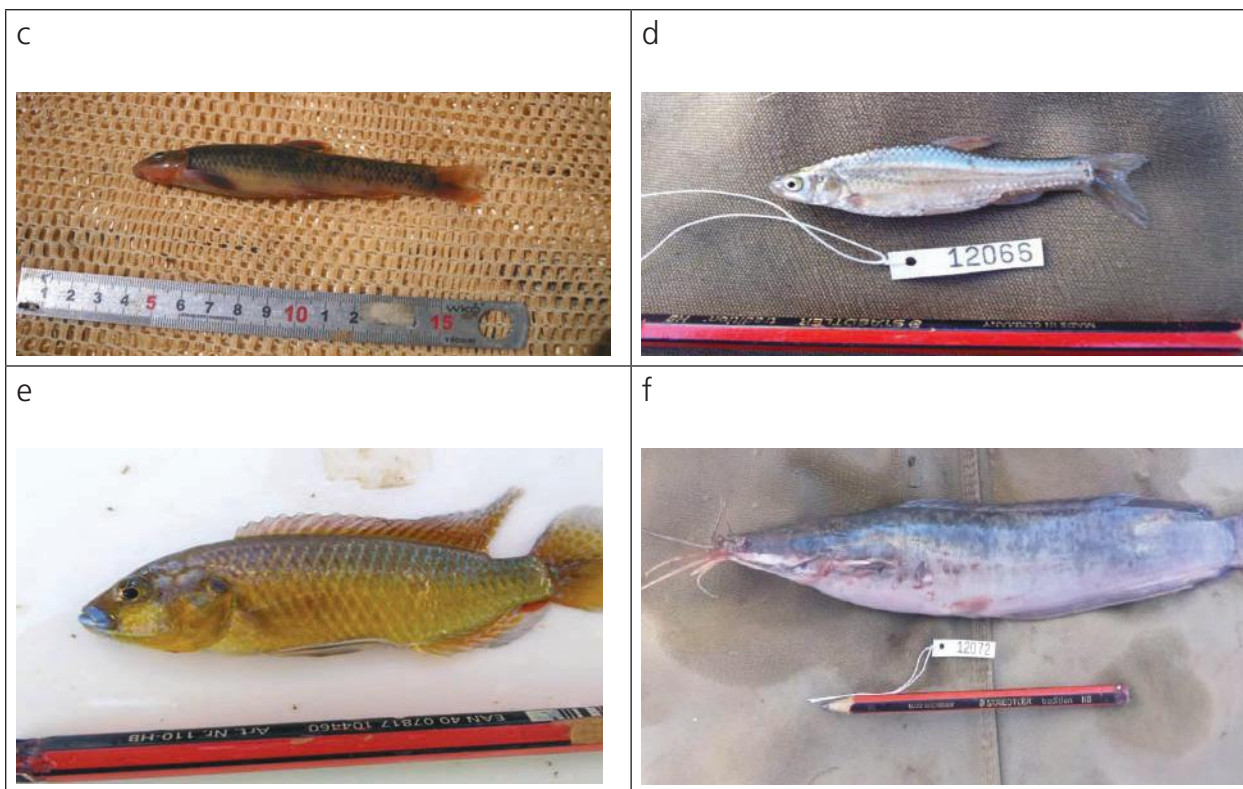
Order	Common name	Sensitivity to pollution
Coleoptera	Aquatic beetles	Moderately tolerant
Decapoda	Freshwater crabs	Tolerant
Diptera	True flies	Tolerant
Ephemeroptera	Mayflies	Sensitive
Gastropoda	Snails	Tolerant
Hemiptera	Bugs	Tolerant
Lepidoptera	Aquatic caterpillars	Moderately tolerant
Odonata	Dragon and damsel flies	Moderately tolerant
Oligochaeta	Aquatic worms	Tolerant
Trichoptera	Caddis flies	Sensitive
Turbellaria	Flatworms	Tolerant

The balance of various species components is essential in normal functioning of the swamp and humans often interfere with this balance leading to negative effects such as proliferation of the invasive. Louisiana Cray fish, *Procambarus clarkii* is abundant in the swamp and this is a good indicator that water quality, and the integrity of the swamp has deteriorated over time.

2.1.4 Fish

Nine species of fish belonging to five families have been recorded across the entire length of the swamp. *Labeo cylindricus*, *Oreochromis spilurus* and *Clarias gariepinus* reach table size and are main species that are fished by local community. The latter two are also farmed by locals. Some species that are found in swamp can be used as ornamental fish in aquaria e.g. *Amphilius grandis*, *Pseudocrenilabrus multicolor* and *Garra hindii* while *Gambusia affinis* can be a biological control for mosquitoes. The other species are *Enteromius paludinosus* and *E. neumayeri* (Terer et al., 2021). (Plate 9)





(a) *Oreochromis spilurus* (b) *Labeo cylindricus* (c) *Garra hindii* (d) *Enteromius paludinosus* (e) *Pseudocrenilabrus multicolor victoriae* (f) *Clarias gariepinus*

Plate 9: Photos of fish species collected in Ewaso Narok Swamp

2.1.5 Herpetofauna

Ten species of herpetofauna; 7 amphibians and 3 reptiles were recorded in Ewaso Narok swamp and its surroundings (Terer *et al.*, 2020; Thenya *et al.*, 2001). One of the endemic frog species recorded in the swamp is the Kenya puddle frog. The species is endemic to the Kenyan highlands occurring up to an altitude of 3000m above seas level (Channing & Rödel, 2019). This species being endemic, a future monitoring of the richness of this species will indicate the ecological integrity and health of the swamp (Terer *et al.* 2021). (Plate 10)



Nile Ridged frog



Northern clawed frog



Kenya Puddle Frog



Battersby's green snake

Plate 10: Amphibians and reptiles recorded in Ewaso Narok Swamp

2.1.6 Avifauna

The swamp provides an array of habitats for avifauna, both resident and migratory species. Approximately 173 bird species have been recorded within and around the swamp of which 50 are swamp specialist and the rest swamp dependent (Thenya 2001). Migratory species use the swamp as stopover during their migration journey including 12 African and 44 Palearctic species (Thenya 2001).

2.1.7 Mammals

The swamp provides an important habitat, watering, and grazing grounds for several mammalian species. Thirteen species have been recorded within the swamp and many more are dependent on it (Thenya et al 2001). These include buffalo; Syncerus caffer, hippopotamus Hippopotamus amphibious, cape clawless otter Aonyx capensis and bushbuck Tragelaphus scriptus. Buffalo and hippos are notorious species involved in human-wildlife conflict, but other species like elephants, baboons and monkey are also usual suspects of the human-wildlife conflict in the area.

2.2 Socio-economic and cultural values

Ewaso Narok swamp provides important socio-economic services to the communities' dependant on these resources directly and indirectly. These include crop cultivation, fishing and livestock grazing among others. Studies have shown that the importance attached to these socio-economic activities varies from one community to another, and from one wetland type to another. The swamp is the main source of water supporting these economic activities. The sections below have described in detail the economic features and their status in Ewaso Narok swamp.

2.2.1 Crop cultivation

The three main crops grown in Ewaso Narok swamp are maize, beans and tomatoes. The crops are grown under varying proportions but most of the farmers grow maize and beans on 0.25 acre each and tomatoes on 0.5 acres. Fig 9



Figure 9: Showing large scale tomato farming adjacent to the swamp

Although crop production has been declining, the farming activities are important for raising cash for education purposes (40%) and household income (Laikipia county statistical abstract 2020). Sale of farm produce is largely (over 50%) controlled by brokers meaning that farmers get low returns for their labour both at the local market and distant markets like Nairobi. At the same time, extension services around the wetland are low to moderate with only 7% of the farmers supported by government extension services, which contributes to low crop production. However, horticulture production from the swamp during dry spell fetches high prices both in local and distant markets when rain-fed farming fails (Laikipia county statistical abstract 2020)

The drawback to the crop farming around the swamp is crop damage by the wildlife though the

damage varies depending on the crop type. Although there have been increased efforts in fencing of wildlife areas within Laikipia, crop damage is still a big challenge mainly emanating from Elephants and Buffaloes. Other challenges associated with crop production around Ewaso Narok include flooding / water logging since most of the farming takes place in the swamp. Presently there is increased irrigation of the adjacent dryland using motorized pumps.

About 95% of the farmers undertake irrigation in their farms in the adjacent dryland areas. The type of irrigation in Ewaso Narok is flooding (74%) and furrow (26%) with the major crops and area under irrigation varying. The crops grown under irrigation are mostly for horticultural commercial purposes with products being transported to large distant markets like Nairobi and Mombasa. Farmers do not pay for water since it is perceived as bequest from nature. (Laikipia county statistical abstract 2020)

2.2.2 Livestock farming

Livestock keeping is also a major undertaking by farmers around Ewaso Narok swamp. The types and numbers vary from household to household with cattle and sheep being a common species kept under free range system. (Laikipia county statistical abstract 2020). Overgrazing and indiscriminate burning of the wetland vegetation to encourage growth of palatable species is serious environmental problem that is impacting negatively on the swamp.



Fig 10: Community members' herding livestock at Ewaso Narok swamp

2.2.3 Fishery

Subsistence fishery is practiced within the swamp with *Labeo percivali*, *Oreochromis spilurus* and *Clarias gariepinus* being the commonly fished species. Fish farming (aquaculture) is undertaken by the prison farms in the swamp (Fig 11). Fisheries department also have a demonstration farm and hatchery ponds at the swamp for distribution of fingerlings to the adjacent communities. The promotion of fish farming will not only enrich households dietary and nutritional diversity but also improves incomes for the locals.



Figure 11: Fish ponds at Ewaso Narok swamp

2.2.4 Building materials

The swamp is also an important source of building materials, these thatch grasses and papyrus reeds (marura) for decorations when processed into mats.

2.2.5 Source energy

There are various sources of domestic energy around Ewaso Narok swamp with wood fuel and charcoal being the two major sources (over 90%), which have moderate availability. Sources of fuel wood include Narok forest (28%); unsettled land (28%); ranches (21%) and on farms (14%) (Kiteme & Thenya, 2011).

2.2.6 Ecotourism

Ewaso Narok has potential for eco-tourism as an income generating activity. Currently local organization such as NASAKITU, Sosian wilderness and Bobong campsite are operating bird watching enterprise around the swamp (Fig 12). However, the county needs to create more awareness and publicity on the birding potential of the swamp to improve income of the local community.



Figure 12: Shows local community members on a bird watching exercise around Ewaso Narok

2.2.6 Market

The importance of the swamp to the local economy cannot be overstated. Because of its endless opportunity Ewaso Narok swamps continues to attract people from all walks of lives. The convergence of pastoralist, farmers and traders provides a robust market for various trading commodities. The market is the cultural melting points where farmers, pastoralist and other traders meet and interact positively. In addition, horticulture production from the swamp during the dry periods provides employment for the locals.



Figure 13 : Casual laborers sorting out tomato harvest to be loaded on the truck then taken to the market

CHAPTER 3: REVIEW OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS

3.1 Introduction

Wetland ecosystems are managed under different policy legal and institutional frameworks. The aim is to enhance the conservation and management of wetlands resources. Ewaso Narok swamp is not gazetted as a protected wetland. However, the swamp is managed under different legal provisions at the national and international levels. Below is a summary of relevant legislative provisions.

3.2 National Policy and Legal Framework

The preparation, planning and implementation process of the Ewaso Narok IMP recognizes existence of the current wetland legal framework including the Constitution of Kenya, Wetland Policy, EMCA 1999 and Wetland Regulations among other legal frameworks which have direct impact to sustainable conservation, management and utilization of the swamp. A highlight of some of the relevant national legal framework is provided in Table 2 below:

Table 2: National legislations

Legal framework	Focus	Relevance to wetland ecosystems
The Constitution of Kenya (2010)	Devolved County Government and the National Government	Chapter 5 focus on environment and participation
Land Policy 2009	Sections 3.4 provisions provided below provide for land use planning 4.3.1 (131a): To sustainably manage land based natural resources, the Government shall encourage preparation of participatory environmental action plans by communities	Land use planning at the local level Management plan preparation as part of local planning
Land Act 2012	Legislative structure for land governance and rights in Kenya, largely aligned with that required by the Constitution. Define land types (public, community and private)	The wetland is a public land
National Land Commission Act 2012	Provide broad functions and authorities in land governance Advice government on land title registration, initiating claims for historic injustices, encouraging the application of alternative and traditional dispute resolution mechanisms, managing and administering all unregistered trust land and unregistered community land on behalf of the county government, developing and maintaining an effective land information management system at national and county levels, and monitoring and oversight over land use planning	Useful in handling land issues in areas around the wetland including boundary placement and adjustments
Wetland Conservation and Management Policy 2014	Wetland resources management in the country	Useful in guiding management of the wetland

Legal framework	Focus	Relevance to wetland ecosystems
Environmental Management and Coordination Act of 1999 (revised 2015)	Overarching law on environmental management in Kenya. Provides for environmental and social impact assessment (ESIA) and annual audit	Custodian of gazetted wetland, formulate wetland regulation Guides on environmental impact assessment for activities such as tourism development that needs ESIA
Forest Policy 1994	Forest development in the country	Provides for participatory approach that capture water catchment conservation and on farm intervention
Forest Conservation and Management Act 2016	Forest resources management created Kenya Forest Service. Section 42 provides for PFM and PFMP preparation Provides for preparation and gazette of rules and regulations such as Participation in Sustainable Forest Management rules 2009, Forests (Charcoal) rules 2009, Forests (Harvesting) rules 2009	Preparation of management plans that captures water catchment conservation and on farm forestry intervention. Captures formation of community forest association (CFA) that are critical in wetland conservation
Wildlife Conservation and Management Act, 2013	Management of wildlife resources in gazetted and community areas framework for conserving, in perpetuity Kenya's rich diversity of species, habitats and ecosystems for the wellbeing of its people and the global community	Act allows for stakeholder consultation in relation to benefit sharing
Water Act 2016	Framework for water resources management including community participation under water resources uses association	Ewaso Narok is a water source and has a number of water user's associations. Water resources management guided by the Act
Agriculture Laws, 2013	Framework for management and investment in crops, livestock and fisheries	Important for farming initiatives around the wetland including soil erosion management
National Climate Change Response Strategy (NCCRS)	Engagement in handling climate change aspects such as weather information release and advice to resources managers and community Investment in carbon business including REDD+	Climate change is likely to continue affecting

3.2 International legal frameworks

Kenya has ratified a number of international agreements, protocols and Conventions that impact on wetlands conservation. They form part of Kenyan laws under article 2 (5) (6) of Constitution of 2010. The key international agreements and conventions that are considered most important for conservation of Ewaso Narok swamp are summarized in Table 3 below.

Table 3: International legal frameworks

Convention/Agreement	Focus Area
The Ramsar Convention	Framework for international cooperation for the conservation and wise use of wetlands and their resources
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 Nations Framework Convention on Climate Change (UNFCCC 1992)	Climate Change mitigation and adaption
African Convention on the Conservation of Nature and Natural Resources, 1968 (as revised in 2003).	Natural Resource Conservation
Convention on Migratory Species	Conservation of terrestrial, marine and avian migratory species
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Regulation of trade in species which are endangered, or which may become endangered if their exploitation is not controlled

CHAPTER 4: STAKEHOLDER ANALYSIS

4.1 Introduction

Stakeholder analysis is a technique used to identify and assess the importance of key people, groups of people, or institutions that may significantly influence the success of an activity or implementation of a specific programme or project. This stakeholder analysis was undertaken for the development of Ewaso-Narok swamp integrated management plan. Stakeholders were defined as any group that benefits from or has an impact or influences the formulation and implementation of Ewaso-Narok management plan at basin, national and regional levels, and international levels.

4.2 Methodology

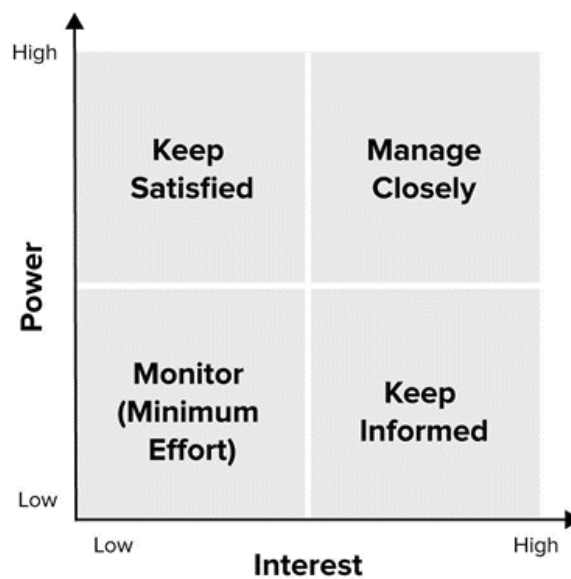
The methodology adopted for the stakeholder analysis included desktop study and working group discussions to review the existing stakeholders in Laikipia to form a preliminary list. It was during this discussion that stakeholders' roles, interests in cooperation with the project, as well as identification of challenges and opportunities to the process of formulation of the management plan were identified. For this analysis, stakeholders identified were classified in broad seven categories (Table 1 below) and discussion were held to identify their roles, whether they are enabler or threat (Fig 8, Annex 1) to the project and their potential for partnership on implementation of the management plan.

Table 4: Categories of stakeholders identified

Category	Stakeholder	Roles/interests/mandate	Influence	Importance
Government	NEMA	Monitoring and coordination advisory of Sustainable management of environment and natural resources Enforcement of laws	High	High
	CGL	Overall responsible for the governance of the county Implementation of the plan	High	High
	Neighboring counties	Downstream and upstream users	Low	Low
	WRA	Water resource management, regulation of Abstraction and enforcement	High	High
	KFS	Management of forest within the catchment	High	High
	KWTA	Management of water towers	Low	Low
	NDMA	Drought management and resilience building	Low	High
	KWS	Protection and management of wildlife ecosystems	High	High
	NMK	Biodiversity research and preservation of cultural heritage	Low	High
	ENNDA	Coordinate and implement development projects in the catchment areas	Low	High
	Ministry of interior	Public order and coordination of government	High	High
	KMD	Climate information services	Low	High
	MoALF&C	Implementation of agriculture and livestock programs	Low	High
	MoLPP	Land administration	High	High
	NLC	Oversight and monitoring of public land	High	High
NGOs	National and county Assembly & senate	Policy formulation and oversight Budget allocation	High	High
	TNC	Conservation and livelihoods support	Low	Low
	IMPACT	Advocacy and lobbying	Low	Low
	LAICONAR,	Advocacy and lobbying, Conservation and Livelihood support	High	High
	Groots Kenya	Advocacy for women at grassroot level	Low	High
	KWAHO	Water sanitation and health programs	Low	Low
Research institutions	Laikipia Forum	Wildlife conservation and sustainable natural resource management	Low	Low
	CETRAD	Training, Research and innovations	Low	High
	Universities	Training, Research and innovations	Low	High
CBIs	CFAs	Sustainable use and Management of forests resources	High	High
	WRUAs	Sustainable use and Management of water resources	High	High
	Ranchers	Large scale farming and wildlife conservation	High	High

Category	Stakeholder	Roles/interests/mandate	Influence	Importance
Community	Pastoralists	Watering and grazing livestock	High	High
	Farmers	Crop production for subsistence and commercial	High	High
	Fisherfolks	Fishing and fish farming	high	High
	Horticulturalists	Commercial farming	Low	High
Private sector	FAO-UN, UN Environment, WI, WWF, UNDP	Knowledge management and technical and financial support	Low	High
Media	Local & National Radio/ Tv and print	Information dissemination and public awareness	high	High

Table 5: Template for power/interest grid



The broad categories include stakeholders at the basin, county, national, regional, and international levels as well as research institutions and media. At the local level; riparian users, associations of farmers, ranchers and water users are identified as primary project stakeholders in terms of implementation of planned management intervention. At county level, county leadership including members of the national assemblies and county assemblies as well as county departments responsible for agriculture, environment and water resource management is identified as key partners to the process.

State authorities responsible for environment and water resource management and emergency response are identified as national stakeholders. Bodies for coordination of activities and programs in the Ewaso-Ngiro North basin and communities in Isiolo and Samburu were categorized as secondary / regional stakeholders. Engagement of scientific and research organization was observed to be valuable in terms of development of the scientific information data acquisition and analysis. Finally, the media was regarded as a powerful influencer for creation of awareness on the values of the wetland and implementation of the wise use strategies.

CHAPTER 5: THREATS FACING EWASO NAROK SWAMP

5.1 Biodiversity loss

Ewaso Narok Swamp is a small ecosystem undergoing high levels of degradation from human activities. The natural habitat surrounding the ecosystem is almost lost with a few *Acacia xanthophloea* and *Senna occidentalis* species left along the riparian ecosystem (Terer et al 2021). The drivers of this losses are mega trends such as habitat degradation, invasive species, over abstraction of water, climate change, pollution, and draining of the swamp. Habitat degradation is caused by clearing or burning of vegetation to create more room for farming (Figure 14) or grazing which alters species composition and diversity. The invasive species can predate, compete for food, or hybridize the native species thus affecting their survivability.



Figure 14: Image showing swamp vegetation cleared and replaced with banana plantation close to one of the streams in Ewaso Narok Swamp

Thermal stress due to anthropogenic climate stressors can be harbinger for the biodiversity loss because less tolerant species are going to die. Presently, there is increase in use of pesticides and other chemicals by farmers around the swamp. These chemicals are harmful to various aquatic lives once it finds its way into the swamp. Over abstraction of water affects environmental flows, causes water scarcity, and increases concentration of the pollutants which in the long run affects aquatic biodiversity and ecosystem functioning particularly provision of drinking water.

5.2 Land use changes

There are various types of land tenure systems in Laikipia county namely Private, Public and communal. According to the Laikipia GIS data base, Public covers a total area of 1,661sqkm (18%), private 7,082 sqkm (74%) and communal land 713sqkm (8%). The areas adjacent to the swamp are undergoing land use transformation from large scale ranching to small-scale farming. During the colonial period, Laikipia county was formerly used for ranching and large-scale farming with the swamp being used as a main source of water and pasture. But with the sub-division of land in the 1970s due to population increase, human activities in and around the swamp increased, particularly in the 1990s. The migrants who settled

in the area after subdivision of the land are crop cultivation communities as compared to the traditional nomadic pastoralists who used the swamp as a dry season grazing area. This transformation has caused the natural ecosystem to be continuously altered, destroyed, and diminished. (Thenya, 1998) (Figure 15)



Figure 15: *land adjacent to Ewaso Narok swamp that has been cleared for maize cultivation*

The location of Ewaso Narok swamp within the dry lands makes it a point of concentrated human activities which accelerated its transformation into a cultivated area. In addition, conflicting government directives of the 1989-1993, 1994 and 1996 which recommended draining of the wetlands for crop cultivation to meet the demand for the settling population, exerted more pressure on the degradation of this swamp (Thenya, 1998).

The area is not zoned and as a result, there are no clear guidelines on the land use around the swamp to mitigate it from the externalities of the incompatible land uses that affects the functionality of the swamp. Furthermore, unclear land tenure around the swamp is also another driver of degradation of the wetland ecosystem. The swamp is surrounded by big land blocks (Mathira, Thome, GG Kariuki, and Narok) with absentee landowners occupying about 100,000 acres. This scenario has attracted squatters into these abandoned lands causing conflict over resource use (water, pasture) amongst different users and wildlife in transit across the swamp. The squatters have also encroached into the swamp for farming and commercial exploitation of other resources within the swamp such as papyrus reeds. Therefore, the effect of land use change and unsustainable land use practices around the swamp is major driver of the degradation the swamp.

5.3 Unsustainable water use

The swamp is managed by Ewaso Narok Water Resources Users Association (WRUA) that was formed in 2011. The mandate of the WRUA is to conserve the water resources and minimize conflicts between farmers and pastoralists. The swamp receives water from Ewaso Narok River, Pesi River and Aiyam stream. Inflows and outflows from the swamp are measured using a monitoring network located at Pesi River (5AB02), Ewaso Narok River (5AC15) and Ewaso Narok River at Sosian (5AC10).

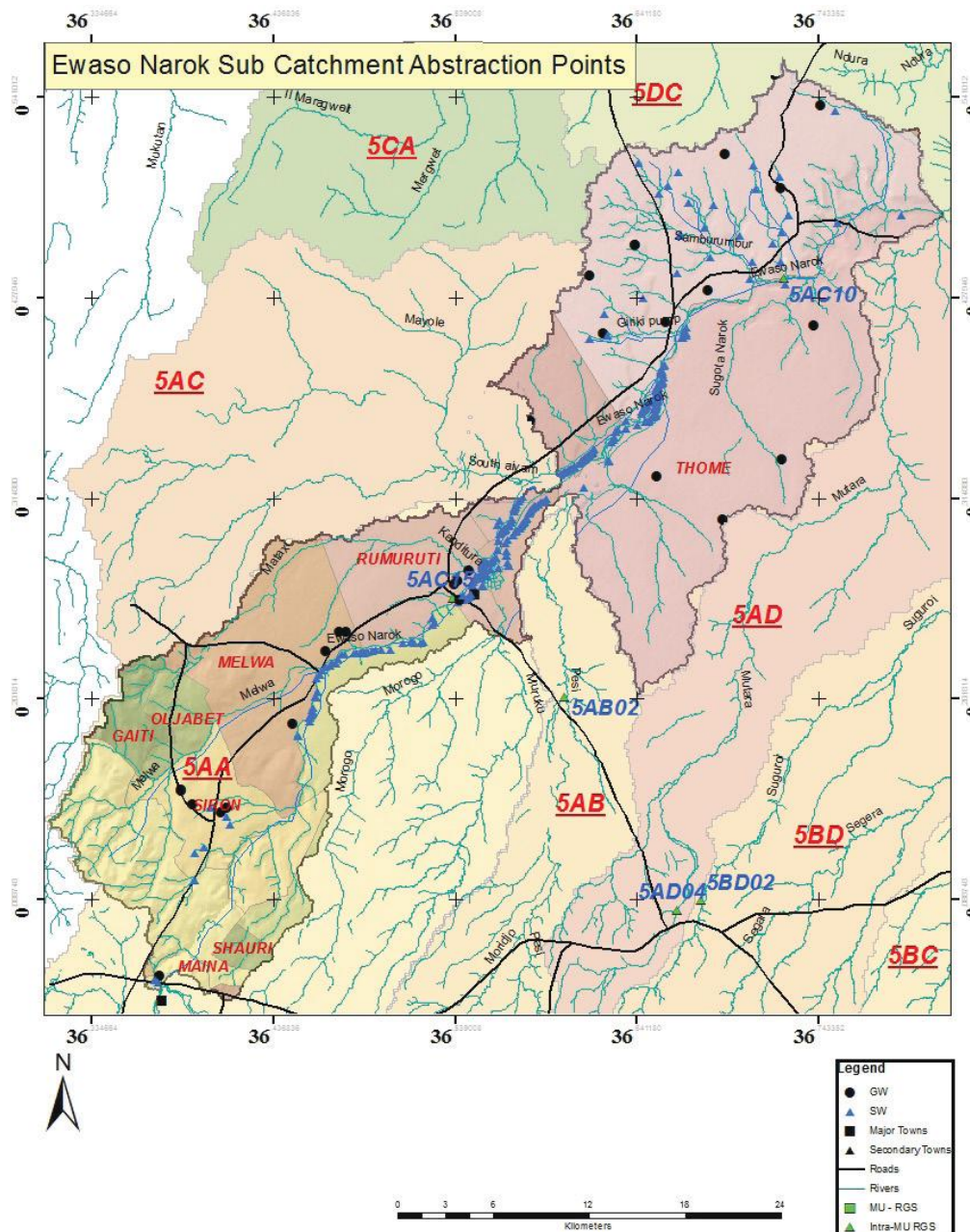


Figure 15: Water abstraction points within Ewaso Narok Sub catchment

The swamp has three canals on Pesi, Jennings and Mathenge areas to provide water for irrigation, livestock, and domestic uses. However, these canals have deteriorated, and they are no longer useful in areas such as Thome. Even in areas where they are functional, the canals are filled with silt or covered by vegetation due to negligence over the years. This deterioration together with water scarcity in the surrounding areas has forced the farmers to farm inside the swamp.

Over abstraction of water was a persistent theme during the community consultation meetings in June 2021. According to the locals and water experts that were interviewed during the community consultation, Water abstraction in the sub-catchment is heavily dominated by a small number of large abstractors' mainly commercial irrigators. There about 11 large scale commercial irrigators along the rivers that feeds into the swamps. In total, there are 414 abstractors in the entire Ewaso Narok sub-catchment but some are unpermitted (Ewaso Narok Sub-catchment abstraction and pollution survey Report – WRMA, 2017). Due to irrigation needs for the large farms, and rising demand for already scarce water for the growing population, water abstraction from the rivers that feeds into the swamp has increased tremendously. This situation has aggravated the alteration of the swamp ecosystem and compounded the problems of the water scarcity for the downstream users.

5.4. Changing flooding regimes

Wetlands prevent flooding by temporarily storing and slowly releasing stormwater downstream. Historically Ewaso Narok played this function perfectly and as a result there was adequate supply for clean water for farming, domestic use and wildlife. Today there is growing concern that the flooding is more frequent and severe with relatively high discharge rate. Although climatic changes such as rainfall can impact on flood magnitude and timing, anthropogenic influence at the catchment scale is a key driver of the changing flooding patterns. Deforestation in the upstream and changing agricultural practices up stream and around the swamp has increased the severity of the flooding and distorted the swamps' ability to store and release water. This change will undoubtedly have negative ecological impacts on aquatic communities and disrupt seasonal calendar of farmers. The flooding phenomenon experienced around the swamp has also caused massive loss of food crop grown in the swamp making the practice unsustainable and hence should be discontinued.

5.5 Social economic and cultural threats

The socio-economic activities by the local communities dependent on the swamp's natural resource – that include crop and livestock production, papyrus reeds harvesting, fish production and ecotourism. Large-scale economic activities mainly entail horticulture and livestock production by the local communities and ranchers in the neighborhood. The conduct of these socio-economic activities has however not been without negative impact on the environment mainly through encroachment and degradation of key habitats. (Fig 17)





Figure 17: Photos showing economic activities around Ewaso Narok swamp

5.6 Governance

There are numerous local and government agencies with varying mandate to manage and conserve wetlands in the country. However, at Ewaso Narok swamp the coordination of these efforts remain inadequate. Efforts by the government institutions and civil society to rehabilitate or conserve swamp has been politicized by some locals with vested interest hence there is need for more awareness and education on the conservation and sustainable use of the swamp resources. Other governance issues bedeviling proper management of the swamp include; poor enforcement of law, inadequate participation of community in in decision making regarding the swamp and inadequate capacity (technical and financial) of WRUAs in conservation and management of the swamp. Some of the ideas floated during the community consultation on improving of the governance included instituting the site management committee and anchoring to the existing structures for environmental conservation and protection e.g. the County Environment Committee (CEC)

5.7 Resource use conflict

In the recent past the incidence of the resource use conflict is on the rise among the users of the swamps. The conflict is due to resource scarcity which is linked to increasing demand for water, pasture, and agricultural land due to increased human population. The situation is exacerbated by perennial drought which leads to influx of pastoralist from neighboring counties exerting more pressure on the already dwindling resources. This often leads to violent conflicts between pastoralist and farmers and to some extent among pastoralist themselves. The swamp lies at the middle of the highlands and lowlands area of the Ewaso Ngiro north catchment areas (ENNCA). This situation is problematic during period of water scarcity and tension between upstream and downstream users (large commercial farms, smallholders, pastoralists, nature conservationists, etc.) have been widely reported during the community consultation meetings in June 2021.

5.8 Pollution

Intensive farming around the swamp, poor agronomic practices in the upstream and proliferation of settlement near the swamp has contributed to massive pollution of water resources. The effluent from upstream commercial horticultural farms and chemicals used by local farmers continues to drain into the swamp affecting water quality. In addition, Rumuruti Municipality lacks sewerage system and poor handling, and disposal of the waste is health hazards to the people relying on the swamp for drinking water. Deforestation in the upstream and over grazing around the swamp has contributed to sediment loading into the swamp affecting water quality, aquatic communities, and the livelihood of the fishermen. Finally, the proposed future development like creation of investors/industrial hub in Rumuruti will further compound pollution problem unless proper development control measures are not instituted.

CHAPTER 6: VISION GOAL AND MANAGEMENT OBJECTIVES

Vision

A model community managed swamp for environmental sustainability and social economic development

Goal

Restored and sustainably managed swamp contributing to community livelihood prosperity and biodiversity richness

Management objectives

1. To promote sustainable economic development and local livelihoods
2. To promote protection of the swamp as an ecologically sensitive area.
3. To promote sustainable land use practices
4. To improve governance in the management of the swamp

CHAPTER 7: MANAGEMENT PROGRAMS

7.1 Biodiversity Management Programme

Biodiversity management issues and challenges

- a) Degradation of biodiversity habitats due to agricultural expansion; overgrazing; overharvesting of papyrus reeds, siltation and uncontrolled burning
- b) Encroachment of the swamp and wildlife habitats
- c) Poor enforcement and compliance with EMCA section 42 and Wildlife Conservation Act 2013
- d) Prevalence of invasive species and lack of enforcement of regulation to prevent and control them

Operational objectives

- a) To promote restoration of degraded biodiversity sites within and around the swamp
- b) To promote wildlife conservation measures within and around the swamp
- c) To promote measures that prevent and control introduction and spread of invasive species

Table 6: Shows a summary of biodiversity management program

Management Objective: To Promote Conservation and Sustainable use of Biodiversity resources around the swamp		
Operational Objectives	Management Actions	Outputs/outcomes
To promote restoration of degraded biodiversity sites within and around the swamp Outcome: Restored biodiversity sites	Map and rehabilitate degraded habitats (swamp, surrounding areas)	Increased biodiversity (swamp acreage, flora, fauna)
	Enforce relevant biodiversity conservation laws and regulations	Improved awareness and compliance with biodiversity regulatory frameworks
	Raise awareness on importance of biodiversity in the swamp	Improved awareness on importance of biodiversity in the swamp
	Develop and implement alternative sources for products derived from the swamp resources e.g. fodder	Alternative sources for products derived from the swamp developed
	Empower youth and women to actively get involved in environmental conservation	Youth and women actively involved in conservation activities
To promote wildlife conservation measures within and around the swamp Outcome: Improved wildlife habitat within and around the swamp	Develop and update inventory for wildlife species	Inventory for wildlife species developed
	Enforce EMCA Act and Wildlife Conservation Act 2013	Improved compliance with legal and regulatory requirements
	Educate and create awareness on sustainable wildlife conservation	Adopted best wildlife conservation practices
	Map and secure wildlife migratory corridors from encroachment	Mapped and controlled migratory corridors
	Develop and implement human-wildlife conflict resolution mechanisms	Enhanced Human-wildlife conflict resolution mechanisms

Management Objective: To Promote Conservation and Sustainable use of Biodiversity resources around the swamp		
Operational Objectives	Management Actions	Outputs/outcomes
To promote measures that prevent and control introduction and spread of invasive species Outcome: Invasive species mitigated	Carry out survey on prevalence of invasive species in and around the swamp	Enhanced knowledge on invasive species
	Undertake research on socio-economic value of invasive species	Enhanced knowledge on invasive species
	Undertake invasive species control and management activities	Enhanced knowledge on invasive species

7.2 Land Resources Management Programme

Background/ Introduction

Laikipia county comprises of three main land use type categories/ ownerships namely private, public and community with the average private small-scale farm and large-scale farm size being 2 acres and 20 acres respectively. The total area occupied by ranches is about 1.5 million acres, which is more than 60% of the total county land mass. Ewaso Narok swamp is currently illegally occupied by approximately 100 households distributed all around the swamp and who depend on it for their daily livelihood activities. Moreover, the swamp is surrounded by five privately owned ranches with an estimated total acreage of 20,000. Wildlife conservation, agriculture and rearing of beef cattle are the major land uses within the catchment.

Management issues and challenges

- a) Unclear land tenure system
- b) Lack of land zonation which has led to competition for land by various interest groups
- c) Land acquired for Speculation, (absentee landlords)
- d) Over-grazing and unsustainable land use practices by pastoralists e.g burning of the wetland vegetation to encourage growth of palatable plant species

Operational Objectives

5. To promote sustainable land use practices
6. Promote sustainable land use management

7.3 Water Resources Management

Background

Water resources are enablers of socio-economic development. Water Resources Authority (WRA) is the lead agency in the management and regulation of water resources as per water Act 2016. This is undertaken through decentralized and participatory approach based on sub-catchment levels. Ewaso Narok swamp is located along Ewaso Narok River in Engare Narok Melghis (Rumuruti) sub region, within the larger Ewaso Ngiro North catchment area.

The plan should consider the following:

- The canals should be made fully functional to provide water for irrigation, livestock watering and domestic use thereby preventing encroachment into the wetland
- Water storage should be provided to meet the high demand for irrigation water, livestock

watering and domestic/ urban use particularly during the dry periods.

- The lower Ewaso Narok WRUA should be strengthened through capacity building and financial support to fulfill their mandate in water resource management and governance
- Introduce modern methods of monitoring river discharge, abstractions and quality testing, surface water quality and effluent discharge to the river. The trend nowadays is to install telemetric monitoring sensors and receive the data near real time at a central place since manual data collection introduces errors and is not always to required standard.
- Water abstraction from the mapped points should be updated and a plan prepared for water allocation. This would stem out water resources conflicts between users like farmers, pastoralists and the ecosystem.

Management Challenges

- Water Use conflicts
- Water scarcity
- Flooding
- WRUA has inadequate capacity (financial and human) in water resources management and governance
- Over abstraction of the water resources
- Lack of real-time monitoring of water resources
- Water Pollution
- Catchment degradation

Objectives

1. To promote catchment conservation and protection at the source of Pesi and Ewaso Narok rivers
2. To ensure sustainable availability of water for environmental and socio-economic needs in the sub catchment
3. To improve solid and effluent management along Ewaso Narok sub catchment
4. To strengthen the WRUA financial and knowledge capacity in water resource management and governance

7.4 Socio-economic Development Programme

Introduction

The socio-economic activities by the local communities, dependent on the swamp's natural resource and these include livestock keeping, horticulture and rain fed agriculture, tourism and eco-tourism. The conduct of these socio-economic activities has however not been without negative impact on the environment mainly through encroachment and degradation of key habitats. Social economic development such as road network is critical in management of ecosystems.

A study needs to be done to establish the extent of birds species that use the swamp as a migratory route and how they have been affected as they play a big part in tourism and ecotourism activities.

Management issues and challenges

1. High poverty and illiteracy levels
2. Unsustainable livelihood practices characterized by livestock over-stocking; slash and burn agriculture, charcoal burning and flood irrigation
3. Poor and inadequate infrastructure and social amenities (sewer system, limited access to potable water)
4. Cultural and indigenous differences
5. Gender inequality and inequity
6. Poor adoption of alternative livelihoods
7. Insecurity and resource use conflict
8. Potential threats from large scale economic development (municipality) activities

Operational objectives

- a) To protect the wetland and promote sustainable economic development and local livelihoods
- b) To integrate modern and indigenous knowledge in the management of the swamp
- c) To restore degraded biodiversity across the entire swamp ecosystem from upstream to downstream.

Table 7: Summary of management actions for Socio-economic development programme

Management objective: To promote equitable and sustainable socio-cultural and economic development		
Operational Objective	Management Actions	Outputs/outcomes
To protect the swamp and promote sustainable economic development and local livelihoods <i>Outcome:</i> Protected swamp Sustainable economic development and local livelihoods in the wetland area.	Support implementation of Ewaso Narok wetland integrated management plan	Improved socio-economic development in the wetland area.
	Promote good agricultural practices around the wetland and its environs (Livestock and crop production, fish)	Best agricultural practices widely adopted around the wetland.
	Diversify livelihood activities e.g. green houses productions, aquaculture, bee keeping, fodder production, ecotourism etc .	Diverse livelihood activities adopted by local communities
	Improve infrastructure to facilitate sustainable use of wetland resources	Improved access and use of wetland resources
	Promotion of small-scale entrepreneurship activities	Economically empowered communities
	Promote sustainable fishing practices	Improved incomes from better conserved fisheries

Management objective: To promote equitable and sustainable socio-cultural and economic development		
Operational Objective	Management Actions	Outputs/outcomes
Integrate modern and indigenous knowledge in the management of Ewaso Narok wetland <i>Outcome:</i> Indigenous knowledge mainstreamed in development and conservation in the wetland.	Document indigenous knowledge (IK) to assist in environmental planning and management processes	IK documented
	Establish community cultural centers	Community cultural centers established. Enhanced and peaceful co-existence of communities
	Identify sites	map sites
	Promote conservation of historical areas-	Document and protect areas
	Empower cultural institutions Laikipia cultural festival, camel caravan. Initiates save Ewaso Narok marathon to actively participate in environmental conservation.	Cultural institutions empowered and to actively participate in environmental conservation
To restore degraded biodiversity across the entire swamp ecosystem from upstream to downstream.	Conduct a survey to establish the extent of biodiversity degradation	Document on the status of the biodiversity across the wetland.
To promote measures that prevent and control introduction of invasive species.	Carry out a survey on the invasive species and their socio- economic values both positive and negative and ways of control and manage them.	The survey report to advice on utilization and management of the invasive species. Knowledge documented on invasive species.

7.5 Governance Improvement Programme

Governance issues around Ewaso Narok swamp remain unclear hence the main cause of environmental degradation evidenced by continued competition for the diminishing resources by different interest groups. For effective management of Ewaso Narok swamp, there is need to raise public awareness on the importance of the swamp resources and enhance capacity and coordination of work done by key agencies involved in wetlands management. Currently, the most mentioned visits are from the Provincial administration (chiefs/DO/DC/ police). The area has a water Resources Users Association (WRUA) but those who have settled or farm inside the swamp are not members of this WRUA. The governance management program aims at promoting specific actions with a view to ensuring effective management and sustainable utilization of Ewaso Narok swamp.

Management challenges

- a) Inadequate institutional capacity at the locale level to manage the swamp
- b) weak and uncoordinated enforcement of the law
- c) conflict and competition for swamp resources
- d) Inadequate knowledge and understanding of swamp ecosystem

Operational objectives

- a) To enhance institutional capacity for effective management of the swamp
- b) To enhance coordination of enforcement actions by relevant agencies
- c) To promote conflict management and resolution in and around the swamp
- d) To improve knowledge and understanding of the swamp through research and monitoring

Table 8: Summary of management actions to improve governance

Management objective: To improve governance in the management and conservation of Ewaso Narok swamp		
Operational Objective	Management Actions	Outputs
To enhance institutional capacity for effective management of the swamp Outcome: Effective management and conservation of the swamp Outcome: Improved compliance with existing legal frameworks	Capacity building for the local level management officials	Trainings for relevant county and local level units
	Undertake public awareness on the existing legal framework that govern wetlands management	Increased social accountability
	Lobby national and county government to allocate resources for the management of Ewaso Narok swamp	Allocation of financial resources to support conservation of Ewaso Narok swamp
	Strengthen enforcement of relevant regulatory frameworks	Increased compliance to relevant legal frameworks
	Recruit and train voluntary scouts for monitoring and surveillance	
To enhance coordination of enforcement actions by relevant agencies	To organize multi agency enforcement operations around the wetland	Reduced incidences of non-compliance
	Establish and build capacity of county environment committees and site committees for effective coordination of enforcement actions	Synergy and coordination among relevant players in enforcement actions
To promote conflict management and resolution in and around the swamp Outcome: Peaceful coexistence among swamp resource users	Map resource use conflict areas	Conflict hotspots mapped
	Establish/ strengthen conflict resolution committees	Conflict resolution committees in place
	Develop conflict early warning systems	Conflict early warning systems in place

Management objective: To improve governance in the management and conservation of Ewaso Narok swamp

Operational Objective	Management Actions	Outputs
To improve knowledge and understanding of the swamp through research and monitoring Outcome: enhanced knowledge and information management on Ewaso Narok swamp	Develop and implement research monitoring activities	Information generated used for adaptive management
	Develop and information management system for Ewaso Narok swamp	Swamp information depository developed
	Organize regular information and lessons sharing forums	Increased level of awareness on the status of the swamp
	Develop inventories and economic valuation of critical habitats around the swamp	Inventory and economic valuation of critical habitats done.

CHAPTER 8: MANAGEMENT PLAN IMPLEMENTATION FRAMEWORK

Table 9: Implementation framework for Ewaso Narok swamp

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
BIODIVERSITY MANAGEMENT PROGRAMME										
Operational Objective 1: To promote restoration of degraded biodiversity sites within and around the swamp										
Map degraded habitats (swamp, surrounding areas etc)	Mapping of degraded areas	Degraded areas mapped	Map of degraded sites	CGL, KWS, KFS, WRA NEMA, NGOs, CBOs, Communities	5	X	X	X	X	X
Rehabilitate degraded habitats (swamp, surrounding areas etc)	Planting of suitable seedlings within the catchment Fencing of the degraded site for restoration	Ha of restored areas Increased biodiversity (swamp cover, habitats etc.) Change in abundance of flora and fauna	Number of sites or hectares rehabilitated Acreage of degraded area fenced.	CGL, KWS, KFS, WRA NEMA, NGOs, CBOs, Communities	30	X	X	X	X	X
Enforce relevant biodiversity conservation laws and regulations	Undertake routine compliance monitoring Prosecute non-compliant entities/ parties Awareness on nvironmental laws/ regulation	Improved compliance with biodiversity regulations	Enforcement reports Number of prosecution cases Number of awareness meetings	KWS, NEMA, KFS, CGL, WRA	10	X	X	X	X	X
Raise awareness on importance of biodiversity in the swamp	Conduct awareness forums Prepare and disseminate awareness materials	Enhanced awareness on importance of biodiversity within the swamp	Awareness meetings/forums reports Number of people attending the meetings Number of TV/ Radio programmes aired	CGL, KWS, KFS, NMK, NEMA, NGOs, CBOs, Communities	15	X	X	X	X	X

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Develop and implement alternative sources for products derived from the swamp e.g. fodder	Identify and implement sustainable alternative sources for products from the swamp	Reduced pressure on the swamp resources	Number and type of sustainable alternative sources of products derived from swamp successfully developed Ewaso Narok swamp boundary map	CGL , NMK, Research agencies; NEMA, NGOs, CBOs, Communities	1	X	X	X	X	X
Operational Objective 2: To promote wildlife conservation measures within and around the swamp										
Develop and update inventory for biodiversity species	Undertake biodiversity surveys	Biodiversity inventory developed	Number of surveys undertaken.	KWS , NMK, CGL, NEMA, KFS, NGOs, , CBOs, Communities	20	X	X	X	X	X
Education and awareness on sustainable wildlife conservation	Conduct sensitization meetings Prepare and disseminate awareness materials Awareness using electronic media (TV, radio & Social media)	Adoption of best biodiversity conservation practices and methods	Monitoring reports Number of education & awareness meetings Number of people reached by awareness efforts	CGL , KWS, NGOs, CBOs, NEMA, Communities	10	X	X	X	X	X
Map and secure wildlife migratory corridors from encroachment	Mapping of wildlife migratory corridors Develop and implement measures to secure wildlife corridors from encroachment	Wildlife migratory corridors mapped and protected	Maps of wildlife migratory corridors Number of migratory corridors identified and secured	KWS , CGL, NGOs, CBOs, Communities	10	X	X	X	X	X

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Develop and implement human-wildlife conflict resolution mechanisms	Identify human-wildlife conflict hotspots	Hotspots identified	Number of conflicts	KWS, CGL, NGOs, CBOs, Communities.	20					
	Research on appropriate human-wildlife conflict resolution mechanism	Best conflict resolution mechanism developed				X	X	X	X	X
	Undertake pilot project(s) on researched conflict resolution mechanism	Pilot project implemented								
Operational Objective 3: To promote measures that prevent and control introduction and spread of invasive species										
Carry out survey on prevalence of invasive species within and around the swamp	Undertake survey on invasive species in and around the swamp	Enhanced understanding of invasive species in and around the swamp	Number and extent of invasive species documented	NMK, CGL NEMA, KWS, KFS, IUCN, Communities	2	X	X			
Undertake research on socio-economic value of invasive species	Undertake research on socio-economic value of invasive species	Knowledge on positive and negative value of invasive species understood	Survey reports	NMK, NEMA, KWS, CGL, NGOs, CBOs, KFS, Communities	5	X	X			
Undertake invasive species control and management activities	Undertake pilot invasive species control and management activities	Invasive species controlled and managed	% Decrease in acreage /types of invasive species	CGL, KWS, KFS, NMK, NEMA, NGOs, CBOs, Communities,	10		X	X	X	X
promote economic use of existing invasive species (e.g. Opuntia spp)	Explore and implement economic use of existing invasive species (eg Opuntia spp)	Economic uses of existing invasive species explored and implemented	Number of products developed/ adopted Implementation reports	CGL, KWS, NEMA, KFS, NGOs, private sector, Communities	10	X	X	X	X	X

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
LAND RESOURCES MANAGEMENT PROGRAMME										
Operational objective 1: To promote sustainable land use practices										
Build the capacity of local farmers/ pastoralists on sustainable resource use and good agricultural practices	Undertake capacity needs assessment on sustainable farming & pastoralism practices Train farmers on best farming practices Sensitize pastoralists on sustainable grazing plans	Good agriculture practices adopted widely in the area	Training needs assessment report. Number of farmers/ pastoralists trained on sustainable land use practices; monitoring reports	CGL, MoALF&C, NDMA, WRA KLMC, SNV, FAO, World Vision,	20	X	X	X	X	X
Develop and implement spatial plans for satellite urban areas around the swamp to ensure controlled development	Develop spatial plans for satellite urban areas Implement spatial plans for urban areas	Spatial plans satellite for urban areas developed and implemented	Number of urban areas with spatial plans; implementation reports	Rumuruti Municipality, CGL, NLC, MoLLP, NEMA	100			X	X	X
Adopt and develop community grazing plan systems and corridors to control livestock overgrazing	Adopt and develop grazing block systems and corridors to control livestock overgrazing Monitoring of the grazing plans implementation	Sustainable livestock farming practices in the area adopted	Number of grazing plans and corridors developed. Monitoring reports	CGL, MoALF&C NDMA, KLMC, SNV, World Vision, FAO,	20	X	X	X		
Mainstream traditional pastoral good practices in policies and development plans	Mainstream traditional methods in CIDP, ADP	Traditional methods of controlling overgrazing adopted	Number of traditional methods applied;	CGL - Lead MoALF&C, NDMA, KLMC, SNV, World Vision, NEMA	10	X	X	X	X	X
Promote livestock commercialization	Promote pasture farming and sale to ease grazing pressure on the swamp Promote feedlot	Improved income by pastoralists Reduced grazing pressure on swamps	Number of value addition initiatives started; number of feedlots or pasture farms established Socio- economic survey reports	CGL - Lead MoALF&C, NDMA, KLMC, SNV, World VISION	100	X	X	X	X	X

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Operational objective 2: Promote sustainable land use management										
Develop and implement Rumuruti spatial plan	Develop a spatial land use plan	Improved land use practices	Spatial plan developed	Rumuruti Municipal Board - Lead, CGL, MoLPP NLC, NEMA, World bank, FAO, CETRAD	30					
	Implement the spatial plan	Popular version of development control guidelines	Spatial plan implementation monitoring reports			X	X			
	Monitor and evaluate plan implementation process									
Improve tenure system	Document land ownership around the swamp	use by the local communities	Record of land tenure	Rumuruti Municipal Board - Lead, CGL, MoLPP NLC,	2	X	X			
WATER RESOURCES MANAGEMENT PROGRAMME										
Operational Objective 1. To promote catchment conservation and protection at the source of Pesi and Ewaso Narok rivers										
Promote catchment rehabilitation	Awareness creation	Increased vegetation cover	Number of awareness creation meetings held	KFS-Lead, NEMA, KWS, CGL, CGN, WRA, WRUA	40					
	Tree planting	Reduced floods	Number of trees planted			X	X	X	X	X
	Construct Soil and water conservation structures	Reduced soil erosion	Number of laid structures							
		Increased ground water recharge								
Promote Riparian Conservation	Awareness creation	Increased awareness on riparian conservation	Number of awareness creation meetings held	WRA-Lead, WRUA, KFS, NEMA, CGL, MoLLP	20					
	Participatory marking and pegging of riparian land	Riparian land pegged	Kilometers of Riparian land pegged			X	X	X	X	X
	Planting of suitable trees (fruit trees, cover crops, trees, fodder crops)	Increased vegetation cover in the riparian zone	Number of trees planted							

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Operational Objective 2: To ensure sustainable availability of water for environmental and socio-economic needs in the sub catchment										
Promote water harvesting and storage in the sub-catchment	Construct dams and pans for water storage Implement rainwater harvesting projects	Increased water availability	Number of dams and pan constructed Volumes of water harvested at the household level Number of water harvesting projects implemented.	CGL - Lead NWHSA; WRA, NEMA, ENNDA, Private sector, WSTF NWSB; Nyahuwasco	100	X	X	X	X	X
Promote real-time water resources monitoring	Automate existing water monitoring stations	Improved quality of data on water levels and discharge	Number of automated stations	WRA-Lead, CETRAD, WRUA,	20	X	X	X	X	X
Enhance water quality monitoring in the sub-catchments	Identify water quality sampling points Carryout water quality analysis Report on the results of the water quality analysis	Water quality sampling points identified Documentation of water quality status in the two sub-catchments	Number of sampling points identified Number of quarterly water quality reports	WRA-Lead, WRUAs, NEMA, CGL	30	X	X	X	X	X
Promote flood control measures in the sub-catchment	Construct dams and pans for water storage Promote soil and water conservation practices	Improved water storage Reduced flooding Reduced soil erosion	Number of dams and pans constructed Number of kilometers of structures done for soil and water conservation	CCL&CGN-Lead, MoALF&C, WRA, WRUA	1,000	X	X	X	X	X

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Operational Objective 3: To improve solid and effluent management along Ewaso Narok sub catchment										
Ensure all discharges are within the required quality standards	Undertake regular pollution assessment	Updated data on pollution	Number of pollution survey reports	NEMA-Lead, WRA, WRUA, CGL, CGN & Rumuruti Board,	20	X				
	Enforce compliance of existing regulations	Improved compliance to existing regulations	Number of enforcement campaigns carried out							
			Degree of water quality							
Develop water allocation plans for the sub catchments	Mobilize and create awareness of stakeholders and water users	Updated water abstraction and pollution survey for Ewaso Narok sub catchment	Number of awareness meetings held	WRA-Lead, WRUAs, CGL, CETRAD	50	X	X			
	Carry out water abstraction and pollution survey for Pesi sub catchment	Pesi water abstraction and pollution survey developed	Number of stakeholders and water users involved							
	Update Ewaso Narok sub catchment water abstraction and pollution survey	Water allocation plans for Pesi and Ewaso Narok Rivers developed	No of water allocation plans developed							
Capacity build the WRUA on Water resources management	Mobilise and train the WRUA on water resources management and governance	Improved WRUA knowledge in water resources management and governance	Number of WRUA members trained Number of trainings held	WRA-Lead, WRUA, CETRAD, NGOs, CGL, CGL	15	X	X	X	X	X
Support the WRUA in Resource Mobilization	Mobilize and train the WRUA on resource mobilization -Support the WRUA in development of resource mobilization strategies Link the WRUA to donors and other possible sources of finance	Improved resources availability	Number of WRUA members trained Number of trainings held Percentage of increase in resources mobilized	WRA-Lead, WRUA, CETRAD, NGOs, CGL, CGN, W STF,	10	X	X			

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
SOCIO ECONOMIC AND CULTURAL DEVELOPMENT										
Operational Objective 1: To protect the wetland and promote sustainable economic development and local livelihoods										
Promote good agricultural practices in and around the swamp (Crops, Livestock, and fisheries production)	Organize exhibitions/ demonstrations on good agricultural practices	Good agricultural practices (GAPs) widely adopted around the swamp	Acreage under GAPs	CGL-Lead, Kenya prison NEMA, IMPACT, Groots Kenya, NGOs NDMA; private sector.	350	X	X	X	X	X
	Undertake pilot projects on good agricultural practices		Percentage Increase in income							
	Enhance Capacity building & awareness		Number of farmers engaged in GAPS							
Promote climate smart agriculture technologies	Establish efficient irrigation methods.	Increased Adoption of efficient irrigation systems	Percentage Increase in water flow downstream	CGL-Lead, MoALF&C KFS, NEMA, KWS, NGOs, private sector, CBOs, NDMA, CETRAD, CFAs, MET ; WRUA	50	X	X	X	X	X
	Enhance Conservation agriculture		Percentage Increase in yields							
	Adopt use of Green houses in production	Increased uptake of conservation agriculture.	Percentage Increase in income							
	Enhance Agroforestry	High value fruit trees	Reduced water use conflicts							
	Enhance Capacity building, creating incentive mechanisms & awareness									
Diversify livelihood activities (poultry rearing, feedlots, aquaculture, apiculture, & ecotourism,) etc.	Undertake a study on alternative livelihoods	Diversified livelihood activities adopted by local communities	Report on alternative livelihoods	CGL-Lead, NGOS, Kenya prisons, financial institutions, CETRAD, KARI ; KARLO	120	X	X			
	Implement survey findings on livelihood alternatives		Percent increase in income							
			Improved resilience							

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Improve infrastructure to facilitate sustainable use of swamp resources	Establish a canal management committee	Increased access and use of swamp resources	Number of Canal management committee established	CGL-Lead, KeRRA, WRA NEMA, Private sector, NGOs, ENNDA, NYS, KWS, NYAHUWASCO, Municipality	300					
	Enhance swamp accessibility	Properly maintained Roads/bridges/ canals	Number of existing functional canal Number of all-weather feeder roads t swamp constructed/ rehabilitated			X	X			
Promote sustainable fish production systems	Awareness creation on sustainable fisheries	Increase in fish production	Number of fish farms/fish ponds constructed	CGL-Lead, NGOS, private sector ; CBOs	100					
	Improve fisheries value chain	Improved income from fish production.	Percentage increase in income				X	X	X	
Promote sustainable Ecotourism	Identify and document suitable attraction ecotourism and cultural sites.	Mapped and documented sites	No. of mapped and documented sites.	CGL-Lead, NMK, NEMA, MoT&W; MoSC&H; NGOs	100					
	Publicize the identified sites.	Increased number of tourists visits to the swamp	Number of publications done.					X	X	X
	Establish tourism infrastructure		Number of tourists visiting the sites							
Promotion of Small and Medium scale entrepreneurship activities	Create awareness on the potential enterprises	Increased uptake of available enterprise fund	Percent Increase in the amount of cash disbursed	CGL-Lead, NGOs, Private sector; Financial institutions	200					
	Implement potential SMEs	Growth of SMEs in numbers and turnover	Percent increase in number of SMEs							
	Linking SMEs with financial institutions for credit and market	Increased income and capital	Percentage increase in income and capital			X	X	X	X	X
	Enhance accessibility to the enterprise fund									

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Promote community cultural center in/ around the swamp	Establish community cultural center and museum Organize annual cultural festival	Community cultural center and museum established	Number of communities cultural centers and museums established	CGL-Lead, NMK, KWS, NEMA, Municipality, MoSC&H; NGOs; private sector,	15	X	X			
To promote measures that prevent and control introduction of invasive species.	Carry out a survey on the invasive species and their socio-economic values both positive and negative and ways of control and manage them.	The survey report to advice on utilization and management of the invasive species. Knowledge documented on invasive species.	Number of invasive species identified. Number of survey reports Management plan of these invasive species	CGL-Lead, MRC NEMA, MoALF, CABI, KEFRI, NGOs and Private Sector	20	X	X	X		
GOVERNANCE IMPROVEMENT PROGRAMME										
Operational Objective 1: To Enhance institutional capacity for effective management of the swamp										
Conduct institutional capacity needs assessment	the institutions and stakeholders relevant in the management of the swamp Conduct a SWOT analysis of the existing (relevant) governance institutions	A matrix of relevant institutions and stakeholders SWOT analysis report and capacity development implementation plan formulated	Number of relevant institutions and stakeholders documented SWOT analysis report and apacity development implementation plan	CGL-Lead, KWS; WRA; NGO; CBOs	1		X			
Establish a swamp management coordination committee	Conduct consultation meetings for the formation of the coordination committee constitute area representatives Establish a co-management framework	Swamp management coordination committee established	Number of committees formed	CGL-Lead, KWS; WRA; NGOs; CBOs; NEMA	2	X	X			

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Establish site/ area management committees	Hold consultation meetings around the swamp	Committees formed	Number of consultation meetings held	CGL-Lead, NGAO; NEMA; WRUAs; CBOs; NGOs	15			X		
	Constitute site/area committees									
Build capacity of the relevant local swamp management institutions	Enhance Capacity of swamp coordination and site/area committees on governance	Training on swamp governance conducted	No. of swamp coordination and site/area committees trained	CGL-Lead, NEMA; WRA; WRUAs; KWS; KFS; KeFS; CFA	3	X	X	X		
	Create awareness for County Environment Committee (CEC)	CEC sensitized on the importance of the swamp	Number of trainings							
Operational Objective 2: To enhance compliance and enforcement in and around the swamp										
Strengthen enforcement of regulatory frameworks for management of the swamp	Establish a compliance and enforcement network amongst regulators	Compliance network formed	Number of compliance network established	NEMA-Lead, CGL, KFS, KWTA, WRA, KWS, WRUAs, NGOs,	15					
	Invoke and enforce provision within the relevant laws	Improvement orders issued	Number of improvement orders issued							
	Staff deployment by relevant agencies	Revitalized regulatory institutions	Number of staff deployed			X	X	X	X	X
	Recruit voluntary community scouts for monitoring/ surveillance	Improved compliance with legal and regulatory requirements	Number of voluntary community scouts recruited							
Conduct public education on the existing NRM regulatory frameworks	Undertake continuous public education on the importance of swamp conservation	Improved conservation and sustainable use of the swamp resources	Number of public education meetings held	GCL-Lead, NEMA, KWS, WRA, KFS, NGOs, CBOs	3					
	Increased social accountability	Number of Meeting reports	X			X	X	X	X	
		Percentage reduction in noncompliance cases								

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Operational Objective 3: To Improve Knowledge And Understanding Of Ewaso Narok Swamp Through Research And Monitoring										
Establish and operationalize scientific committee for Ewaso Narok	Map relevant institutions that will constitute the scientific committee for Ewaso Narok	A functional scientific committee in place	Number of scientific committees formed Number of meetings held	CGL-Lead, CETRAD, KWS, NEMA, NMK, KEFRI, NGOs, Universities and research institutions, CBOs	1		X	X		
Promote participatory research and monitoring for adaptive management	Undertake and implement participatory research and monitoring activities for adaptive management	Adaptive and sustainable management of Ewaso Narok swamp	Number of Research studies and Monitoring reports	CGL-Lead, CETRAD, KWS, NEMA, NMK, KEFRI, NGOs, Universities and research institutions, CBOs	20	X	X	X	X	X
Develop a baseline map for monitoring habitat change	Prepare a baseline map for monitoring habitats for endemic/ endangered and sensitive species	Improved monitoring of habitat changes	Number of Baseline maps and reports for monitoring habitat change	CGL-Lead, NMK, CETRAD, DRSSRS, NEMA, KWS, KFS, KSA, NGOs, CBOs, Universities and Research institutions	5	X	X			
Conduct inventories and economic valuation of the swamp	Prepare inventories and economic valuation of the swamp	Improved knowledge on economic value of the swamp	Number of economic valuation studies	CGL-Lead, NEMA, NMK KFS, KWS, NGOs, CBOs	10	X	X			
Develop an information management system for Ewaso Narok swamp	Establish a GIS based information management system for Ewaso Narok swamp	A functional Information Management System for Ewaso Narok swamp established	Number of Information Management Systems for Ewaso Narok swamp developed	CGL-Lead, NEMA, NMK, Research Institutions, Scientific Committee,	50	X	X			

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Information dissemination on Ewaso Narok swamp	Organize conferences, workshops, seminars for shared learning	Improved knowledge base on Ewaso Narok swamp	Number of Workshops/ conferences held	CGL-Lead, WRA, NEMA, Research and Universities Institutions, Media, NGOs, private sector, CBO,	5					
	Develop policy and information briefs		Number of policy and information briefs disseminated					X	X	X

Operational Objective 4: To enhance communication, education and public participation and awareness

Conduct education and awareness campaigns on importance of the swamp at all levels	undertake sensitization forums	Improved level of awareness and social accountability in conserving the swamp	Number of outreach forums held	CGL-Lead, NEMA, NGOs, private sector, CBOs	20					
	Prepare and disseminate awareness materials		Number of people reached							
	Implement an environmental award scheme to recognize best practices		Number of awareness materials disseminated			X	X	X	X	X
			Number of awareness campaign conducted							
			Number of environmental award							

Activity	Sub-activity	Expected Output/ outcome	Performance/ M&E Indicators	Actors	Budget (KSh) M	Timeframe (years)				
						1-2	3-4	5-6	7-8	9-10
Operational Objective 5: To promote conflict and dispute management and resolution in the swamp										
Promote conflict and dispute early warning systems and resolution mechanisms	Develop and implement conflict early warning systems	Peaceful co-existence by communities and resource users	Number of Early warning systems in place;	CGL-Lead, NGAOs, NEMA, NLC, Judiciary, MoLPP, KFS, KeFS, NMK, NGOs, CBOs, site committee, swamp management and coordination committee	5	X	X	X	X	
	Develop and implement conflict/ dispute resolution mechanisms e.g. AJS including ADR & TDR	Peaceful co-existence by communities and resource users; reduced conflicts/disputes	Number of disputes/conflicts reported							
	Establish Grievance Redress Mechanism (GRM) in the swamp		Number of Conflict resolution/AJS mechanisms in place							
	Strengthen access and benefit sharing scheme for the swamp resources		% decrease in number of cases of conflicts/disputes							
Gazettement of the Ewaso Narok swamp	Map and gazette the swamp boundary	Clearly demarcated Swamp boundary	Gazette notice of the Ewaso Narok swamp	NEMA -Lead, CGL, FAO, NLC, WRA, KWTA, MoLPP, CETRAD,	5	X	X			

CHAPTER 9: MONITORING AND EVALUATION

Monitoring the implementation of the Ewaso Narok swamp Integrated Management Plan will be necessary in order to assess whether or not program objectives are being achieved and what adjustments are needed to ensure that objectives are achieved. M a& E will be utilized to build an information base and identify critical gaps.it help identify attributes of the resource’s threats, mitigation measures as well as identify the baseline conditions and emerging issues and guide budget estimations and allocation.

The effectiveness and sustainability of a monitoring and evaluation plan is dependent on the following conditions:

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

Table 10: Monitoring and Evaluation framework

Management objectives	Performance indicator	Means of verification	Risks and assumptions
To promote sustainable economic development and local livelihoods	Improved wellbeing of the community eg income, employment, etc Reduced conflict over resources	Livelihood assessment report Human development index Mortality and morbidity rates and incidences	The ecosystem can support and sustain the existing and upcoming developments All developments are environmental and socially acceptable
To promote protection of the swamp as an ecologically sensitive area.	Acreage of degraded area restored Increase in proportion of habitat and species Biodiversity index for flora and fauna Voluntary compliance with laws policies and regulations	Project reports	Political instability Lack funds Noncompliance by resource users Emergence of development

Management objectives	Performance indicator	Means of verification	Risks and assumptions
To promote sustainable land use practices	<p>Ewaso Narok Land use plan developed and implemented</p> <p>County government spatial plan developed and implemented</p> <p>Number of good land use practices and technologies adopted</p>	<p>Land use report</p> <p>County government spatial plan</p>	<p>Incomplete county spatial plans</p> <p>Conflicting policies</p> <p>Resource users will comply with the land use plans</p>
To improve governance in the management of the swamp	<p>Types of institutions setup to govern and manage the swamp</p> <p>Type of existing and or formulated policies, laws and regulations to manage the swamp</p> <p>Ewaso narok swmap management framework implemented</p> <p>Participation and representation of al stakeholders in decision making</p> <p>Number of stskeholders that utilize the actionable information and skills taught</p>	<p>Institutional reports</p> <p>Management committee reports</p> <p>Number of training reports</p> <p>Awareness campaign records</p> <p>Resource users awareness survey</p>	<p>The management institution have adequate capacity to over see socio economic development.</p> <p>Uncoordinate defforts on the stakeholders involved</p> <p>There will be positive receptiveness from resource users</p> <p>Lack of funds</p> <p>There is capacity to govern and manage the swamp resources</p> <p>Stakeholder willingness</p> <p>Political will</p>

REFERENCES

- FAO (2015)** Forest and Farm Facility Baseline Study Report for Laikipia County, Food And Agriculture Organization of the United Nations
- Government of Kenya (2010)** National Climate Change Response Strategy. Ministry of Environment and Mineral Resources, Nairobi.
- Kenya Bird Map** (http://kenyabirdmap.adu.org.za/coverage.php#menu_top) 9x9 km grid,
- Macharia J, Oyieke H, Becker M, Möselers B, Warui C, Alvarez M, Mwangi E (2017)**. A checklist of invertebrates of Ewaso Narok swamp in the semi-arid Laikipia County, Kenya. Version 1.4. National Museums of Kenya. Checklist dataset <https://doi.org/10.15468/ftig5v> accessed via GBIF.org on 2020-10-06.
- Thenya T,(2001)** challenges of conservation of dryland shallow waters, Ewaso Narok Swamp, Laikipia District Kenya, *Hydrobiologia* 458, pages 107–119(2001)
- Wanyoike Wamiti, Philista Malaki, Kamau Kimani, Nicodemus Nalinya, Chege Kariuki and Lawrence Wagura, (2010)**. The birds of Uaso Narok Forest Reserve, Central Kenya. *Scopus* 30: 12–25.

ANNEX

ANNEX 1: Checklist of Plants found in Ewaso Narok swamp

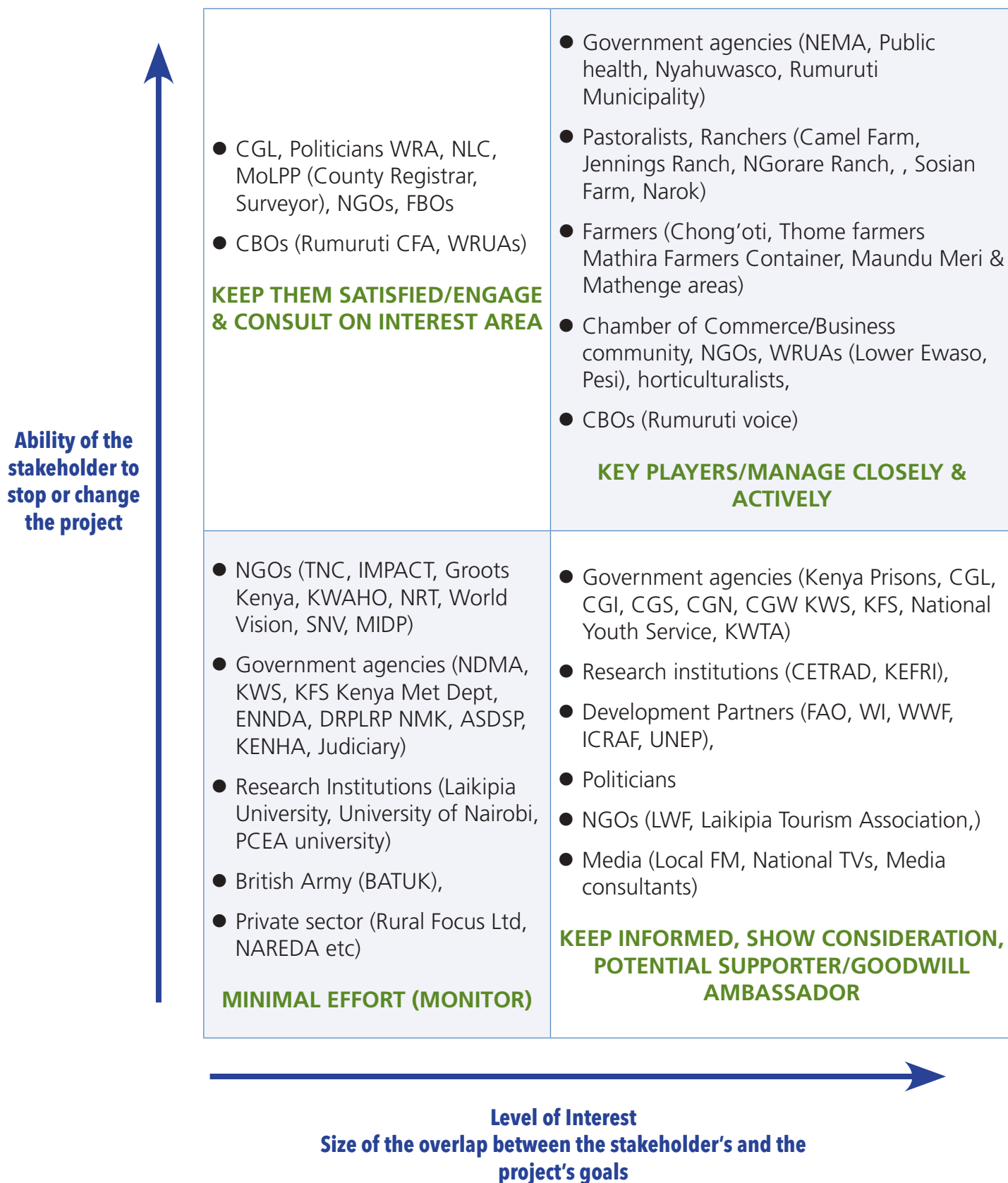
Family	Scientific name	Lifeform
Acanthaceae	Dyschoriste nagchana (Nees) Benn.	H
Acanthaceae	Hygrophila schulli (Buch.-Ham) M.R.Almeida	H
Acanthaceae	Justicia anselliana (Nees) T.Anders	H
Aloaceae	Aloe sp.	S
Amaranthaceae	Achyranthes aspera L.	H
Amaranthaceae	Alternanthera sessilis (L.) DC.	H
Amaranthaceae	Amaranthus hybridus L.	H
Amaryllidaceae	Allium sativum L.	H
Anacardiaceae	Searsia natalensis (Bernh. ex C.Krauss) F.A.Barkley	S
Apiaceae	Cyclospermum leptophyllum (Pers.) Sprague ex Britton & P. Wilson	H
Apocynaceae	Carissa spinarum L.	S
Apocynaceae	Gomphocarpus semilunatus A.Rich	S
Apocynaceae	Marsdenia sp.	C
Asparagaceae	Asparagus africanus Lam.	C
Asparagaceae	Guizotia sp.	H
Balanitaceae	Balanites aegyptiaca (L.) Delile	T
Basellaceae	Basella alba L.	C
Brassicaceae	Crassula granvikii Mildbr.	H
Brassicaceae	Lepidium bonariense L.	H
Brassicaceae	Nasturtium officinale R.Br.	H
Brassicaceae	Rorippa palustris (L) Besser	H
Cactaceae	Opuntia exaltata A. Berger.	H
Cactaceae	Opuntia ficus-indica (L.) Mill.	S
Caesalpiniaceae	Caesalpinia decapetala (Roth) Alston	C
Casuarinaceae	Casuarina equisetifolia L.	T
Celastraceae	Gymnosporia arbutifolia (Hochst. ex A. Rich.) Loes.	S
Celastraceae	Maytenus arbutifolia (A.Rich.) Wilczek	S
Commelinaceae	Commelina diffusa Burm.f.	H
Commelinaceae	Commelina sp.	H
Commelinaceae	Commelina subulata Roth	H
Compositae	Acmella caulirhiza Delile	H
Compositae	Ageratum conyzoides (L.) L	H
Compositae	Bidens pilosa L.	H
Compositae	Cirsium vulgare (Savi) Ten.	H
Compositae	Cotula sp.	H
Compositae	Crassocephalum vitellinum (Benth.) S.Moore	H
Compositae	Erigeron bonariensis L.	H
Compositae	Galinsoga parviflora Cav.	H
Compositae	Galinsoga quadriradiata Ruiz & Pav.	H

Family	Scientific name	Lifeform
Compositae	Laphangium luteoalbum (L.) Tzvelev	H
Compositae	Melanthera scandens (Schumach. & Thonn.) Roberty	H
Compositae	Micractis bojeri DC.	H
Compositae	Schkuhria pinnata (Lam.) Kuntze ex Thell.	H
Compositae	Sonchus asper (L.) Hill	H
Compositae	Sphaeranthus sp.	H
Compositae	Sphaeranthus steetzii Oliv. & Hiern.	H
Compositae	Sphaeranthus suaveolens (Forssk.) DC.	H
Compositae	Targetes minuta L.	H
Compositae	Tripteris vaillantii Decne	H
Compositae	Xanthium strumarium L.	H
Convolvulaceae	Ipomoea cairica (L.) Sweet	C
Crassulaceae	Kalanchoe lanceolata (Forssk.) Pers.	H
Cucurbitaceae	Cucumis ficifolius A. Rich.	H
Cucurbitaceae	Zehneria scabra Sond.	C
Cyperaceae	Courtoisina assimilis (Steud.) Maquet	H
Cyperaceae	Cyperus dichrostachyus Hochst. ex A.Rich.	H
Cyperaceae	Cyperus exaltatus Retz.	H
Cyperaceae	Cyperus latifolius Poir	H
Cyperaceae	Cyperus papyrus L.	H
Cyperaceae	Cyperus rigidifolius Steud.	H
Cyperaceae	Cyperus rotundus L.	H
Cyperaceae	Cyperus sp.	H
Cyperaceae	Eleocharis marginulata Hochst. ex Steud.	H
Cyperaceae	Pycreus elegantulus (Steud.) C.B.Clarke	H
Cyperaceae	Pycreus sp.	H
Cyperaceae	Schoenoplectus corymbosus (Roth ex Roem. & Schult.) J.Raynal	H
Ebenaceae	Euclea divinorum Hiern	S
Euphorbiaceae	Croton dichogamus Pax	S
Euphorbiaceae	Euphorbia inaequilatera Sond.	H
Euphorbiaceae	Phyllanthus sepialis Müll. Arg.	S
Euphorbiaceae	Ricinus communis L.	S
Flacourtiaceae	Dovyalis caffra (Hook. f. & Harv.) Hook. f.	S
Lamiaceae	Leonotis nepetifolia (L.) R. Br.	H
Lamiaceae	Leucas glabrata (Vahl) Sm.	H
Lamiaceae	Mentha aquatica L.	H
Lythraceae	Ammannia auriculata Willd.	H
Lythraceae	Lythrum rotundifolium A.Rich.	H
Malvaceae	Abutilon mauritianum (Jacq.) Medik.	H
Malvaceae	Pavonia patens (Andrews) Chiov.	S
Malvaceae	Sida schimperiana Hochst. ex A.Rich.	H
Malvaceae	Triumfetta tomentosa Bojer	S
Marsileaceae	Marsilea sp.	H
Mimosaceae	Acacia drepanolobium Harms ex Y. Sjöstedt	S
Mimosaceae	Acacia nilotica (L.) Willd. ex Delile	S
Mimosaceae	Acacia xanthophloea Benth.	T

Family	Scientific name	Lifeform
Mimosaceae	Aeschynomene schimperii A.Rich.	S
Molluginaceae	Glinus lotoides L.	H
Myrtaceae	Eucalyptus sp.	T
Oleaceae	Jasminum fluminense Vell.	C
Onagraceae	Ludwigia abyssinica	S
Onagraceae	Ludwigia stolonifera (Guill. and Perr) Raven	H
Oxalidaceae	Oxalis comiculata L.	H
Papilionaceae	Alysicarpus glumaceus (Vahl) DC.	
Papilionaceae	Crotalaria sp.	S
Papilionaceae	Crotalaria incana L.	H
Papilionaceae	Indigofera sp.	H
Papilionaceae	Senna didymobotrya (Fresen.) H S Irwin & Barneby	S
Papilionaceae	Sesbania sesban (L.) Merr.	S
Papilionaceae	Trifolium rueppellianum Fresen.	H
Papilionaceae	Trifolium semipilosum Fresen.	H
Papilionaceae	Trifolium sp.	H
Papilionaceae	Vigna luteola (Jacq.) Benth.	C
Papilionaceae	Vigna vexillata (L.) A. Rich.	H
Poaceae	Brachiaria sp.	H
Poaceae	Cynodon dactylon (L.) Pers.	H
Poaceae	Cynodon nlemfuensis Vanderyst	H
Poaceae	Digitaria abyssinica (A.Rich.) Stapf	H
Poaceae	Echinochloa colona (L.) Link	H
Poaceae	Echinochloa haploclada (Stapf) Stapf	H
Poaceae	Echinochloa pyramidalis (Lam.) Hitchc. & Chase	H
Poaceae	Eleusine indica (L.) Gaertn.	H
Poaceae	Eragrostis exasperata Peter	H
Poaceae	Eragrostis patula (Kunth) Steud	H
Poaceae	Eragrostis sp.	H
Poaceae	Eriochloa fatmensis (Hochst. & Steud.) Clayton	H
Poaceae	Leersia hexandra Sw.	H
Poaceae	Paspalum scrobiculatum L.	H
Poaceae	Paspalum sp.	H
Poaceae	Paspalum sp. 1	H
Poaceae	Pennisetum clandestinum Hochst. ex Chiov.	H
Poaceae	Pennisetum sp.	H
Poaceae	Setaria pumila (Poir.) Roem. & Schult.	H
Poaceae	Sorghum arundinaceum (Desv.) Stapf	H
Poaceae	Sporobolus pyramidalis Beauv.	H
Polygonaceae	Oxygonum sinuatum (Meisn.) Dammer	H
Polygonaceae	Polygonum salicifolium Willd.	H
Polygonaceae	Polygonum senegalense Meisn.	H
Polygonaceae	Polygonum setosulum A. Rich	H
Polygonaceae	Rumex steudelii Hochst. ex A.Rich.	H
Portulacaceae	Portulaca oleracea L.	H
Proteaceae	Grevillea robusta A.Cunn. ex R.Br.	T

Family	Scientific name	Lifeform
Ranunculaceae	Ranunculus multifidus Forssk.	H
Rhamnaceae	Scutia myrtina (Burm.f.) Kurz	H
Rhamnaceae	Ziziphus abyssinica Hochst.	S
Rosaceae	Rubus niveus Thunb.	S
Salviniaceae	Azolla filiculoides Lam.	H
Salviniaceae	Azolla nilotica Mett.	H
Scrophulariaceae	Veronica anagallis-aquatica L.	H
Solanaceae	Datura stramonium L.	H
Solanaceae	Ipomoea cairica (L.) Sweet	C
Solanaceae	Physalis peruviana L.	H
Solanaceae	Solanum anguivi Lam.	H
Solanaceae	Solanum campylacanthum A. Rich.	S
Solanaceae	Solanum nigrum L.	H
Solanaceae	Solanum villosum Miller	H
Tiliaceae	Grewia similis K.Schum.	S
Typhaceae	Typha domingensis Pers.	H
Verbenaceae	Verbena bonariensis L.	H

Annex 2. Power-Interest Matrix of Ewaso Narok Swamp





ISBN 978-9914-9940-9-4

FOR FURTHER INFORMATION PLEASE CONTACT:

The Director General

National Environment Management Authority

Popo Road, off Mombasa Road, P.O, Box 67839-00200, Nairobi, Kenya

Tel: +254 (20) 605522/2101370; Fax: +254 (20) 608997;

Mobile: +254 (0)7350102 7 or +254 (0)724253398

E-mail: dgnema@nema.go.ke,

Website: www.nema.go.ke